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THE ADAPTATION OF INDEPENDENT AUDIT PROFESSION TO THE DIGITAL ERA

Sezin AÇIK TAŞAR

Dr. Öğr. Üyesi, Beykoz Üniversitesi,
İşletme ve Yönetim Bilimleri Fakültesi,
sezinaciktasar@beykoz.edu.tr
0000-0002-0406-7734

Hakan ERKUŞ

Prof.Dr., İnönü Üniversitesi,
İktisadi ve İdari Bilimler Fakültesi,
hakan.erkus@inonu.edu.tr
0000-0003-0925-9396

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Abstract

Today, the independent audit profession has updated the auditor's role from working among piles of paperwork to digital age. Unprecedented innovations in this area are cognitive technology (artificial intelligence), predictive analytics, workflow automation and smart digital hubs, and electronic audit apps; eliminating humdrum and labor-intensive manual processes that are traditionally associated with audit process. Moreover, these innovations can increase the quality of audit and provide more benefits for customers, auditors, investors and capital markets as a whole. On the other hand, in line with these developments, today's auditors should keep their professional knowledge and skills up-to-date in order to meet the challenges posed by the profession and should be able to follow the new developments in the sector closely. In addition to these, the COVID-19 pandemic has forced the audit industry to work remotely and strengthen its infrastructure with digital technologies in order to obey the full disclosure restrictions. This study aims to highlight the innovations experienced by the audit profession and to specify the qualifications that should be improved by those who are willing to work in the audit in the future. In addition, suggestions are made in order to achieve efficient and quality results in the face of positive situations such as technological developments that may occur in the audit sector in the future or negative situations such as global pandemics. This study contributes to the literature on emphasizing the need to transform audit services by integrating new technologies and enriching studies on audit quality.

Keywords: Audit, Innovations in audit, New generation auditor, Remote auditing, COVID-19

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BAĞIMSIZ DENETİM MESLEĞİNİN DİJİTAL ÇAĞA ADAPTASYONU

Öz

Günümüzde denetim mesleği evrak yığınlarının arasında çalışan denetçilerden rolünü dijital çağa göre güncellemiştir. Bu yenilikler bilişsel teknoloji (yapay zekâ), tahmine dayalı veri analizleri, iş akışı otomasyonu ve akıllı dijital dağıtıcılar ve elektronik denetim uygulamaları olup, geleneksel olarak bir denetim süreci ile ilgili olan sıkıcı ve emek-yoğun süreçleri ortadan kaldırmaktadır. Bunun ötesinde, bu yenilikler denetimin kalitesini artırabilir ve müşteriler, denetçiler, yatırımcılar ve sermaye piyasaları için daha fazla fayda sağlayabilir. Artan denetim kalitesi ve hızının, piyasada daha kapsamlı bilgiye daha kısa zamanda ulaşma olanağı sağladığından, piyasanın tüm aktörlerine büyük fayda sağlayacağı açıktır. Öte yandan, günümüz denetçileri bu gelişmelerle birlikte, mesleğin yarattığı zorluklara cevap verebilmek için mesleki bilgi ve becerilerini güncel tutmalı ve çağı yakından takip edebilmelidir. Ayrıca, COVID-19 pandemisi tüm sektörleri olduğu gibi denetim sektörünü de uzaktan çalışmaya ve dijital teknolojilerle altyapısını güçlendirmeye zorlamıştır. Pandemi sürecinde yaşanan tam kapanma kısıtlamaları denetim sektörünü uzaktan çalışma yöntemine zorlamıştır. Bu çalışma, denetim mesleğinin dijital çağa ayak uydurabilmek için yaşadığı inovasyonların altını çizmeyi ve gelecekte denetimde çalışmaya denetimde çalışacak kişilerin yaşanan gelişmeler doğrultusunda geliştirmesi gereken unsurları belirtmeyi amaçlamıştır. Ayrıca, gelecekte denetim sektöründe yaşanabilecek teknolojik gelişmeler gibi olumlu veya küresel pandemi gibi olumsuz durumlar karşısında verimli ve kaliteli sonuçlara ulaşılabilmesi adına önerilerde bulunulmaktadır. Bu çalışma, yeni teknolojileri entegre ederek bağımsız denetim hizmetlerini değiştirme ihtiyacının vurgulanması ve denetim kalitesi konusundaki çalışmaları zenginleştirme konusunda literatüre katkıda bulunmaktadır.

