

Lavinia Mihaela Cristea

# *Romanian Auditors' Perception Concerning the IT Impact in the Big Data Era*

---

**SUMMARY:** Like any business process, auditing is a process that can be perfected, technology complementing a set of advanced data processing skills and techniques. The objective of this paper is to research the way how Romanian auditors work and perceive the impact of IT on audit missions. The results of the conducted survey, based on 102 responses, highlight a series of working tools (Data Analytics, Microsoft Excel, Data Automation) which, through the analysis of the Big Data phenomenon, facilitate the audit process. Regarding the software category, Ciel Audit and Revision, Gaudit, CaseWare are among the most frequently used, auditors considering ready to work with emerging technologies. Continuous professional training is ensured by participation in professional training courses, along with severe documentation about new technologies. In Romania, the current level of performing audits based on new technologies is average, for the future a higher level and a higher forecasting and analysis capacity are expected. The auditing profession will be perfected more and more, the current tasks will be gradually replaced by the new technologies, auditors becoming more appreciated by the external environment. Professional skepticism remains the basic quality of the auditor, along with the understanding of the competitive environment. Uncertainty characterizes the amendment of the International Standards on Auditing (ISA). This paper contributes to the literature by bringing to the fore the current technological context for the audit profession, namely the impact perceived by auditors during the fourth industrial revolution.

**KEYWORDS:** auditors' perception, IT impact, Data Analytics, audit mission

**JEL CODES:** M40, M42

**DOI:** [https://doi.org/10.35551/PFQ\\_2021\\_s\\_1\\_4](https://doi.org/10.35551/PFQ_2021_s_1_4)

---

**I**n Romania, the financial auditor profession is situated between two junctures: regulation and digitalization, the 21st century being characterized by a regulation reform in a close connection of the business environment with technology. Sectors all over the world are part of the fourth industrial revolution, a transformation which will eliminate millions of

jobs and at the same time, will create new jobs for the young people who are now in the early stages of learning. This revolution will require from the external environment (i.e. employees and employers) continuous training programs, an eye kept on emerging technologies, critical observations in terms of how adaptation and encouragement of innovation succeed, since technology is established in all activity areas (e.g. communications, administration,

---

*E-mail address:* [cristealaviniamihaela@yahoo.com](mailto:cristealaviniamihaela@yahoo.com)

research, development, innovation, financial sector). This paper will research the audit sector and how new technologies impact the profession, analyzing the Romanian auditors' perception in the Big Data era.

The traditional audit is based on audit practices that involve processes of observation, inspection and analysis of financial data, performed by the human expert (Byrnes et al., 2018). The aforementioned processes represent the main approach in the audit field, including in financial audit (Gepp, 2018). The financial audit represents a complex process, often performed manually, at the procedural level. Over time, Computer Assisted Audit Techniques (CAATs) have intervened in supporting this process, by managing repetitive work tasks. CAATs provide fast verification of electronic support accounting documents (e.g. invoices, reception notes and finding differences, accounting records) that facilitate the bookkeeping process. These work techniques can be used at any stage of the audit mission, starting with the planning audit statement, having knowledge of the client, continuing with conducting detailed tests, evaluating internal control, and verifying data integrity.

Currently, financial audit missions continue to be performed with CAATs, which refers to various software used by the auditor in order to improve the audit process. Microsoft Excel, ACL, Access databases, statistical analysis through SAS and CaseWare IDEA are the most common tools used by auditors. These work instruments are needed to examine customer data, to provide a proper financial preparation for detailed analysis and complex investigations, but also to faster information extraction (Gray and Debreceny, 2014; Caranica, 2016; Moffitt et al., 2018; Cohen and Rozario, 2019; Gartner, 2019). The properties consist of work tasks facilities, that is filtering accounting records of millions or filtering accounting records that are not

currently used, such as 462 account 'Other payables', 151 account 'Provisions', 4118 account 'Uncertain customers', 781 account 'Income from provisions', according to the Romanian chart of accounts. The filters are based on previous similar situations identified by the auditor as non-compliant or as a potential fraud risk.

The objective of this paper is to investigate the extent to which authorized romanian auditors are working with new technologies, how they perceived the first technological impact and how they are adapting. Finally, will a change in financial reporting standards be needed in order to complete the digitalization of this profession? The new, emerging and cognitive (technology) terms are used interchangeably in this paper.

## ANALYSIS OF THE SPECIALIZED LITERATURE

Recently, large companies that continuously are investing in technology have increased significantly, cognitive technologies revolutionizing auditing and financial reporting. For auditors, cognitive technologies are the type of technology that affords a broader view of financial processes, by visualizing business strategies and models or business processes that might be improved. Cognitive technologies improve audit processes and the quality of the audit mission delivered, through the analysis and understanding of the risks the company's confronting, that is, where control presents deficiencies. In this way, auditors are able to focus on the weaknesses (i.e. risk sectors) of the organization, pursuing a next degree (more in-depth) of Big Data examination, using Data Analytics tools, along with Machine Learning (ML), Robotics Process Automation (RPA), Blockchain and Artificial Intelligence (AI) technologies.

