Результати дослідження. *Інформаційно-комунікаційні технології сприяють поширенню інформації, обговоренню політичних питань, широкій демократичній участі окремих осіб і груп, більшій прозорості та підзвітності демократичних інституцій і процесів, залучають громадян у спосіб, що приносить користь демократії та суспільству. Важливо пам'ятати, що для електронної демократії первинною є демократія, тоді як суть електронного урядування полягає у використанні ІКТ для оптимізації взаємодії органів державної влади та надання адміністративних послуг споживачам.*

Висновки*. Концепцію електронної держави слід розглядати не як технократичний проєкт, а як проєкт, спрямований на подальший розвиток принципів демократії, в якому електронні технології спрямовані на якнайповнішу реалізацію цих принципів. Електронну державу неможливо звести лише до процесів цифровізації державних та комунальних послуг – це лише одна з форм взаємодії органів державної влади та громадян, громадянського суспільства.*

Ключові слова: держава, інститути громадянського суспільства, інформаційно-комунікаційні технології (ІКТ), цифрова реальність, публічна влада.

UDC 007.2:005]:657.6
JEL Classification M42
DOI: http://doi.org/10.31617/visnik.knute.2021(140)05

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PROCEDURAL AND ACCOUNTING TRANSFORMATION AS AN IMPERATIVE STAGE OF DIGITAL AUDIT

The greatest success is achieved by the one
who has the best information
Benjamin Disraeli

The current state and prospects of digital audit implementation are studied. The content and specifics of the process of accounting transformation, its stages, features of implementation in terms of exchange of large arrays of information are highlighted. The main problems that create microprocesses of manual accounting and administration in the framework of outdated methods of transmission of accounting data are revealed. It is proved that the implemented automation of microprocesses, starting from the level of information exchange, is the primary but imperative stage of the transition to digital audit.

Keywords: audit, digital audit, accounting, transformation, Big data, Big 4.

Background. The transformation of digital audit is a gradual, evolutionary transition from the traditional performance of audit procedures to a comprehensive analysis and evaluation of relevant information using software that allows you to visualize the necessary data. It is on the basis of visualized information that the auditor identifies problematic, high-risk, dangerous areas of accounting and information support of the entity and performs a set of actions in accordance with International Standards for Quality Control, Auditing, Review, Other Assurance and Related Services of the International Federation of Accountants and Methodology of Auditing firms [1].

Modern implementation of audit procedures in practice is carried out in Microsoft Office software (Excel, Word, PowerPoint, Access, etc.). Like any other MS Office software, it has its own clearly defined limitations. Modern auditing is characterized by a significant, much larger quantitative increase in the amount of information that requires appropriate changes in the methods of its processing. The concept of digital audit provides for the procedural support of the auditor in a rapid (with a different order of numbers) growth of accounting information: such an increase in information will occur from 33 zetabytes* in 2018 to estimated 175 zetabytes in 2025 [2], i.e. 5.3 times. For example, research by the SAAS Scout portal shows that the basis for information growth is the online segment (*Figure 1*).

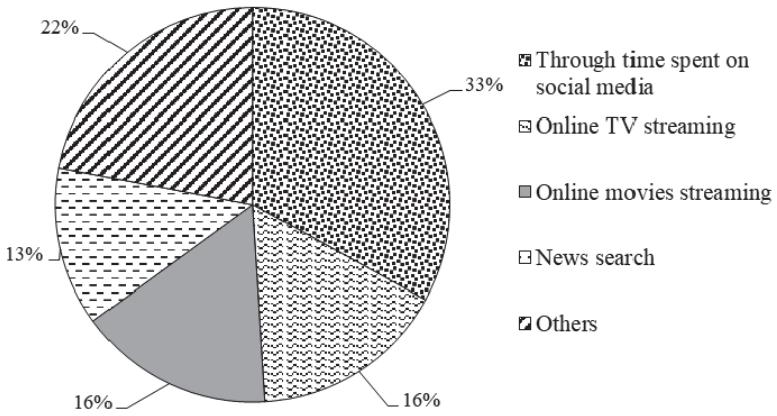

Figure 1. The reasons for the growth of Big data in the economy

Source: compiled by the authors on the basis of [3].