Anahtar Kelimeler: Denetim, Denetimde inovasyon, Yeni nesil denetçi, Uzaktan denetim, COVID-19

INTRODUCTION

The World is continuously changing. During times of financial crises, it becomes more apparent that the financial systems are globally interconnected. This interconnectedness would bring greater global prosperity; however, at the same time it would cause higher systemic risk (Jeffrey and Gambier, 2016). On the other hand, as financial crises create a decrease in confidence in society, it is so obvious that audit profession is one of the solutions. In order to succeed, it is inevitable that auditors need to adapt themselves to the challenges of large societies and interconnected world expectations.

The internet, a complex global network, has changed our world and revolutionized the way we exchange information (Warburg, 2016). This change effects any kind of business that is related to exchanging information. Audit is one of them. The elements that changed in the competitive markets are the environment of accounting profession and expectations of interest groups from audit and auditors. Initially, audit sector adapts itself to those changes over the years like all other professional sectors. Keeping up with the environmental, economic and technological changes over the years is one of the factors protecting the industry in the competitive market. Thus, change is also inevitable for accountants. According to the study made in 2016 by ACCA (The Association of Chartered Certified Accountants), it is determined that smart machines and new mass media tools are the devices the accountants will need globally (Jeffrey and Gambier, 2016).

Demands for financial statements of a company by the different interest groups are also increasing through new technologies applied in the audit procedures. For instance, stockholders expect auditors to use new audit procedures to increase audit efficiency. Therefore, the quality of audit will become better

and reporting times will be shortened. Investors, who is another interest group member for financial statements of a company, want to reach non-financial data. These demands would be met by new technology tools for audit easily.

Besides, while the world is struggling with the impact of the COVID-19 global pandemic, all countries have taken their own precautions against the pandemic. Lockdown which is one of the precautions that many countries applied, has caused all sectors to change the way they do business. The audit sector has also been affected by this change, as clients companies continue their businesses by remote working method. Hence, the audit industry has been forced to adapt remote working method and digital technologies due to the pandemic.

Depending on all these changes, auditor needs to improve his/her technological knowledge as well as auditing standards, financial accounting, financial reporting, internal control, management accounting and tax. The audit quality is emphasized more than before, due to the risk of audit and professional skepticism increased.

In this study, there are suggestions on the innovations which are expected to be implemented in audit profession in order to keep up with changes of competitive market conditions. Also, how auditors need to act with these innovations is also explained.

This study contributes to literature on the digital transformation of independent audit profession and audit firms in general. It also highlights the need to change independent audit services by integrating new technologies and enrich the work on audit quality.

1. OUTSTANDING INNOVATIONS IN THE INDEPENDENT AUDIT PROFESSION

Considering the changes in financial statement auditing over the years, significant financial crises needs to be observed. For instance, the period after the stock market crash in 1929 had become the start of gaining public confidence in global markets for financial statement auditing in modern era (Coffey, 2018).

Since then, the audit profession has kept going on improving continuously by adapting itself to digital era. Due to the increasing data analysis and Certified Public Accountants' (CPA) contribution to the audit process, the audit profession has been improved. Automation and digitization of information may reshape the audit function (Coffey, 2018).

KPMG, which is one of the four biggest audit firms in the world, has published "Audit 2025" report in October 2016 out of 200 participants in USA. The participants were 46 audit committee members, 62 financial affairs managers, 19 senior audit officers, 18 senior tax officers, 21 controllers and 34 financial reporting directors. According to the research, 45% of the participants have requested that the scope of audit should be expanded as including finding fraud risk and the company's risk management processes, and improved analytics on information technologies systems. On the other hand, %80 of the participants think that auditors should expand sample sizes for the accounts and use more advanced technologies while collecting and analyzing data. According to Chief Financial Officer of Arrow Electronics, Chris Stransbury, audited client businesses now expect a much more detailed understanding of globalization, competition, changing legislation, opportunities and how to navigate risks from the current perspective (KPMG Audit 2025 Report).