Once adopted, cognitive technologies would contribute to a permanent change in the audit sector (KPMG, 2017). Companies that provide audit services and do not invest in new technology solutions are risking to fail their status to other competitors (e.g. IBM, Microsoft) that have already adopted these technologies. The new technological way will permit users to experience a development regarding the internal control monitoring (i.e. separation of tasks, appropriate risk management and control strategies, company performance monitoring procedures, periodic evaluations). This endorsement (internal control monitoring) will identify the main causes and effects of deficiencies. This evolution towards cognitive technologies will transform audit missions, starting with the working procedures and continuing with the added value audit. By grasping cognitive technologies, we refer to the comprehension of statistical techniques set that facilitates the analysis, understanding and generation of human language, Machine Learning ensuring the user-system interface both in writing and vocally, converting natural language to make it intelligible for machines.

Comparing the old working methods with the current ones, it can be observed a significant improvement in real-time data achievement (Cangemi, 2015; Castka et al., 2020), as a result of both working and supervising cognitive technologies from the auditor position. KPMG (2017) is confident in 'supervised cognitive' technologies since combines cognitive science with the knowledge and skills of professional auditors, representing the best way to conduct an audit mission. Cognitive technologies allow analysis leading, valuable information exploration, and professional judgment.

KPMG's (2017) opinion is that audit firms' investments in RPA, ML and AI cognitive technologies are necessary to ensure the

continuity of the company's business objective and the quality of its audit missions, assuring a smart audit (Vasarhelyi, 2020). Knowledge of Neuro-Linguistic Programming (NLP) contributes to the understanding of intelligent applications in the form of chatbots (i.e. chat robots) or intelligent agents, which provide support in a digital world. Understanding NLP and ML can help auditors in the decision-making processes, by identifying patterns transposed from previous audit missions or making more accurate predictions regarding the risk of fraud, accounting transactions treatment, which is considered suspicious. Thus, technology supports and complements the auditor's working way and does not contemplate the replacement of this specialist (Castka et al., 2020). The 'intention' of IT is to amplify human capacity, not to replicate it (Deloitte, 2018).

It is well known that the current economic climate is characterized by a slow economy and a high degree of uncertainty, along with the ongoing regulatory process. The digital transformations make hard for auditors to interpret the Big Data phenomenon, since data meets various formats. In this respect, auditors are using analytic tools to ensure heterogeneity in clients data (Moffitt et al., 2018; Cohen and Rozario, 2019; Vasarhelyi, 2020), after all, the auditors possess the specialist role in coordinating the audit mission and formulating the final conclusions (Castka et al., 2020). In Romania, financial auditors are rather use Microsoft Excel, Ciel Audit and Revision, CaseWare, Gaudit. The aforementioned software include plenty of strengths, such as ease of data use, fast information access, cost reduction, multiple data management possibilities (Caranica, 2016). In line with software applications for audit missions, Microsoft Excel and CaseWare are facilitating audit tests and are frequently used by auditors who do not

master yet emerging technologies (Laureano and Pedrosa, 2016; William and Prawitt, 2016; Leite and Silva, 2018; Moffitt et al., 2018; Anders, 2019; Cohen and Rozario, 2019).

Emerging technologies are recognized, supported, tested and implemented by large companies (i.e. Big Four). New technologies can support the quality of the audit mission, especially in the busy-season, when auditors might encounter a wealth of assignments. In this respect, recent scholarly work recognizes the IT impact that contributes to an improved financial audit process (Zhang et al., 2015). Evolution is supported by the Big Data phenomenon (Griffin and Wright, 2015; Brown-Liburd and Vasarhelyi, 2015), Blockchain technology (Sutton, 2017; Ahmad, 2018; Rozario, 2019; Vasarhelyi, 2020), Machine Learning and RPA (Clark, 2018; Tiwari, 2018; Castka et al., 2020; Vasarhelyi, 2020). RPA can automate workloads that consist in a standard format processing and follow a routine process (e.g. the process of reconciling invoices with the corresponding payments by identifying the contract number or by the name of the customer). RPA consist of automation tools, which follow well-known processes, particularly repeating a set of test actions once performed by the user, performing the audit hands free (Vasarhelyi, 2020).

Currently, the migration from a traditional audit to a continuous/ tech/ future audit is presented by the literature as a development cycle (Byrnes et al. 2018), a journey into a digital world that requires (for the future) more effort from the specialists' side (CPA, 2017). This development is needed in order to achieve automation of specific and narrowed audit procedures, or complex audit workloads that for auditors is not easy to be observable. By complex audit workload, we understand work activities that involve consultation of

data from several sources, various formats, requiring detailed processing, that is a non-routine process. Changes with automation include documentation about data processing. At this step, auditors are checking the invoices issued by the same supplier, there might be identified no specification of VAT calculation on the external invoice, multi-line invoices, multi-page invoices with no due date calculated (according to contracts or related orders), no currency specification on invoices, or approximately identical invoices number (by only a short suffix added). For all of the above-mentioned examples, there is a complex inspecting process required.

Following data processing and business problem identification, the auditor may decompose complex business processes, identifying causes (e.g. late payments contract, customers who do not honor in time contractual obligations) and inconveniences (e.g. defective delivery process, poorly defined clauses). In this respect, any business process might be decomposed into standardized business processes, followed by patterns creation. The patterns may include inventory lists, orders, invoices and payment verifications. Once decomposed, work processes can be analyzed using Data Analytics tools and Machine Learning technology.

Through Data Analytics tools, financial auditors easily value the information from large volumes of data (i.e. Big Data), in order to interpret financial data and state relevant conclusions. By considering Data Analytics techniques, human reasoning, which in some situations may be limited, can be overcome. Actually, this is a major advantage of Data Analytics, exposing complex and hidden variables that the human factor could not identify at that particular time, reducing dependence on intuition and supporting the hypothesis with fact-based ideas. The reality behind the transactions can be obtained by

a diligence process, highlighting significant opportunities for the audited organization (i.e. output).