The increase in the amount of non-financial information in all categories leads to an increase in the amount of financial accounting data both in general and at the level of microtransactions. If in the past decades the phenomenon was unique to banks, now a comparable amount of credentials

* *zetabyte = 1024 exabytes, 1 exabyte = 1024 petabytes, 1 petabyte = 1024 terabytes. 175 zetabytes = ~ 188 billion terabytes*

is transferred to non-banking institutions, as the number of accounts, accounts, bonus programs, zones and types of monetization on streaming services, etc. increases. All such non-financial innovations are reflected in the accounting systems and data tested by auditors.

From the auditor's point of view, all segments, except "Other" (see *Figure 1*), form the basis for billing systems, which include audit procedures and IT control testing procedures, and financial accounting data are included in the "Other" category, which is 22 % of the total growth of Big data.

These trends in practice form a significant problem, which significantly reduces the key indicator of the audit – its quality. Due to the progressive increase in the amount of information during the audit procedures in this traditional software package, the effectiveness of the work of a particular auditor, and, consequently, the audit in general, is gradually decreesing. The efficiency and quality of the audit directly depends on the procedural optimization of processes. For example, one MS Excel sheet contains 1 048 576 rows. This clearly limits the amount of information on a single sheet. According to these restrictions, it is logical to place information on the second, third and subsequent sheets. This approach can be used in cases where the client of the audit company provides information in the amount of 5-6 million lines. Despite the large volume of one excel file, in the future it can be actively used, in particular, to transfer via MS Outlook, process and more. At the same time, in cases where a larger amount of information is provided, it is no longer possible to use this software, which creates the problem of choosing other programs for receiving and processing data.

It is important to emphasize that companies that meet the criteria of "large", and especially those whose activities are in the public interest, in accordance with the amendments to the Law of Ukraine "On Accounting" [4], must order *a mandatory audit*. Such companies can generate an extremely large amount of accounting information – Big data. This can be seen, for example, by analyzing the EY Transparency Report for 2018-2019 in Ukraine [5; 6], including information on large companies that have ordered audit services from EY. According to the latest trends of the world and national economies, such companies are in the focus of interest of information users and, as a result, auditors. Exclusively from this list, the companies that can generate large amounts of data should include banks, JSC "Ukrainian Railways", PJSC "Ukrtelecom", PJSC "Concern Galnaftogaz" and others. These are usually business entities whose activities are in the public interest – and they produce a large amount of accounting data. Thus, JSC "Ukrainian Railways" daily sells a set of services related to the transportation of goods and passengers, PJSC "Ukrtelecom", which provides communication services, has a billing system to account for the package of services, and PJSC "Concern Galnaftogaz" (petrol stations OKKO) sells fuel and related products to retailers on a daily basis, which is equivalent to retail. Based on the nature

of the business of these companies, accounting for inventory, cost, revenue, taxes can number in the tens of millions of lines, so the total database (journal or other data register), depending on the company's accounting system, may consist of 100 and more than a million lines.

Considering the above arguments, audit firms are forced to look for alternative methods of receiving information, accounting and database processing, which allows to clearly identify the problem that requires appropriate research: finding the optimal combination of new software and human resources to perform audit procedures and methods of accounting for documents and customer information.

Analysis of recent research and publications. Despite the fact that a significant number of articles, monographs, etc. are devoted to the issues of general audit methodology of financial statements by scholars and practitioners, the problems of organization and methodology of digital audit are almost not covered today due to its innovation. Thus, the results of the analysis of scientific research of such scientists as N. Petrenko [7], I. Shevchenko [8], D. Dolbneva [9], I. Podik [10] show that the process of transforming auditing into such an innovative type as digital auditing is not fully disclosed. Besides, the researchers did not investigate and, accordingly, did not assess the impact of the growth of accounting information on audit procedures.

Analysis of the fundamental works of leading scientists in the field of audit (R. Adams, M. Bilukha, G. Davydov, F. Defliz, V. Bondar, E. Mnykh, V. Rudnytsky, D. Sushko, F. Defliz, J. Robertson, etc.) does not provide answers to the ways how to solve audit problems associated with working in conditions of Big data. The auditor now needs new audit procedures. At the time of publication of the works of these scientists, the problem of the transition of digital audit using large arrays of information Big data – was irrelevant. However, there is a significant amount of scientific work of Ukrainian and foreign scientists on the methods, principles, classification of Big data, but without reference to the audit.