The pace of recent changes in audit profession is remarkable. Advanced analysis, robotic process automation, and cognitive technology (artificial intelligence) are the major change elements in audit (KPMG Audit 2025 Report). In order to understand the change better, an example can be given from one of the biggest audit firms, Deloitte. 40% of accounting works were automated with robotics in Deloitte by 2020 (Coffey, 2018).

The main areas of this advanced technology that will improve the auditing profession for today and later are summarized as follows:

1.1. Cognitive Technology (Artificial Intelligence)

According to the article published by Deloitte, the cognitive technology, also known as artificial intelligence, can analyze large pieces of data digitally which is thought to be realized by today's audit teams. The cognitive technology contains algorithms enabling software to detect information and think like a human being. Auditors can use cognitive technology to redesign audit processes, thus structured and unstructured data analysis, which was not possible previously, can be performed. For instance, information from non-traditional sources such as social media, TV etc. can be examined and compared to the client's records. Advanced analytics can also be used in order to detect potential risks more clearly (www.forbes.com).

Artificial Intelligence technology includes computer systems theories that can enable and improve human tasks. Two of the artificial intelligence technologies can be related to audit profession. One of them is Natural Language Processing, which is the technology that enables reading and understanding main concepts of electronic documents. The second technology related to audit profession is Machine Learning, which is the technology enabling a system improving itself without reprogramming (Raphael, 2017).

On the other hand, according to KPMG USA New Audit Solutions Leader, Brian Foster, auditors can perform high quality audit works by using cognitive technology. The dataset can be examined in details, the risks and financial reporting process of the audited company can be revealed by cognitive technology (KPMG Audit 2025 Report).

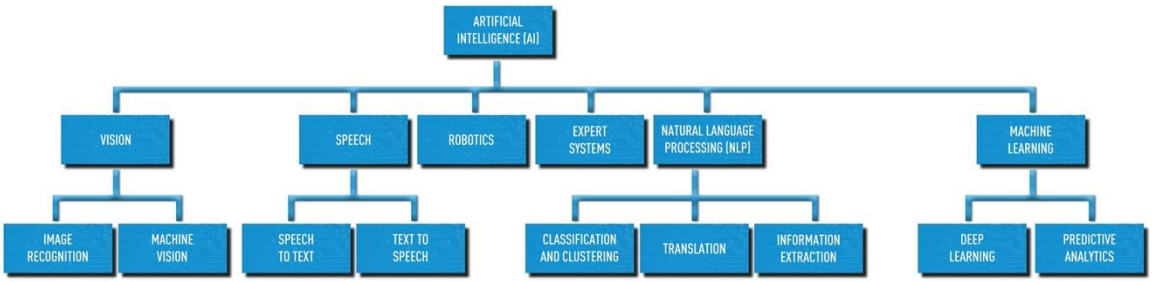
Artificial intelligence has various effects on auditing (Boillet, 2018):

- It can be used to automatically monitor financial transactions,
- It can speed up fraud detection by creating models that focus on complex machine learning.
- It can be used to interpret a variety of data sources such as e-mails and audio files from meetings.
- It can allow auditors to use their intuition to evaluate documents on a larger scale and in greater depth.

In Figure 1 below, various types of artificial intelligence used for auditing to be applied different types of tasks can be seen. This has been made possible by exploiting (Genest, 2019):

- exponentially growing datasets such as financial statements, digital images, sound recordings,
- innovative algorithms that can make logical inferences and understand human language,
- smart equipment (robotics) that can learn autonomously.

Figure 1. Types of Cognitive Technology (Artificial Intelligence)



Source: Romanini, 2018.

One of the Big Four audit companies, Deloitte, has launched AI based tailored audit program that fits every kind of businesses, called Omnia. With this program, the company offers to prepare unique audit work to its clients by focusing on the client's unique risks. Raphael, National Managing Partner of Deloitte & Touche LLP, mentioned that Omnia has realized customer fit audit works by embracing the power of the data, automating manual processes and centralizing project management. A client who has experienced the audit work of Deloitte's Omnia program describes it as the use of the program's highly advanced analytics of large datasets. In addition, Omnia program was named as digital innovation of the year in 2021 by International Accounting Bulletin (www.deloitte.com).

1.2. Predictive Analytics

According to IBM, predictive analytics defines advanced analytic techniques in order to make predictions about future forecasts based on historical data and statistical modeling, data mining, and machine learning techniques. Since today's companies are attached to big data, data scientists use deep learning and machine learning algorithms to find data patterns and make predictions to define future forecasts (ibm.com).