For Romanian auditors, using advanced, dynamic, integrated analytical tools allows obtaining information at a significant level of detail. Such performance in Data Analytics complies with the 2018 General Data Protection Regulation (GDPR), where non-compliance instigate potential penalties of up to EUR 20 million or 4 percent of the total annual previously reported turnover. Compliance with the GDPR introduces an important principle, specifically the responsibility for personal data protection. In this sense, the compliance risk for worldwide companies is increasing. Organizations are responsible for developing a framework designed to manage business risk and to predetermine actions to be taken whether there is a possibility that the calculated risk might endanger the company's performance.

In order to obtain a detailed, technical and reliable analysis as possible, companies need to invest in advanced data analysis tools. In this way, detailed technical perspectives on auditing acquisitions, revaluations of fixed assets, financial losses or impairment of assets might not be difficult to be obtained. Despite the advantages offered, Data Analytics is rather used to develop organizational strategies; in the first instance, there has been observed a reluctance to apply Data Analytics during the planning stage of the audit mission, specifically to know the client. Since data source varies in complexity and content, data analysis represents one of the primary responsibility of today's auditors, who seek to combine traditional audit techniques with new technologies.

The auditor called for support to ensure the quality of the audit engagement and to identify the most appropriate business solutions for

the audited entity. That is, between humans and AI, the development of technologies has led to a closer relationship and collaboration, contributing to the emergence of ML. The development of sophisticated algorithms, necessary to formulate predictions, serve as the foundation of ML performance. The more complex the degree of the audit engagement and the technology adopted, the greater the risk of formulating a non-compliance opinion. Therefore, learning (about) ML, analyzing data by Data Analytics, applying AI, examining Blockchain accounting recordings, identifying situations and technological advantages constitute the taken into account aspects for a compliance opinion (Cristea, 2020).

Audit companies use storage platforms for data analysis, applications and AI software that optimizes organizational information, analyzing large volumes of data (i.e. Big Data), necessary for processes optimization, invoice recognition, predictive analytics. The challenges in adopting and working with new technologies commence from integrating cognitive technologies with existing systems (Deloitte, 2018). Cognitive technologies cannot complete complex processes, but individual work tasks, components of a full process (i.e. financial audit mission).

A possible cause of people's resistance to embracing the new technological changes is due to insufficient knowledge and the how-to work perspective, understanding cognitive technologies at a satisfactory level required by work processes being a real challenge nowadays (Deloitte, 2018). Companies such as Apple, Google and Amazon, leaders in their good understanding and work performed, have successfully implemented new technologies. Their innovative strategies and future enabled steps are performing in the modern era, a world of AI and ML. Companies that adopt emerging technologies

and adapt to the new economical context should represent the 'guide light' for the audit profession, in order to derive advanced technological skills and appropriate measures to literate IT knowledge.

## RESEARCH METHODOLOGY

Given a series of coordinates intervening in the financial audit missions, such as fast software updates, type of audited client that varies depending on the activity field (e.g. at the state, at the private), a different legal basis from an operator to another, adopted technologies, this paper intends to clarify the IT impact in financial audit missions and in the romanian auditor profession. Specifically, the conducted questionnaire seeks the auditors' first impact, their adaptation and professional opinion regarding the new technologies' evolution.

This paper is based on qualitative empirical research, by conducting a survey (Sandor 2013, p. 119). The questionnaire was transmitted to certified auditors from Romania, comprising 19 questions with multiple choice answers and matrix type. The analysis of the answers received represents the essence of this paper, the objective is to identify the perception of the Romanian professional auditors regarding the IT impact. The reference is related to current technological changes presented in the analysis of the literature section. The questionnaire was administered exclusively to financial auditors from Romania, the e-mail addresses being found in the Public Electronic Register on the website [aspaas.gov.ro](http://aspaas.gov.ro), 'Certified Auditors' section. 4731 e-mails were sent, 103 responses were obtained, one response being removed because the participant was not part of the target group, resulting in 102 analyzed responses. The survey 'IT impact on audit missions' was conducted between December

15, 2019 - June 10, 2020, and addresses perceptible, organizational and administrative issues, about:

① the use of specific software (e.g. Ciel Audit and Revision, Gaudit, CaseWare, Acceler IT) in the audit activity;

② the specificity of the software used in professional activity;

③ perception of the first impact with the computer program used;

④ the type of technology the company's using for;

⑤ auditors' perception in regard to the emergence and development of Big Data, Data Analytics, Artificial Intelligence, Blockchain;

⑥ the extent to which technology has changed and penetrated the stages of the audit mission;

⑦ the future of this profession after the technological impact. Is it considered that this profession will be more and more improved, more appreciation added from the external environment and current work tasks gradually replaced by new technologies?

⑧ ensuring professional training for working with new technologies in order to achieve performance in audit missions;

⑨ the current training level in audit, taking into account the continuous (r)evolution of IT and the increasing requirements of stakeholders;

⑩ the fundamental qualities of today's auditor, in order to redefine them;

⑪ the possibility of changing the International Standards on Auditing (ISA).