Thus, the scientific study of Big data issues in auditing, the transition to digital auditing in general and the study of such administrative issues as document accounting and customer information in particular is insufficient. As a result, there is a need to analyze the current practical achievements of commercial companies, which will form the basis for further basic research and the formation of the concept of digital audit.

The **aim** of the study is to analyze and professionally assess the theoretical and practical approaches to the transformation of the method of transmission of accounting data during the transition to digital audit.

The object of analysis is the initial stage of the process of transition from traditional (classic) audit of financial statements to digital audit for companies that work with large amounts of information - Big data.

Materials and methods. The information base of the article is the work of domestic and foreign scientists in the field of accounting, auditing,

Big data, as well as open data of the companies of the Big Four (Big 4) – the leaders of modern auditing. In the process of solving these problems, general scientific and special methods of scientific cognition are used: observation, comparative and complex analysis, induction, synthesis, graphical, generalization.

Results. Well-known international leaders in the field of audit and assurance services are the Big Four. Their tools and methods as leading practices are being implemented around the world. Companies have a large number of branches and representative offices in different countries and the appropriate resources to transform operating activities to maintain a sufficient level of profitability. An additional argument for choosing Big 4 as a research base is their resource base, which allows for the audit of companies that can produce Big data, which is the driving force behind the transition from traditional to digital auditing. In addition, their media activities and publicity allow them to better understand the basic tools they use for conduction both traditional and digital audits, unlike other companies.

Among the Big 4 companies in Ukraine, it is appropriate for the needs of scientific research to choose EY as a company that is a leader in open data, as well as internal systems of audit procedures. The basis is the changes that this company implements in its operating activities in terms of providing assurance services for the company's financial statements.

In general, the process of auditing the company's financial statements is a clear algorithm of actions: establishing business relationships – obtainning information – processing information – providing an audit report (conclusion) and other products. It is important that the transition to digital audit is not limited to changes in the performance of audit procedures, but covers all its imperative stages, starting with the establishment of business relationships. For the needs of research in accordance with the established purpose, it is necessary to emphasize the receipt and processing of information as an imperative component of digital audit.

Procedurally, if we break down the microprocesses of obtaining customer data, we can see that from the moment of gradual receipt of data, there is additional administration of information flow by staff and its subsequent manual accounting, a certain classification and codification. Manual accounting involves maintaining a status file (usually by Excel) for received and unreceived requests for electronic and paper information. To further use the information obtained, you must perform one of *two types of search*:

• the end user of the client's credentials searches for data among the data already existing and sorted in the cloud environment / server and downloads it to the local computer;

• the responsible person receives all electronic correspondence and, in accordance with the audit plan and the distributed responsibilities of the current project, at his / her own discretion, searches for the end user of the information and keeps records in the status file.

Both approaches have significant disadvantages, as the user communicates with the information manually. At the same time, there are significant shortcomings and obstacles to the information processing process.

Disaggregation information. A significant number of received e-mails with files due to the limitations of mail servers (by default, the attachment to the e-mail can not exceed 20 MB), which, in turn, sprays and reduces its quality.

Repeated requests. When occurs the next events like returing of e-mail to sender for clarification, adding of missing documents etc, search for actual versions of necessary documents takes more time.

Time lags. Delay in receiving information due to the search for the final executor or search on the server for the necessary information by the executor.

Generalizing all the process of reception of the information in the block diagram, in the traditional audit it is at the stage of "manual compilation of information on the local disk (for sending to the end user) or on server (for search by the end user)" process variations and these problems begin to occur (*Figure 2*).

