Proceedings of the 7th International Conference on Economics and Social Sciences (2024), ISSN 2704-6524, pp. 187-198

The 7th International Conference on Economics and Social Sciences
Exploring Global Perspectives:
The Future of Economics and Social Sciences
June 13-14, 2024
Bucharest University of Economic Studies, Romania

The Evolution and Impact of Digital Transformation on Internal Audit and Managerial Control in Public Institutions

Lucia-Maria UDRESCU[1]

DOI: 10.24818/ICESS/2024/020

Abstract

This paper explores how digital transformation has changed the way internal audit and internal management controls are conducted in public institutions. From traditional audit methods to new technology-based methods, mainly driven by the development of artificial intelligence (AI) and blockchain technologies, they greatly improve the depth of analysis and reduce the need for manual work. This aspect allows the automation of everyday tasks as well as the most complex ones, where large data series are analysed, audits become more transparent and efficient. The purpose of the research is to evaluate how prepared the professionals from public institutions are to move from manual to digital work, as well as to identify the main challenges encountered in the implementation of these technologies. The objectives consist of evaluating the progress of the transition to digital work in public institutions in Romania and identifying the obstacles to a successful adoption. The methodology includes reviewing the specialised literature and conducting quantitative surveys of staff in audited public institutions. Based on these ideas, the paper presentation attempts to understand the advantages and challenges to digital transformation that the public audit may face. Finally, the digital transformation represented an important and helpful aspect in the internal audit, but it is necessary to overcome the challenges to obtain these benefits in public institutions. The paper emphasises useful aspects of the use of digital technologies in public audit: improving audit capabilities and addressing the challenges of applying new technologies to existing systems.

Keywords: internal managerial control, internal audit, digitalisation, public institutions.

JEL Classification: H83, M42, M48.

[1] Bucharest University of Economic Studies, Bucharest, Romania, udresculucia20@stud.ase.ro.

1. Introduction

The public institutions of the nowadays times acknowledge the contemporary utilisation of internal audit methods, for instance artificial intelligence and blockchain. There has been a replacement of the ineffective and chronophagous audit methods, that were substituted by more adequate and quicker digital methods. Benefits such as work automation, great volume data processing, time saving, and task fulfilment in a minimised timeframe are advantages that appeared along with these novel technologies. Despite these advantages, the utilisation of these instruments requires the retraining of auditors to help them accommodate these activities, this process generating reluctance from their part.

To integrate the research context in the current framework, the interaction between public institutions and technological instruments such as artificial intelligence needs to be comprehended. In order to improve working time efficiency, more and more fields are adopting workplace digitalisation, and in this case, more and more public institutions are considering adopting a digital solution, following the long-term model of private companies. Like many other countries, Romania has invested in digital infrastructure to improve public services, particularly since in recent years, like many other countries, it has received non-refundable funding to achieve these objectives. The aim of the study is to assess the level of training of employees working in public institutions and the readiness to move from manual to digital audit work. The document also examines the challenges faced by auditors when using these new tools. The author researches how Romanian institutions reached progress in implementing digital solutions as well as the drawbacks associated with the adoption of such instruments. In the specialty literature, digital transformation significantly influences taxation areas such as taxation, financial accounting, management accounting, audit, internal control, risk management, and corporate governance. Technology impacted the accounting field to a great extent, modifying the way that things work and the structures permitting their support. Stark (2020) noted that people, tools, objects, plans, and money are among the noteworthy points of a proper digital transformation. Technology shifts the manner in which activities are performed, in the same way as spring reshapes the environment. Today, people prefer to use digital forms of documentation and communication in order to get rid of their work as much as possible. The layout of this study is as follows. Section 2 discusses the background of the study, highlighting the amount of effort required to elaborate a proper strategy for digitalisation in public organisations. As stated in section three, the research questions and aims of the study revolve around the preparedness of professional in public organisations, the challenges faced when implementing digital technologies. Section 4 gives details of the way in which this study was conducted, which included a review of recent literature, a questionnaire elaborated by the author that were to be used in the collection of data from employees from public internal audit departments. In section five, the results of the study are presented as well as a preliminary analysis of the questionnaire used in the survey. In conclusion, Section 6 of the paper discusses the impact of digital transformation on internal audit function in Romanian public organisations, the necessary changes, and suggestions for future research.