First questions related to the position in the company (e.g. financial auditor, junior auditor, manager auditor, etc.), the field of work (e.g. public sector, private sector), experience in auditing (e.g. under 5 years, between 5-10 years, over 10 years), net turnover of customers (e.g. below 50,000 euro, between 50,000-100,000 euro and 100,000-500,000 euro, more than 500,000 euro) were designed

to identify details of respondent’s professional experience. The survey was based on specialized studies that analyzed the advantages of Data Analytics tools, the impact of AI, Blockchain and RPA, under the Big Data phenomenon. Also, a detailed formulation of the questions that constitute the survey capture aspects that the author has analyzed over years of work experience and during the university period, being itself an accountant verified by the auditors.

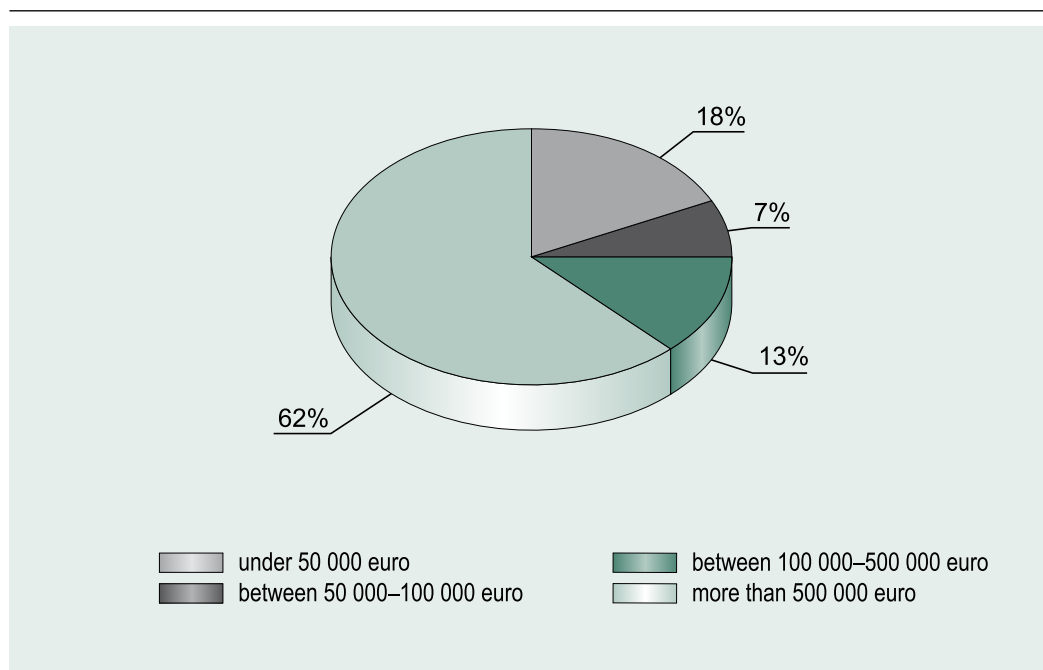
This paper complements previous specialized research, aiming to examine the implementation degree of new technologies in the auditing practice. The number of answers obtained is acceptable, given that previous specialized works presented a similar sample (Săcărin, Bunea and Gîrbină, 2013; Abou-El-Sood, 2015; Tarek, 2017; Rîndașu,

2017). Most respondents hold manager auditor position (24.5%), followed by partner auditor (20.6%), senior auditor (16.7%), internal auditor (13.7%), and other categories (financial auditor, internal public auditor, deputy director, head of financial accounting department, advisor, economist) (Figure 1).

The professional experience of auditors varies. Respondents with less than 5 years of professional experience answered in a proportion of 11.8, between 5 and 10 years respondents answered for 17.6%, and most of the respondents have more than 10 years of experience, the percentage was 7.6. Survey participants work mainly in the private sector (83.3%), but also in the public sector (16.7%). The clients’ net turnover varies, most auditors work for clients who reported over 500,000 euro net turnover (61.8%).

Figure 1

**NET TURNOVER OF AUDITED CLIENTS**



Source: own processing of the authors, based on the collected data

## RESULTS AND DISCUSSIONS

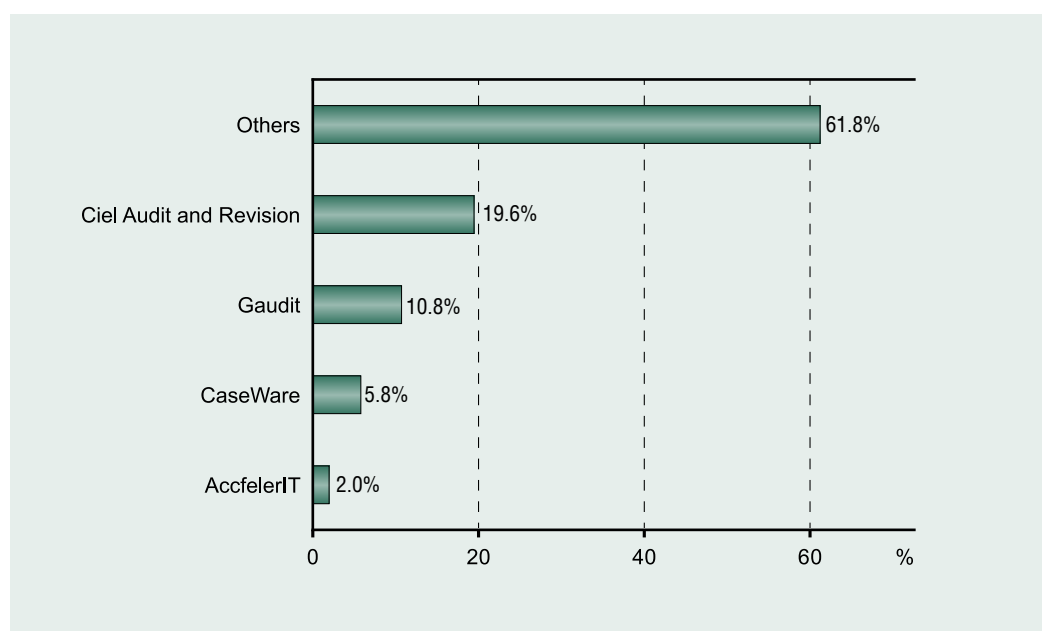
Most of the answers apply to respondents with experience in auditing, who acquired solid knowledge, considering the position in the company (i.e. manager auditor), the average age was about 51 years and more than 10 years as professional experience. The participants were asked whether they use specific software in their activity, 62.7% affirm the practice with computer programs in their daily work. We already know that, nowadays, the usefulness of accounting and audit software is widely recognized in the financial sector, where for the proper conduct of an audit mission there are various steps necessary to be performed, such as verifications, correlations, detailed data tests and numerous consultation sources, for comparisons between factual and number evidence.