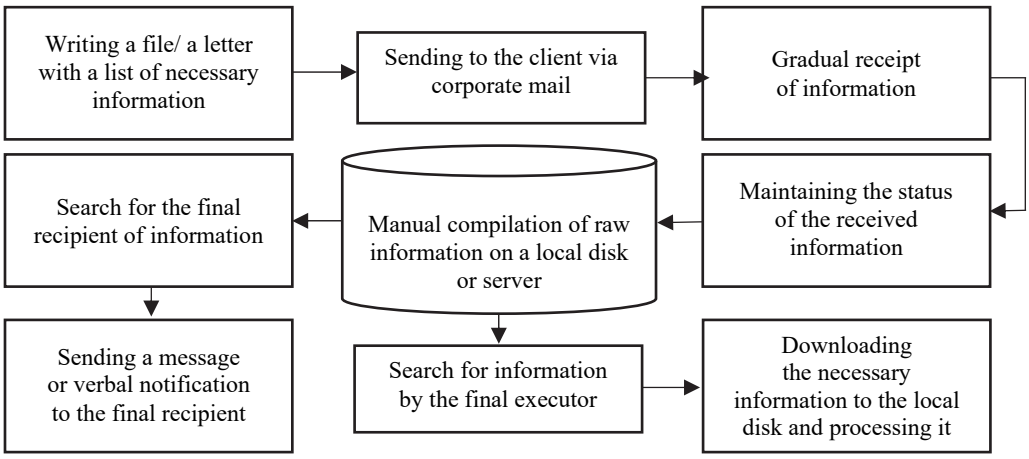

Figure 2. Receipt of information by the auditor from the client under the conditions of traditional audit

Source: developed by the authors.

These problems cause a chain of the following, derivatives, unnecessary actions:

• the client's disaggregation of information for forwarding leads auditors to search for opportunities to reduce the amount of information provided, additional time to collect portions of information in a single register to perform audit procedures, etc.;

• repeated requests may be erroneous, as the responsible person in the electronic flow may skip certain emails (or enter updated data in the status file). Manual sorting and accounting leads to calls from the client with complaints about the effectiveness of the auditors;

• time lags are a consequence of previous problems. Searching for information, repeated inquiries, customer calls and inquiries with complaints and grievances negatively affect the general attitude of accountants on the part of the client to the auditors, delay responses and provide information on current inquiries.

Administering the flow of information in the process of auditing large, socially significant, "large" clients in cases where the audit team has a significant number of people, worsens the client's margins, as increases the time spent on the project. Given that EY has in its business portfolio such large companies, groups, etc., as Ukrainian Railways, Khlibprom, Ukrtelecom, Siemens, Coca Cola, Walmart, Alphabet (Google), Amazon, etc. [11], the issue of microprocesses and accounting is extremely relevant. A similar situation is observed in other companies, both the Big Four and non-Big 4 companies.

The process of transformation is the implementation of IT solutions that cause the departure from the use of MS Outlook as a basic mass software, which involves a large number of micro-operations (see *Figure 2*) to obtain information in other IT solutions, such as internally developed software software or third-party programs written to order that are directly integrated into the software environment where the audit procedures are performed and / or documented.

The transformation of the process of obtaining information in EY took place using two tools My EY – Client Portal and EY Canvas [12; 13]. After the implementation of the client platform and its connection to the electronic database of procedures and document management system, the process covers three main stages (*Figure 3*).

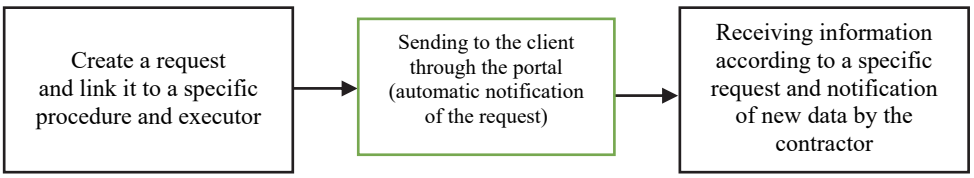

Figure 3. Receiving information from the client through the MY EY portal

Source: developed by the authors based on [13].

Administration and automation of input data and accounting allowed to solve these problems, to avoid small routine operations presented in *Figure 2*. This helps the audit team focus on performing the actual procedures, rather than on ancillary microprocesses that affect the timing of the audit and the relationship with the client. The recipient of the request (on the part of the client) no longer needs to monitor the status and check mail for new requests, decide how to transfer "heavy" files, and the executor of procedures does not need to search for the received information.