2. Problem Statement

2.1 Digital Transformation Today

To fully embrace digital transformation, companies need a clear plan that uses resources from all parts of the organisation. Stark (2020) argues that successful digital change requires using human resources, improving technology, making the most of physical assets like buildings and equipment, reorganising the company, and using financial resources wisely. As companies move from outdated, manual, and time-consuming systems to digital ones, they deal with much more data, showing how much technology is changing things (Reis et al., 2018).

The cloud has become very popular and very easy to use. Some of these technologies include: data analytics, artificial intelligence, processing of big data, and blockchain technology among others (Teichert, 2019). However, the knowledge about technologies is not enough. For a company to embrace digitisation, it is essential to understand; how these technology options engage the whole organisational fabric; its culture, its procedures and direction (Stark, 2020). Tax consulting, financial accounting, management accounting, auditing, internal control, risk management, corporate governance, and more are the areas that are impacted by the phenomenon of digital transformation. Based on the literature, it is evident that the accounting profession is changing significantly due to the influence of a technology (Rini et al., 2021).

2.2 Literature Review

Digitisation in audit implies the utilisation of high-performance techniques in order to make audits to be quicker and more effective, this fact determining audit organisations to employ technologies such as AI, machine learning, blockchain, and big data analytics. These steps that private companies have taken in the last 5 years (we can consider that the pandemic is also a catalyst for these decisions) have determined that public institutions should be inspired by good practices and approach such a step as well. These help auditors and professionals to carry out the day-to-day activities more accurately, quickly, and effectively. But how do public institutions face this transition?

In a study conducted by Bjerke-Busch and Aspelund (2021), the authors stated that public organisations face numerous obstacles when trying to incorporate new technology in the day-to-day work. This is because entities face different kinds of problems that refer to the infrastructure, not enough personnel specialised in using these technologies, incomplete legislation, and many other factors depend on outside groups. The study separates these obstacles into three types: external, organisational, and management. External obstacles refer to regulations, insufficient money allocation, and no tech standards. Organisational obstacles come from workplace cultures, separation between departments, and how employees use resources. Management obstacles refer to leadership's struggle with the alignment of the institution's objectives and the implementation of these technologies.

Some other authors (Vasarhelyi et al., 2010) link the recent corporate scandals that lead to regulations like the Sarbanes-Oxley Act with data analytics and the need of monitoring for continuous assurance. The authors consider that these tools are beneficial in handling enormous information from different sources, making audits more detailed and complete. These tools help in identifying trends, assessing risks, and making more informed decisions.

In the view of Yermack (2017), technologies such as artificial intelligence and blockchain have the potential to become a transformational element for managers, investors, and auditors and add transparency to the conducted activities. In addition, these technologies will permit users to keep away from unfavourable conduct, hold real-time accounting, enable investor safety, and modify the manner in which individuals invest and own.

There is clear proof for the fact that the activities operated by managers, auditors, and employees will be significantly altered. Individuals are willing to employ such improvement elements to make their tasks simpler and use the supplementary time in steady assessments and other quantitative tasks, that in the end may improve the results.

3. Research Questions / Aims of the Research

This article aims to explore two important research issues: to assess the degree of preparation of professional public institutions to move from manual practices to those that involve the use of AI technologies, and, secondly, to identify the main challenges they face during the implementation of digital technologies. The objectives are to analyse the state of the situation in terms of the digitalisation of Romanian public institutions and the results of all factors that may impede the successful implementation of these innovations. This assessment is in line with the guidelines of the National Recovery and Resilience Plan, which aims to improve the level of digitisation in relation to routine processes within institutions in an effort to improve routine tasks and overall organisational activities. In the meantime, the study will assess whether audit activities are well linked to other digitalisation objectives in public institutions or not.