Another question in the questionnaire refers to the software used in professional activity (*Figure 2*).

According to the results of our survey, Ciel Audit and Revision is used by 19.6% of Romanian auditors, 10.8% use Gaudit, followed by CaseWare (5.8%), AccfelerIT (2%). 61.8% indicate for the professional activity other software, such as Microsoft Excel, CAATs, BCOMM Audit Manager, IDEA® Data Analysis Software, B&B, Pentana, AuditX, AURA (PwC specific audit software), SAGA for accounting verification, SAP Audit Management, SIUI, SIPE, Sintact.ro or other software developed internally by the company. Ciel Audit and Revision is extensively used in Romania, by the accessible menu and intuitive commands, representing a reliable IT support for auditing activities. In Big Four companies, IDEA® Data Analysis Software is

*Figure 2*

### SOFTWARE USED IN THE AUDIT MISSIONS



Source: own processing of the authors, based on the collected data



more than popular, including diverse tools for data extraction and analysis of high-risk amounts. The auditors were able to use the 'other' answers section whether the predefined variants were not appropriate.

Comparing our results with Caranica (2016) based on the survey conducted in 2015, we might take into account that romanian auditors remained consistent and preponderantly, credible to various applications (Microsoft Excel, Ciel Audit and Revision, CaseWare, Gaudit). However, our results showed other software applications too, taking into consideration the technology developments between 2015 and 2020. The first technological impact was perceived to be hard at first and easier in time, respondents adapting to new technologies (37.3%), while the other category believed that computer programs were easy to use

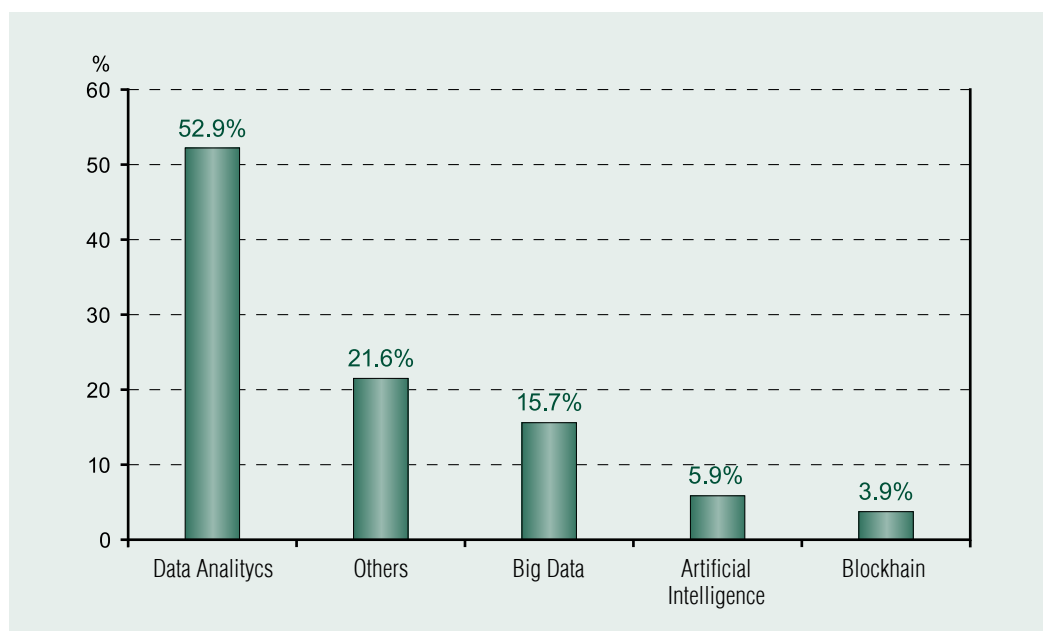
and accessible (33.3 %). For 10.8%, the first impact was hard, requiring assistance in this regard. Since most entities are based on the recording and processing of financial-accounting information, taking into account the impressive technological advances, nowadays, companies (even small businesses) use specific software in order to provide real-time information, for clients and investors.

The *Figure 3* shows that Data Analytics is the most common tool used by financial auditors from Romania (52.9%), a result determined by the Big Data phenomenon (21.6%).