The process of obtaining information is built into the operating environment in such a way that the client can send the information himself without waiting for a request from the audit team. An additional feature is to set the connection of a specific audit procedure, such as "Bank confirmation" or "Cut-off on Trade receivables", to a specific request.

The introduction of digital audit without optimizing the process of obtaining information should be considered inappropriate, because conducting a digital audit involves obtaining a comprehensive understanding of the processes, based on visualized in the graphs, tables of information using specialized tools. During the digital audit, the task of the specialist is to study the anomalies in the visualized data, which will consist of a description of the situation, requests for comments from the client, testing primary documents or searching for data in open sources, which will achieve the required level of professional confidence. reflection in the audit report (conclusion). Otherwise, there is a question of efficient use of time for accounting and administration of information that affects the timing of the project, repeated requests for information already provided but not identified by auditors, indicates to the client the disorganization of work, which affects the formation of sustainable business relationships and accountant-auditor relationship.

Other Big 4 companies use resembling platforms. In particular, Deloitte Connect [14], PWC Connect [15; 16], KPMG Clara [17]. At the same time, each of these leading international audit companies is trying to make it convenient to account for and administer audit documents and information for both professionals and clients.

The results of the analysis of Big 4 presentation videos [14–17] and the description of customer interaction systems (see *Figure 3*) show that they all have a similar scheme of operation, but all three differ in that they may or may not have a function that allows you to synchronize documents in accordance with the request with a specific procedure in the operating environment for the performance of audit procedures and visual design. The peculiarity of synchronization makes information accounting systems more convenient, and this allows employees to save more time than specialists in firms-competitors.

An additional factor that influences the construction of a new process of accounting for documents and information, as introduced in the Big Four companies, is the protection of information, avoidance of sending to erroneous recipients, which violates the confidentiality of information, and the ability to transfer large databases, in cases cannot connect to the client's accounting systems.

Conclusion. The common method of transferring work files to auditors via MS Outlook is one that does not meet the needs of either the audit firm's specialists or their clients, as the accounting and administration of the received information in a company without new systems is inefficient. This negatively affects the timing of the audit and the relationship between the performers – the client's accountants who provide information and the auditors who receive it; it also creates an additional burden on staff.

Auditors need to take into account the fact that the growth rate of data will continue to increase, and this requires a response from audit companies

to transform traditional (classical) audit into digital audit. In order for the transformation to be successful, it is necessary to make changes not only in the organization and methodology, but also in the microprocesses that accompany the audit procedures. One of such processes is the processing of electronic correspondence and accounting of documents. An analysis of the current approach from a practical point of view has shown that the administration of data sent by the client is inefficient and needs to be changed. The study selected Big 4 companies, which are key to the audit industry in the global market.

Summarizing the experience of Big 4 companies, non-Big 4 companies should adopt existing practices to improve electronic document management, document and information accounting, and reduce the number of microprocesses, as this is one of the first points of transformation to the digital audit that is coming. to change the audit in its traditional sense.

The results of the analysis indicate the absence of theoretical achievements in fundamental works. Considering this, the current practical steps of digital audit implementation at the lowest level of the transformation process in Big 4 companies are described, further development of digital audit at the level of data exchange between accountants and auditors in the field of information protection and avoidance of operator errors.