In independent audit profession, predictive analysis also includes using advanced data analysis techniques while forecasting future. In high-quality auditing, auditors can benefit from digital tools in order to obtain information from a company's system and they can use predictive analytics to determine expected and unexpected results and trends. This type of analysis can be happened for various reasons. Providing information about audited client's business and financial risks are one of the major reasons. Auditors can use client's information to both analyze information about the audited client in detail and to compare this data with the competitors in the sector. Nevertheless, predictive analysis is performed to point to the potential results rather than providing future information (www.forbes.com).

With the aid of advanced technology, tedious and time consuming audit work could be automated (Teeter and Brennan, 2010). The idea of predictive auditing is that instead of just auditing past events and looking back to create corrections based on changes or errors that have already occurred, auditors can perform the audit in a way that they can detect or avoid quickly (Kuenkaikaew and Vasarhelyi, 2013:39).

1.3. Workflow Automation

Many audit transactions, which was time consuming so much previously due to being performed manually by auditors, can now be automatized with the help of technology (Tysiac, 2017). Thus, it will decrease of boredom of monotony and give a chance to perform faster and more comprehensive analysis.

For instance, one of significant audit transactions is electronic document review, which is already automatized with workflow automation and artificial intelligence. Auditors from Deloitte teach Argus, a licensed cognitive technology application, to enable audit specific document query and analysis fast. This application uses Natural Language Processing and Machine Learning technologies in order to read and analyze any kind of electronic document. Argus application, newly launched to the markets, auditors from Deloitte have started to use this application to research various kinds of documents such as sale agreements, invoices, financial statements and lawyer letters (Raphael, 2017). Tools with machine learning technology such as Argus is able to analyze hundreds of documents quickly and reach more effective results in the desired date ranges. This means that researches that are expected to last for days, can be done in real time with the help of this technology.

1.4. Smart Digital Hubs and Electronic Audit Apps

As the concept of remote working was not included in this profession until a short time ago, it was only possible for auditors to access customers' information systems by going to the customer's workplace. In one sense, auditors had to work desk-bound. Then, mobile technology gave the chance to the auditors as working outside of the office and at the client company's site. But now, digital hubs are accepted as the latest trend of financial technology. Digital hubs can be utilized as "smart platforms" where auditors can use real time data, analytics, automation and visualization remotely (www.forbes.com; Date of Access: 28.09.21).

On the other hand, many calculations performed manually in audit can be calculated automatically with the tools which are known as electronic audit applications. Due to these applications, auditors can make not only simple tasks like ratio analysis, but also complex queries to investigate abnormal accounts or activities.

In coming years, audit applications expected to be implemented may be composed of a script or procedure that collects, analyzes, or presents data in several formats, for instance (Vasarhelyi et al., 2014):

- *Control Board;* provides an instant visualization of data status,
- *Analyzes;* uses for statistical and summary procedures,
- *Query;* choose records that match some certain criteria,
- *Trend;* evaluates values in a time range,
- *Ratio;* compares data relations,
- *Data Matching;* uses for finding duplicate and missing data,
- *Classification;* groups data items with similar characteristics.

2. LITERATURE REVIEW

Digital approaches in independent auditing have taken place in the studies of many researchs on the literature. Some of the latest studies have been compiled in the literature research section below.

First of all, Ertaş and Güven (2008) performed a study on how information technologies affect the auditing process. The study was based on the questionnaire results taken from 21 audit companies. As of study, it was determined that the costs of software development, software purchasing and hardware were high with respect to the costs of employee training. It was determined that, with information technologies, experienced employees can focus on more technical and risky areas, the job satisfaction and morale level of audit employees increase, and audit studies can be examined more easily.

Similar results have been taken from other researches. For example, Taş and Mert (2019) prepared a study on the effects of technological improvements related to artificial intelligence in audit profession. In the study, the authors declared that the more varied artificial intelligence applications were, the more efficient they were. Another result of the study was auditing would become more effective if artificial intelligence applications were performed full time.