Detailed analysis is performed through Data Analytics, a tool that assist auditors in a better understanding of clients' data. An affirmative answer was also found in AI (5.9%) and Blockchain (3.9%). AI and Blockchain, two relatively new technologies in Romania and interesting for the auditor profession,

*Figure 3*

**EVOLUTION OF TECHNOLOGY TYPE**



Source: own processing of the authors, based on the collected data

will be soon transposed to a complete level. Blockchain advantage is characterized by the safety transactions audit, in other words, the impossibility to alter data once created. AI refers to the robotics workload that currently is time-consuming and is presently performed by the auditors. By creating intelligent modules, AI can select transactions that were previously perceived as potential risks of fraud, followed by the analysis and detection of ambiguous situations.

The remaining 21.6% of respondents applied other tools or preferred other working techniques, such as Data Automation and Data Analytics, Excel, Document Management System, VPN, in-house developed software, designed software with integrated modules for contracts/projects, for tracking the execution of the physical and value quantity on calculation items, acquiring information in the financial accounting modules (that is information about payments and receipts, customers and debtors, creditors, revenues and costs), management programs and personalized bookkeeping, electronic audit files, associating databases for methodologies, automated questionnaires, sampling software (Figure 3).

Despite implementation costs, (in particular) large companies were the first to integrate new information technologies for financial systems, due to the availability of high information quality. At the same time, dependence on Data Analytics, Artificial Intelligence and Blockchain functionality will lead to audit trail visibility, reducing human inputs, lowering error rate, reducing workloads. By adopting emerging technologies, for example, the auditor would be able to automate debt filtering transactions older than 1 year or automation of contracts that exceed 100,000 RON.

55.9% of respondents considered ready for new technologies adoption, a percentage of 29.4 reported not being fully prepared, while

14.7% detailed about a positive attitude, open for training and technological preparation. Respondents need more information for the adoption, by reason of everything which is new, requires to be explained. As a particular case, from the analysis of the responses, particular auditors do not feel ready to work with robots. RPA represents relatively a new subject in the auditing profession and has recently advanced in financial audit. With the full implementation of RPA, the auditor will no longer be responsible for confirming repetitive workloads (i.e. thickening and bashing) that complete the audit process, the software or the robot being responsible for repetitive operations, which follow a certain routine process and for which most situations are already known, embedded in patterns for RPA analysis. Another respondent particularized the auditing, being a continuous development field, you can never be fully prepared, as an auditor your responsibility is to continuously acquire new technological skills.

Technology has significantly changed the way work is performed and the auditors' profession itself (74.5%). In the past, checking financial information was extremely time-consuming, and presently, there exists the possibility to conduct easily and quickly analysis by way of internally developed software and Data Analytics tools. 14.7% of respondents believed that technology changes the trajectory of the audit mission to an insignificant extent. This category is represented by auditors who previously were detailing about a resistance to change, conducting audit tests based on old verification methods, and not on the new ones. Analyzing more specifically this group of auditors (i.e. resistant to change), the average age was 51 years, previously stated that they do not feel ready for adoption and work with emerging technologies.

4.9% believed that technology will completely change the way this process is

conducted, taking into account the current economic acceleration. At short intervals there may be designed and implemented dozens of software updates, might be completed stages of the audit mission that previously lasted longer, weeks or months. Also, there might be debated strategic analyzes on the audited financial statements, all this progress following the software results, which are more efficient than manual work. It would not be surprising that technology will (completely) change the audit mission flow, from the smallest detail and to the finality of this process, that is to automate the transmission of the audit report, once completed this process.

The future of the audit profession is perceived in a positive way, in the sense that technology helps auditors in audit missions (44.1%), this redefining is due to the impact of emerging technologies (45.1%). A very small percentage of respondents perceive the future of the profession in an uncertain manner (7.8%). This is because the level of technology, elusive for Romania, is difficult to be achieved. Due to the low IT appliance perspective in economy and society, the integration of digital technology and digital public services experience insufficient progress.

Continuous training is provided by financial auditors in Romania by participating in training courses (CAFR) (40.2%), by documenting (15.7%) and testing new Big Data technologies, such as AI, Data Analytics, Blockchain (13.7%) and by attending training (13.7%). Among other answers, there were mentions about the integration of new policies, practices and working methods, followed by testing and application of new technologies. Currently, training programs continue to take place in large companies. The multinationals implement and develop AI programs, meant to bring benefits both at the audit procedural level and at the quality level, through a deeper understanding of financial data.

In Romania, the current training level is average (68.6%), other respondents perceived the level to be reported as low (19.6%). Romania is situated somewhere in the middle of technological trend changes, taking into account the results of the conducted survey, and the current technological development state in Romania. Only a percentage of 10.8 from the respondents advocated for an advanced training level. Even if the work with the new technologies is not very developed, the respondents claimed that they had noticed a higher capacity for analysis and forecasting (51%), followed by methodological changes (22.5%). The change in the auditor's profile was considered by respondents as a consequence (16.7%), along with the data analysis focus that includes forecasts (5.9%). Only 2% of respondents believed that the development of emotional intelligence would be part of the change.

It is certain that the auditor profession will be more and more improved. 51% of respondents agreed with this statement, the current workloads being gradually replaced by new technologies (32.4%). In the future, it is considered that the auditing profession will be more appreciated by the external environment (15.7%) since the quality of audit missions will be considerably improved. Specifically, the degree of appreciation will meet an advancement, the usefulness of this profession will be higher recognized.