4. Research Methods

From a methodological perspective, the author reviewed the specialised literature to evaluate the readiness of Romanian public institutions to implement AI in internal public audit departments. Additionally, quantitative research was conducted through the distribution of a questionnaire developed by the author to public officials engaged in audit departments of institutions such as the National Fiscal Administration Agency and its territorial institutions, the National Health Insurance House and its territorial ministries, and other relevant entities. The questionnaire administration took place between April 1st and May 2nd.

The researcher has applied Exploratory Factor Analysis to the data acquired through the survey.

5. Findings

In the specialised literature on digitalisation and AI, there are many mentions of how Romania made a lot of efforts in adapting to this change. The literature currently describes the transition from traditional auditing to continuous, technology-driven, or future auditing as a developmental cycle (Byrnes et al., 2018). Some authors say that the main problems with the audit and control idea lie in the old infrastructure and not in poor IT systems. They mention that most public organisations are still in the early stages of using digitalisation and automation for their financial control processes. This lack of modern, integrated IT systems hampers the ability to analyse financial data swiftly and effectively (Floștoiu, 2023).

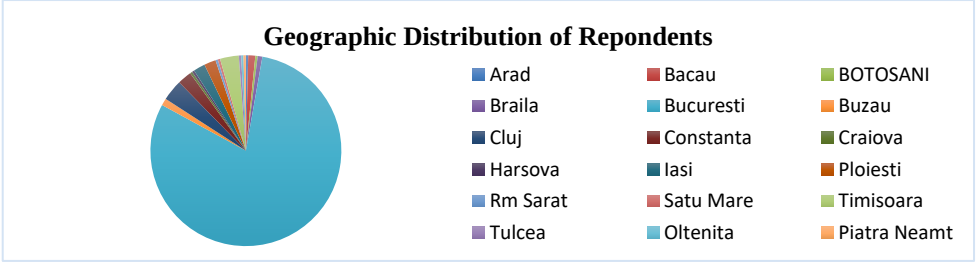
To assess the opinions of public institution employees on artificial intelligence and the transition to digital auditing, the author created and distributed a questionnaire through communication platforms and specialised groups to staff from these institutions. The interpretations of the results are presented below. The number of responses received is 252.

5.1 Exploratory Analysis of the Questionnaire

The initial survey questions are designed to collect basic information about the participants, such as where they work, how old they are, and what school they attend. This information helps us better understand the following responses and allows us to look at opinions about AI and digital auditing in public places in a more specific way.

Most of the people who responded to the survey said they work in Bucharest, then Cluj, Timisoara, Constanta, Iasi, Ploiesti, and other places.

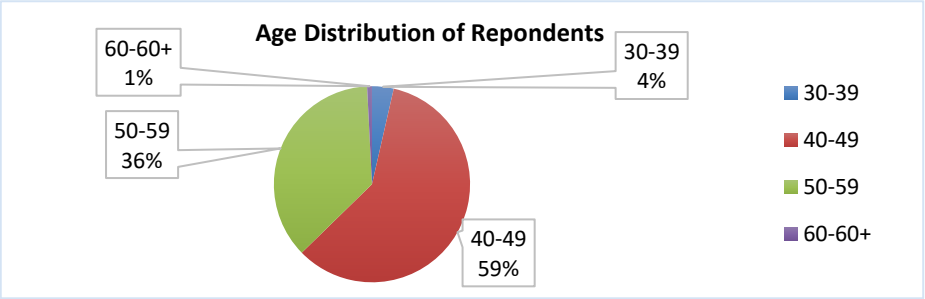
Figure 1. Results of the questionnaire



Source: own processing, questionnaire results.