Focusing on the quality of the audit service, Manita et al. (2020), studied on digital transformation of independent audit. In the study, authors aimed to investigate how digital tools affect external audit and corporate governance. In the result part of the study, it was found that digitalization allowed auditors not to waste time on humdrum and repetitive tasks and focused on more added-value tasks for their customers. Also, with the help of digitalization, the audit quality became better by offering real-time auditing services, validation of forecast data etc.

Likewise, Lohapan (2021) performed a study on digital accounting implementation. During the study, the effects of digital accounting implementation on the auditors in Thailand were discussed. The results of the study were stated as digital accounting implementation plays a crucial role while enhancing the audit report, audit performance and competency.

Barac et al. (2021) also had similar results of digital transformation of auditing process. They conducted a semi-structured interview study on changing the audit practice recent years. The aim of the study was investigating how auditor's ways of working need to be reformed and making suggestions about it. At the end of the study, it was found that audit firms had complex adaptive systems which includes remote audit approaches with virtual audits.

Some researchers performed audit related studies with general information about digital technologies used in auditing process. For example, according to Kirkos et al. (2010), auditor appointment was related to the audit quality and affected by several factors. In order to retain the right auditor at a fair price, three artificial intelligence techniques were used in the study. At the end of the study, two AI techniques outperform logistic regression.

Another researcher, Omoteso (2012) studied on artificial intelligence use in audit profession. The study focused on the main research efforts and latest debates on audit profession by using more artificial intelligence tools. The research also indicated the benefits and drawbacks of intelligent systems in audit.

Similarly, Şen (2016) conducted a study related to continuous auditing with the help of the improvements in information technologies. The study aimed to give brief information on the concept of continuous auditing with the aspect of advantages and disadvantages of it. The study also mentioned extensive business reporting language and its relation to continuous auditing.

Lastly, according to a study performed by Yıldız and Ağdeniz (2019), a general information about big data, artificial intelligence and audit 4.0 was made. The aim of the study was explaining the possible effects of the digital transformation experienced within the scope of industry 4.0 on the audit profession and the basic technologies to be used in the evolution of the audit profession.

3.NEXT GENERATION AUDITOR

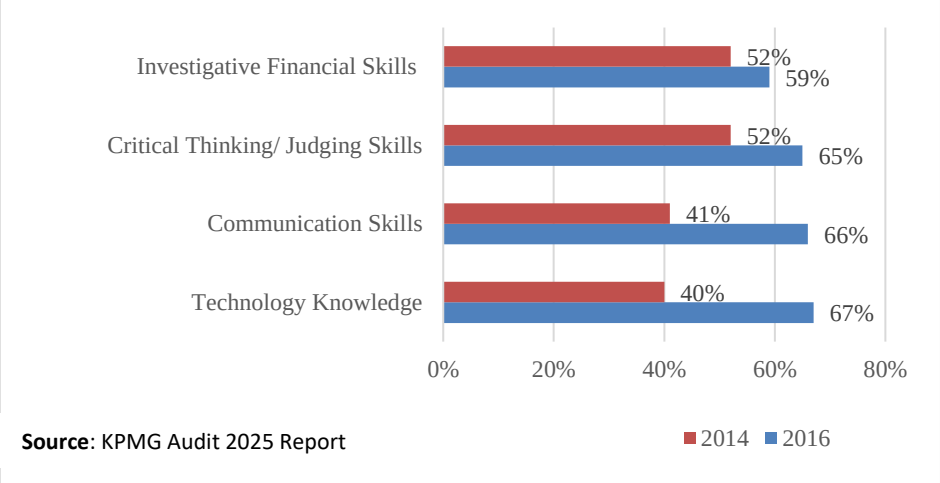
Today's auditors have owned traditional knowledge and experience about international audit standards, financial accounting, financial reporting, internal control, management accounting and tax. However, these criteria are regarded as beginning to emerge the concept of next generation auditor, which is planned to be developed in the future.

It is expected that the future auditor will have more qualifications than the current auditors. According to 2025 Audit Report published by KPMG, the concept of the future of the audit was commented on by leading executives of the American Financial Market who participated in the research in 2014 and 2016 in Figure 2 below. According to this; the participants expressed that technical knowledge, communication skills, critical thinking/judgment skills and investigative financial skills were the concepts that future auditors need to possess. All of these expressed concepts were evaluated as more important in 2016 compared to 2014. In 2016, the most important qualifications of the participants indicated that the future auditors should have technical knowledge and communication skills with an increase of 27% and 25%, respectively.