With reference to the current auditor qualities, professional skepticism (56.9%) was considered the most important virtue. Resulting 20.6%, respondents believed that understanding the competitive environment is essential, in addition to developing emotional intelligence (8.8%), developing empathy with customers and business research. Respondents considered that it is more than appropriate to combine their knowledge with an IT audit since regulations are becoming increasingly complex in this respect.

Regarding the possibility of amending the International Standards on Auditing (ISA), 71.6% of respondents contemplated that ISA will change, 19.6% did not consider any details about them, while 5.9% pleaded to a non change. 2.9% recognized that ISA will certainly be reformed with the Code of Ethics. Like any business process, the audit is a process that can be perfected, as the Code of Ethics should include cases regarding the implementation of AI. Finally, for better functionality of the audit, IT played a key role in ensuring progress (57.8%). IT will help the audit profession to become 'friendly' with new technologies, providing evidence of a forward-looking perspective, marking an important transition in the evolution of this sector (33.3%). By implementing information technology, 5.9% of respondents acknowledged a contribution of ERP systems to better management of the business, improving analysis and business forecasts.

Financial auditors in Romania used AI in a proportion of 5.8, this paper presenting an affirmative answer from only 6 of the 103 respondents. This result may be due to the ignorance or non-recognition of the 'power' of this technology, which allows companies to enter into the immensity of available data (i.e. Big Data), to better know the markets and activity segments on which the audited company operates. By CAATs, which are already part of the data processing 'procedure', the emergence of AI would make it possible to gather and evaluate related data sources and models that could be adopted in data analysis processes. Moreover, AI makes this possible in a much faster way than would have been expected in the past.

We can take the revenue recognition example, known as a complex process, given the connections between companies and their services provided, the information flow which ensures the business processes completion.

In other words, the complexity behind these transactions can become a hard audited process and may result in unmanageable tasks, concluding in high workloads. Traditionally, the auditor would use a sample and would examine the source of the supporting document, checking how transactions are accounted for, and the revenue recognition method.

## CONCLUSIONS

This paper detailed how IT impacts the audit sector. Over time, progress has been impressive in the way of performing work, engaging in audit methodologies and investigating probabilities of fraud. During the fourth industrial revolution, Data Analytics tools, the emergence of AI, Robotic Process Automation development, Blockchain security transactions lead to a new Big Data era in auditing. The results of the survey revealed a visible awareness at the professional level regarding the need for more and advanced development of professional work skills and a (full) recognition of the technological impact.

It is necessary for financial auditors to learn how the stages of the audit engagement could become automated. Lack of specialized training or technical experience may prevent adaptation to the new automatic work systems. Low job satisfaction and productivity level can occur due to insufficient knowledge of new technologies, requiring the development of new working skills to practice this profession. In order to promote new technological improvements and to become usual for companies, frequent training should be considered, in other words, to understand the theory for the practice. By the 'usual' term we understand that new technologies become common in audit missions, this means the

auditor verifying the information (through the system) using an automated technique, by easily accessing Data Analytics and AI tools. Respondents were of the opinion that specialized training and documentation about new technologies would significantly contribute to the adoption of technology to be considered 'usual' in the audit missions.

Both future and current audit practitioners might take into account a proper response to business needs. Recently, international professional bodies have begun to sound the alarm on acquiring new working skills set towards contemporary technological audit systems. By accessing current information about future technologies, it would create valuable support for understanding emerging technologies, therefore to a rigorous checking on audited data by reducing non-compliance risk. During the analysis performed, we provide evidence that in Romania, the knowledge sphere that should be significantly developed is not fully defined. In the author's view, professional bodies should consider the definition of a new and clear set of competencies for financial auditors, in order to significantly reduce the lack of knowledge percentage, reported in this paper.

The auditor is the one who takes the final decisions and provides the organization the control keys for reviewing the organizational strategy, implementing more efficient controls and to schedule repeated operational processes, in order to obtain a better future

evaluation. Because, in the end, the auditor is the professional in charge of the audit report, using his professional skepticism, we consider that technology represents support for the auditor, complementing the auditing activity. Respondents are mostly unaware of the amendments to the International Standards on Auditing (ISA), but there are some question marks about unknown details. As a result of the survey, participants believe that, indeed, ISA should undergo changes for a better harmonization with the auditor's Code of Ethics.

It is undoubtful that emerging technologies induce a deeply positive impact on the auditing profession, environment and the most important, efficiency and optimization to the day to day processes. Auditors are aware of the need for a new start, that is to embrace viable alternatives, to increase their knowledge about Data Analytics, Blockchain, RPA, Machine Learning in order to update the existing procedures with the new ones. This paper provides support for CAATs as well since CAATs bring auditors the possibility of increasing data processing and continuous monitoring. Proof-of-work through the Blockchain and AI audit software represents an essential boost for the financial sector, even if auditors and accountants are not yet enlightened with new technologies and how can be used. This would be crucial in order to remain relevant and to be successful in both professions.