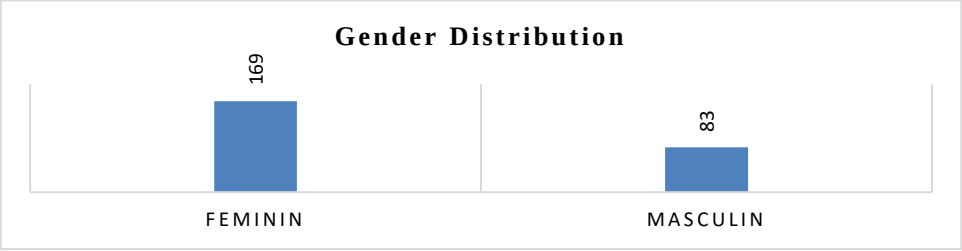
When queried about the age of the respondents, the majority fell within the 40-49 age bracket, followed by those aged 50-59 years. Only nine respondents were between 30-39 years old, and two were aged 60 or older. This chart shows the average age of workers in Romanian public organisations, especially in the internal public audit department, where most people are over 45. This is different from the private sector, where younger people are more common, because multinationals tend to hire younger people more than public institutions do. Additionally, the number of responses from females was almost double that of males.

Figure 2. Age distribution of respondents



Source: own processing, questionnaire results.

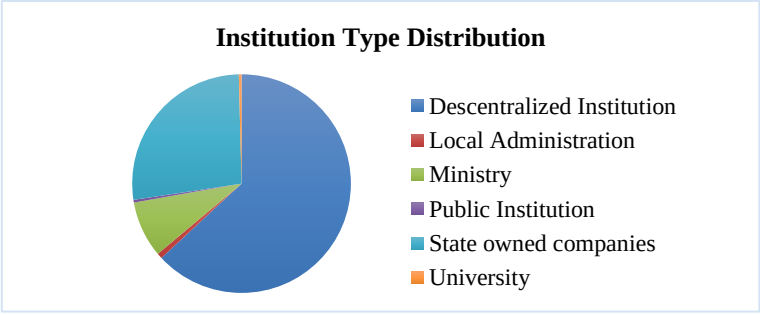
Figure 3. Gender distribution



Source: own processing, questionnaire results.

In terms of the types of institutions in which the respondents are engaged, 159 respondents are engaged in decentralised institutions (territorial health centres, tax agencies, ministries), 68 respondents work in state enterprises, followed by 21 respondents working in ministries. Only two respondents worked in city halls and only one at a university.

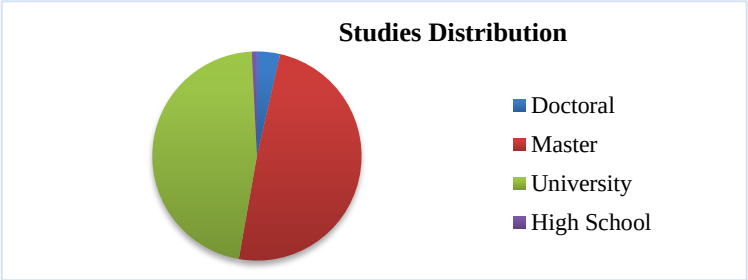
Figure 4. Institution type distribution



Source: own processing, questionnaire results.

To the question about education, 124 respondents have higher education (master's), 117 respondents have bachelor's studies, 9 respondents have doctoral studies, and only two of the respondents have only high school as a basis.