REFERENCES

1. IFAC. What we do. *cutt.ly*. Retrieved from https://cutt.ly/ZE3U44q [in English].
2. Reinsel, D., Gantz, J., & Rydning, J. The digitization of the World from Edge to Core Data Age 2025. *cutt.ly*. Retrieved from https://cutt.ly/aE3U6kN [in English].
3. SaaS Scout Research Group (2021). Industry report Big data Statistics, Growth & Facts. Retrieved from https://cutt.ly/kE3IwQC [in English].
4. On amendments to the Law of Ukraine "On Accounting and Financial Reporting in Ukraine" to improve some provisions: Law of Ukraine of 05.10.2017 № 2164-VIII. *Voice of Ukraine*, *202*. *cutt.ly*. Retrieved from https://cutt.ly/QE3IrVf [in Ukrainian].
5. Transparency Report for 2019 EY in Ukraine. EY reporting in Ukraine. *cutt.ly.* Retrieved from https://cutt.ly/LE3Ipoh [in Ukrainian].
6. Transparency Report for 2018 EY in Ukraine. EY reporting in Ukraine. *cutt.ly.* Retrieved from https://cutt.ly/HE3IshB [in Ukrainian].
7. Petrenko, N. I. (2015). Modern problems of audit development in Ukraine. *Bulletin of the Khmelnytsky National University. Economic sciences, 3 (1),* 89-94. Retrieved from https://cutt.ly/8E3IfTT [in Ukrainian].
8. Shevchenko, I. O., Lipnytska, M. V. (2019). The essence and development of audit in European integration conditions. *Black Sea Economic Studies*, *38 (2),* 142-147. Retrieved from https://cutt.ly/gE3Ihu3 [in Ukrainian].
9. Dolbneva, D. V. (2018). The current state and directions of improving auditing in terms of European integration of Ukraine and the application of international standards. *Economy and State*, *2*, 72-76. Retrieved from https://cutt.ly/9E3Izr4 [in Ukrainian].

10. Podik, I. I. Biletska, G. M., & Kovtunovych, N. L. (2018). Normative and legal support of electronic audit in Ukraine: current status and prospects. *Economy and State*, *10*, 37-41. Retrieved from https://cutt.ly/5E3IcZc [in Ukrainian].
11. EY Clients (2020). Big 4 Accounting Firms. Retrieved from https://cutt.ly/YE3Im54 [in English].
12. My EY. About My EY. EY Building a better working world. *cutt.ly*. Retrieved from https://cutt.ly/YE3Im54 [in English].
13. EY Canvas. EY Building a better working world. *cutt.ly.* Retrieved from https://cutt.ly/DE3IEPF [in English].
14. Deloitte Connect. Deloitte. *cutt.ly.* Retrieved from https://cutt.ly/bE3ITP3 [in English].
15. Connection Quick Reference Card. PWC. *cutt.ly.* Retrieved from https://cutt.ly/JE3IOvR [in English].
16. The technology taking your audit into tomorrow. PWC. *cutt.ly.* Retrieved from https://cutt.ly/kE3Q2Gw [in English].
17. KPMG Clara. KPMG. *cutt.ly.* Retrieved from https://cutt.ly/ME3IShR [in English].

The article submitted to editor's office on 09.08.2021.

Назарова К., Бондаренко К. Процедурно-облікова трансформація як імперативний етап digital аудиту.

Постановка проблеми. *Поточний обмін даними аудиту здійснюється через MS Office. Аналіз тенденцій розвитку технологій Big data показує значне збільшення обсягів уже зараз та у найближчій перспективі. Зростання нефінансових даних спричиняє збільшення фінансових. Аудиторські компанії, переважно Велика четвірка, переходять від класичного аудиту до digital аудиту. Оскільки процес трансформації має велику кількість рівнів, основою цієї статті обрано найнижчий – рівень рутинних дій обміну даними між аудитором та бухгалтером.*

Метою *дослідження є аналіз та професійна оцінка теоретичних і практичних підходів до трансформації способу передання облікових даних під час переходу до digital аудиту.*

Матеріали та методи. *Інформаційною базою статті є публікації вітчизняних та зарубіжних вчених у галузі бухгалтерського обліку й аудиту та великих даних, а також відкриті дані компаній Великої четвірки. Застосовано методи спостереження, систематизації, графіки, аналізу та синтезу.*

Результати дослідження. *Результати аналізу інформації про компанії Великої четвірки та опис систем взаємодії свідчать, що всі вони виконали трансформацію найнижчого рівня та намагаються інтегрувати вхідні дані від клієнта до інструментів програми аудиту без додаткового адміністрування вручну через MS Office.*

Висновки. *Аудиторам необхідно враховувати, що темпи зростання обсягів даних у найближчі роки збільшаться, що вимагає відповідного реагування аудиторських компаній на перетворення традиційного (класичного) аудиту на цифровий. Для того, щоб трансформація була успішною, необхідно вносити зміни не лише в методологію та підходи, а й у мікропроцеси, які супроводжують аудиторські процедури.*

Ключові слова: аудит, *digital* аудит, облік, трансформація, *Big data*, Велика четвірка (*Big 4*).