---

## REFERENCES

- ABOU-EL-SOOD, H., KOTB, A., ALLAM, A. (2015). Exploring Auditors' Perceptions of the Usage and Importance of Audit Information Technology. *International Journal of Auditing*, 19(3), pp. 252-266
- AHMAD, A., SAAD, M., BASSIOUNI, M., et al. (2018). Towards Blockchain-Driven, Secure and Transparent Audit Logs. In Proceedings of the 15th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services. pp. 443-448

- ANDERS, S. B. (2019). Audit Resources. *The CPA Journal*, 89(2), pp. 70-71
- BROWN-LIBURD, H., VASARHELYI, M. A. (2015). Big Data and Audit Evidence. *Journal of Emerging Technologies in Accounting*, 12(1), pp. 1-16
- 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, pp. 285-297
- CARANICA, C. (2016). Cercetari Privind Utilizarea Instrumentelor Informatice în Auditul Financiar. *Audit Financiar*, 14(1), pp. 32-39
- CASTKA, P., SEARCY, C., MOHR, J. (2020). Technology-enhanced Auditing: Improving Veracity and Timeliness in Social and Environmental Audits of Supply Chains. *Journal of Cleaner Production*, 258, 120773
- CLARK, A. (2018). The Machine Learning Audit – CRISP-DM Framework. *ISACA Journal*, 1
- COHEN, M., & ROZARIO, A. (2019). Exploring the Use of Robotic Process Automation (RPA) in Substantive Audit Procedures. *The CPA Journal*, 89(7), pp. 49-53
- CRISTEA, L. M. (2020). Innovations in Financial Audit based on Emerging Technologies. *Audit Financiar*, XVIII, 3(159)/2020, pp. 513-531, <https://doi.org/10.20869/AUDITF/2020/159/016>
- GARTNER (2019). Why Audit Leaders Need to Adopt RPA. Retrieved July 3, 2020, from <https://www.gartner.com/smarterwithgartner/why-audit-leaders-need-to-adopt-rpa/>
- GEPP, A., LINNENLUECKE, M. K., O'NEILL, T. J. et al. (2018). Big Data Techniques in Auditing Research and Practice: Current Trends and Future Opportunities. *Journal of Accounting Literature*, 40, pp. 102-115
- GRAY, G. L., DEBRECENY, R. S. (2014). A Taxonomy to Guide Research on the Application of Data Mining to Fraud Detection in Financial Statement Audits. *International Journal of Accounting Information Systems*, 15(4), pp. 357-380
- GRIFFIN, P. A., WRIGHT, A. M. (2015). Commentaries on Big Data's Importance for Accounting and Auditing. *Accounting Horizons*, 29(2), pp. 377-379
- LAUREANO, R. M., PEDROSA, I. (2016). Computer-assisted Audit Tools in Verification Tasks: Implementation in Microsoft Excel and in CaseWare IDEA. In 2016 11th Iberian Conference on Information Systems and Technologies (CISTI), pp. 1-7
- LEITE, J., SILVA, A. (2018). Computing Prediction Intervals with CAATs: Implementation in CaseWare IDEA and Complemented in R Project Software. In 2018 13th Iberian Conference on Information Systems and Technologies (CISTI), pp. 1-6
- MOFFITT, K. C., ROZARIO, A. M., VASARHELYI, M. A. (2018). Robotic Process Automation for Auditing. *Journal of Emerging Technologies in Accounting*, 15(1), pp. 1-10
- RÎNDAȘU, S. M. (2017). Emerging Information Technologies in Accounting and Related Security Risks—what is the Impact on the Romanian Accounting Profession. *Journal of Accounting and Management Information Systems*, 16(4), pp. 581-609
- ROZARIO, A. M., THOMAS, C. (2019). Reengineering the Audit with Blockchain and Smart Contracts. *Journal of Emerging Technologies in Accounting*, 16(1), pp. 21-35

- SĂCĂRIN, M., BUNEA, Ș., GÎRBINĂ, M. (2013). Perceptions of Accounting Professionals on IFRS Application at the Individual Financial Statements: Evidence from Romania. *Accounting and Management Information Systems*, 12(3), pp. 405-423
- SUTTON, A., SAMAVI, R. (2017). Blockchain Enabled Privacy Audit Logs. In International Semantic Web Conference, pp. 645-660
- ȘANDOR, S. D. (2013). Metode și tehnici de cercetare în științele sociale, *Tritonic*
- TAREK, M., MOHAMED, E. K., HUSSAIN, M. M. et al. (2017). The Implication of Information Technology on the Audit Profession in Developing Country. *International Journal of Accounting & Information Management*
- TIWARI, A., HOODA, N. (2018). Machine Learning Framework for Audit Fraud Data Prediction. *Universal Review*, 7(6), pp. 164-167
- VASARHELYI M., (2020). Smart Audit: the Digital Transformation of Audit. In BIG DATA and Digital Audit. (1) pp. 27-35, Retrieved November 30, 2020, from [https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20\\_01/JOURNAL20\\_01.pdf](https://www.eca.europa.eu/Lists/ECADocuments/JOURNAL20_01/JOURNAL20_01.pdf)
- WILLIAM JR, M., GLOVER, S., PRAWITT, D. (2016). Auditing and Assurance Services: A Systematic Approach. *McGraw-Hill Education*
- ZHANG, J., YANG, X., APPELBAUM, D. (2015). Toward Effective Big Data Analysis in Continuous Auditing. *Accounting Horizons* 29(2), pp. 469-476
- CPA (2017). Blockchain Technology and its Potential Impact on the Audit and Assurance Profession. Chartered Professional Accountants Canada and the American Institute of CPAs
- Deloitte (2018). Cognitive Technologies, Retrieved. July 1, 2020, from <https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/technical-primer.html>
- KPMG (2017). Harnessing the Power of Cognitive Technology to Transform the Audit. KPMG International