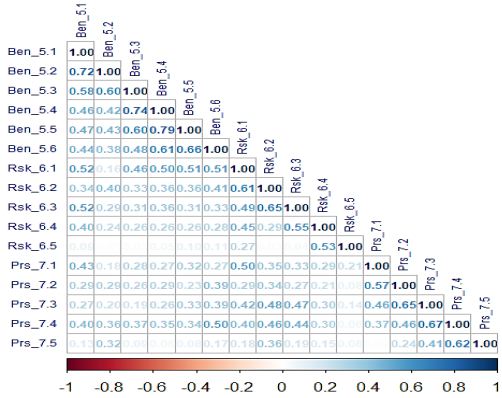
Figure 5. The distribution of studies



Source: own processing, questionnaire results.

According to the survey, Romanian public sector workers are mostly women, especially in decentralised institutions engaged in territorial administration. Most of the respondents are between 40 and 50 years old, unlike young people working in the private sector. Most people in the education sector have at least a bachelor's degree, indicating their education. These conclusions show that we need to develop strategic initiatives to attract young people who are interested in auditing and help them to develop their skills to meet changing job requirements.

Figure 6. Correlation Matrix



Source: own processing using R, questionnaire results.

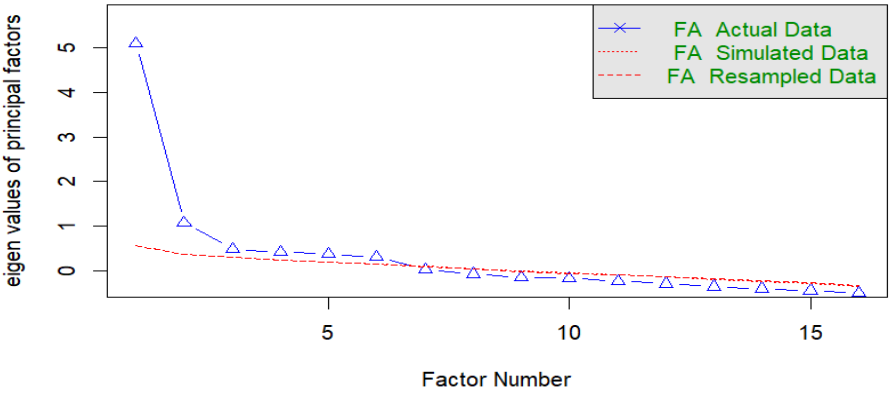
In Figure 6, we can see how correlated are the answers from the correlations closer to 1. We can see that we have correlation of 1 for the same question.

The subsequent questions have either a strong positive or a strong negative correlation. Also, the group 6.1-6.3 correlates considerably with 7.1-7.4.

After running a Kaiser-Meyer-Olkin factor adequacy, we obtain an overall MSA of 0.66 which suggests that there is a mediocre suitability of the data for the analysis. Also, the individual MSA for each item is higher than 0.5.

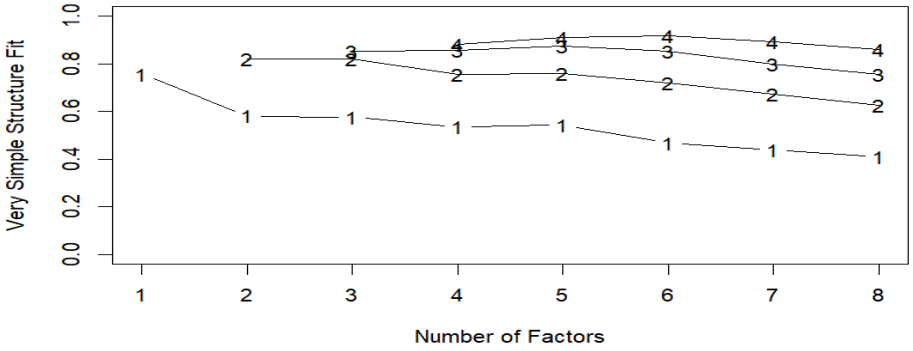
The Parallel Analysis (Figure 7) suggests a number of 3 factors, after analysing the Scree plot. The resultant factor analysis shows as follows:

Figure 7. Scree Plot and Parallel Analysis



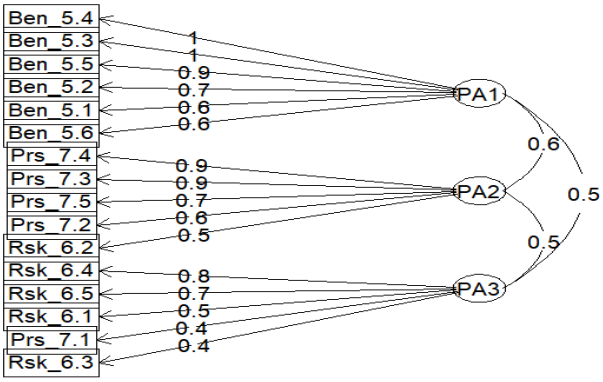
Source: own processing using R, questionnaire results.

Figure 8. Very Simple Structure



Source: own processing using R, questionnaire results.

Figure 9. Factor Analysis



Source: own processing using R, questionnaire results.

The resulting factors are grouped into three categories: benefits, personal, and risk/vulnerabilities.

Table 1. Results

Benefits	Personal	Risk/vulnerabilities
5.1 AI increases transparency	6.2 AI implementation requires important changes to the IT infrastructure	7.1 AI cannot replace me at my job
5.2 AI and secure financial records	7.2 AI helps me with repetitive work	6.1 Legal and regulation issues related to the usage of AI in Audit
5.3 AI increased efficiency and fraud risk reduction	7.3 AI is not correctly regulated	6.3 AI can experience interoperability issues when being integrated with other public institution systems, due to the infrastructure
5.4 AI facilitates access to decentralized data	7.4 One's organisation has the necessary infrastructure to support AI	6.4 AI can have a negative impact on the environment
5.5 AI increases conformity through auditable transparent records	7.5 AI usage does not facilitate work from home	6.5 AI can replace me at my job
5.6 AI can replace repetitive manual work		

Source: own processing using questionnaire results.

From the perspective of advantages, people think that AI can make audit work clearer and more trustworthy, protect financial records, and save time and money while lowering the chance of fraud, which is a common idea in the literature (Lazăr & Popescu, 2021; Rada, 2015). Cristea (2021) conducted a study that shows how IT affects auditing, which is the process of checking financial records and reports. The study says that IT makes auditing more complex and challenging, but also more useful and reliable, by using tools such as Data Analytics, AI, and Blockchain. The study also says that auditors need to keep learning and improving their skills to use these tools well, which will make auditing faster and better. Another thing that the survey suggests is how AI helps get access to decentralised data, which makes it easier to analyse and do audits. By combining AI with audits, we can get a more detailed and up-to-date look at different types of data, which could make audits faster and more accurate (Odeyemi et al., 2024; Alkan, 2022). A good aspect that defines AI is its ability to clarify matters and bring honesty to them by automatising tasks and maintaining the evidence of everything (Pearce, 2022). One good thing is that AI helps people work from home, so they do not need to use paper as much for auditing—a lot of big companies are already doing this. But for public organisations in Romania, the lack of consistent infrastructure makes it hard for them to let people

work from home. Even though there are some problems, people think that having software that lets them work from home is a good thing.

Personally, respondents claim that the AI technology operates major transformations in the IT infrastructure. At the level of Romania, public institutions experience technology struggles in response to improper infrastructural investments. Additionally, the absence of funds may represent a significant obstacle for the adoption of AI, generating challenges for the financing needs to sustain such technological progresses. Many respondents feel safe in the fact that AI helps with repetitive work (Henry & Rafique, 2021; Kokina & Davenport, 2017). While some view AI use in auditing positively, they also suggest its insufficient regulatory framework. There is a legislative void regarding advanced technologies, which leads to the need for help from the government both in the educational system, to prepare people with what AI entails and how to use it, and companies investing in AI through improved regulations and potential financial incentives (Mihai & Duțescu, 2022). Some of the respondents believe that AI can help in audit missions, but believe that there are not enough regulations to be able to control this part. The lack of adequate rules and laws for new technologies, together with the lack of clear directions for AI, makes potential users want more serious intervention from the government to step in and want better legislative tracks and rules, providing resources for those who want to implement such technologies.

Regarding risks and vulnerabilities, opinions among respondents varied on AI's role in auditing. Some respondents believe that AI could replace their presence in the office (in the near future, not necessarily now), while others disagreed, stating that while AI is beneficial in the analysis area, compilation of data, and efficiency of handling large databases, it cannot replace the professional judgment required in auditing, which necessitates human input. The findings are also strengthened by the work of Bizarro and Dorian (2017), who assert that AI cannot substitute human skills, for instance judgment, conveyance of emotions, implementation of professional scepticism, and even the realisation of expert judgments, regardless of AI's ability to make accounting and auditing tasks more efficient. The respondents also mentioned environmental matters and claimed that environmental damage can be triggered by the nurturing of AI in public institutions. These matters are justified by the fact that in auditing, AI will impose a great degree of energy usage and the employment of novel technologies, an action that will trigger a contribution to electronic waste, given the need for periodic updates and hardware substitution. Provided that institutions adopt renewable energy sources and solutions that generate minimal pollution, the effect over the environment can be a reduced one.

In Romania, the employment of AI is perceived as an advantageous process due to the benefits it holds, for instance work environment simplification, maintaining the evidence of monetary transactions in a more efficient way, as well as fraud identification. In addition, the constructive effect of AI on audit methodologies has been recognised by Romanian studies and literature, and they emphasised the requirement for the ongoing professional growth of auditors, to make possible the inclusion of this progress into their activities. Nevertheless, Romania experiences legislative drawbacks produced by the absence of formal procedures and adequate

structures. Furthermore, it has a social impact arising from the increase in energy consumption possible by AI and the growing problem of electronic waste. These various aspects imply the importance of careful coordination and therefore require careful and targeted technological and legal decision making in national environments.

An important element underlying the potential development of this field of AI in Romania, interoperability and investments is the National Recovery and Resilience Plan. This plan aims at significant improvements regarding the public sector until 2030, with an emphasis on digitisation and public services "one click away".

6. Conclusions

In conclusion, it could be stated that these outcomes indicated the effects of the digital transformation on the internal audit of public organisations in Romania, with an interest in such essential technologies as AI. These technologies have been influential in enhancing the quality, speed, openness, and security of the audit functions. Nevertheless, such a transition seems to entail a significant degree of changes, such as retraining the auditors, and other concerns related to infrastructural and regulatory disparities. Although, the given use has a lot of potential advantages, implementing all these technologies into existing systems is a great and compulsory work, which is necessary to bring the audit practices up to the modern level and to increase the general levels of audits' efficiency.

Regarding the research limitations, the number of respondents (252 participants) is reckoned to be the major limitation, although this does not reduce the references made by researchers to public institutions. Future researchers will advance the present findings and create value and diverse angles to established thoughts.

Acknowledgment

The author appreciates the efforts of the scientific community to bring together accountants and auditors. Also, the author wishes to express his gratitude to those involved in the revision of the works as well as to those who contribute to the expansion of knowledge for such vast fields as those of accounting and auditing.

Bibliography

[1] Alkan, B.Ş. (2022). How Blockchain and Artificial Intelligence Will Effect the Cloud-Based Accounting Information Systems?. In: Bozkuş Kahyaoğlu, S. (eds) The Impact of Artificial Intelligence on Governance, Economics and Finance, Volume 2. Accounting, Finance, Sustainability, Governance & Fraud: Theory and Application. Springer, Singapore.

[2] Bizarro, P. A., Dorian, M. (2017). Artificial Intelligence: The Future of Auditing. Internal Auditing, 5, 21-26.

[3] Bjerke-Busch, L.S., Aspelund, A. (2021). Identifying Barriers for Digital Transformation in the Public Sector. In: D.R.A. Schallmo and J. Tidd, eds. Digitalization, Management for Professionals. Springer Nature Switzerland, 277-290.

[4] Byrnes, P.E., Al-Awadhi, A., Gullvist, B. et al. (2018). Evolution of Auditing: From the Traditional Approach to the Future Audit. In Chan, D.Y., Chiu, V., Vasarhelyi, M.A. (Eds.), Continuous Auditing (Rutgers Studies in Accounting Analytics). Emerald Publishing Limited, London, 285-297.

[5] Cristea, L.M. (2021). Romanian Auditors' Perception Concerning the IT Impact in the Big Data Era. Public Finance Quarterly = Pénzügyi Szemle, 66 (S1), 68-82.

[6] Floștoiu, S. (2023). Considerații privind posibilele direcții de îmbunătățire a modului de efectuare a controlului financiar în instituțiile publice din România [Considerations regarding the possible directions of improvement for the realization manner of the financial control in public institutions in Romania]. Buletinul Universităţii Naţionale de Apărare «Carol I» [The Bulletin of «Carol I» National Defense University], 04, 161-169.

[7] Henry, H., Rafique, M. (2021). Impact of Artificial Intelligence (AI) on Auditors: A Thematic Analysis. IOSR Journal of Business and Management, 23(9), 1-10.

[8] Kokina, J., Davenport, T.H. (2017). The Emergence of Artificial Intelligence: How Automation is Changing Auditing. Journal of Emerging Technologies in Accounting, 14(1), 115-122.

[9] Lazăr, T.N., Popescu, C. (2021). Digitization of external public audit in the context of the COVID 19 pandemic and the role of supreme audit institutions in the Recovery and Resilience Facility. Theoretical and Applied Economics. Special Issue Volume XXVIII (2021), 28-36.

[10] Mihai, M.S., Duţescu, A. (2022). Artificial Intelligence solutions for Romanian accounting companies. Proceedings of the International Conference on Business Excellence, Sciendo, 16(1), 859-869.

[11] Odeyemi, O., Okoye, C.C., Ofodile, C.C., Adeoye, O.B., Addy, W.A., Ajayi-Nifise, A.O. (2024). Integrating Ai With Blockchain For Enhanced Financial Services Security (Finance & Accounting Research Journal), 6(3), P.No., 271-287, March 2024.

[12] Pearce, G. (2022). Focal Points for Auditable and Explainable AI. ISACA Journal, 2022 Issue, Volume 4.

[13] Rada, C.I. (2015). Digital Agenda For Romania, Progress Towards 2020. Europaea Journal, Volume 4.

[14] Reis, J., Amorim, M., Melão, N., Matos, P. (2018). Digital Transformation: A Literature Review and Guidelines for Future Research. In Á. Rocha et al. (Eds.), WorldCIST'18 2018 (AISC 745, pp. 411-421). Springer.

[15] Rini, R., Rahayu, S., Yudi, Y., Gowon, M. (2021). Internal Auditor Transformation Strategy in the Industrial Revolution 4.0 Era. Literature Review, LePALISSHF.

[16] Stark, J. (2020). Digital Transformation Industry- Continuing Change. Cham: Springer.

[17] Teichert, R. (2019). Digital Transformation Maturity: A systematic Review of Literature. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis TARGETS". Studia Universitatis Babes-Bolyai – Studia Europaea, 4, 35-66.

[18] Vasarhelyi, M.A., Alles, M., Kogan, A. (2010). Principles of Analytic Monitoring for Continuous Assurance. Journal of Emerging Technologies in Accounting, 7(1), 1-21.

[19] Yermack, D. (2017). Corporate Governance and Blockchains. Review of Finance, 21(1), 7-31.