In other words, next generation auditors need more advanced communication skills, detailed industry knowledge, critical thinking skills, as well as technology to analyze client data and identify unexplored risks. Besides, client companies also expect that the auditors are related to the new technology concepts and tools. The reason behind this, clients believe that technology has improved the quality of auditing and will continue to increase in the future. On the other hand, clients also expect auditors to warn them of potential problems, along with their technology knowledge.

All of these means the auditors should have a forward-looking perspective during data collecting and performing analyses. At first, clients look for better quality and more comprehensive audit works; however, they still put emphasis on importance of valuable observations and predictions determined by the auditor (Murphy and Tysiac, 2015).

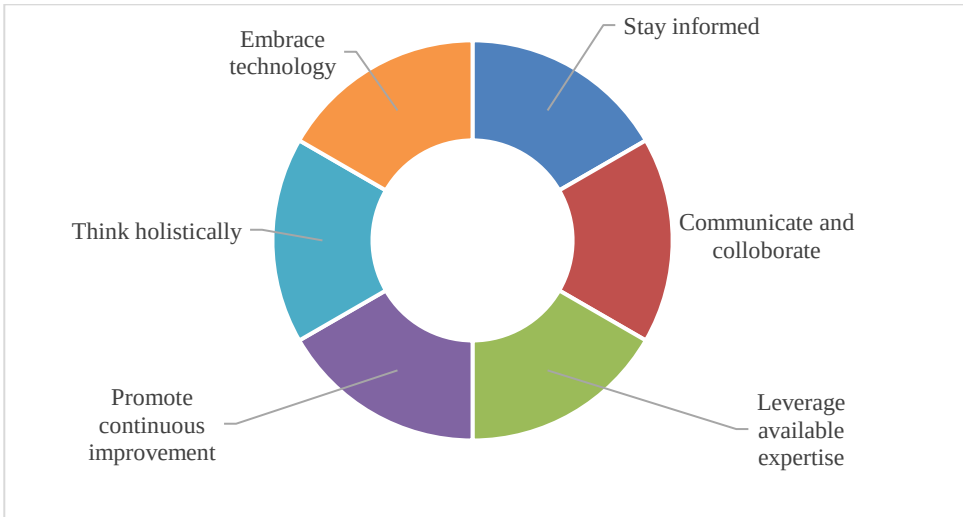
Figure 2. The Qualifications That Future Auditor Should Have



Source: KPMG Audit 2025 Report

According to the report published by IFAC on operating audit transactions during COVID-19 process, audit committee should be disciplined and engaged to the difficulties that pandemic process changed the way of making business of every sector and creating a new normal. Figure 3 below shows the role of audit committee during pandemic process in order to get a timely and coherent understanding of continuous developments (Kashyap, 2020).

Figure 3. The Role of Audit Committee



Source: Kashyap, 2020.

4.AUDIT IN PANDEMIC

The global health precautions that the states all over the world have taken to prevent the spread of COVID-19 pandemic distrupted the continuation of commercial operations with traditional ways. Also audit is influenced from these precautions and restrictions as other

professions. In other words, reaching of sufficient and appropriate audit evidence which is essential for audit process is impossible without traditional audit methods. Observation of inventory by auditors, document assembly, physical verification of inventory, meetings and discussions with clients are among the traditional evidence gathering ways. Performing the audit processes became more difficult for auditors without applying traditional audit evidence gathering ways which includes clients' physical presence.

As of March 2020, with the first case of COVID-19 in Turkey, many restrictions have been imposed on in daily life (www.trt.com.tr; Date of Access: 02.09.2021). Auditors adapt these restrictions quickly. As the global pandemic keep going on, more audit procedures need to be changed for the next reporting periods and macroeconomic forecasting became more important (Murphy, 2020).

According to IFAC (International Federation of Accountants), in pandemic there has become a significant uncertainty on economy and future income, which are main elements of financial reporting process. This uncertainty may increase the difficulty of getting sufficient and appropriate audit evidence needed for making an independent audit opinion on rationality of client company's management decisions and forecasts (Arnold, 2020).

In the report that was prepared by ACCA (Association of Chartered Certified Accountants) in 2020, COVID-19 effect on companies' performance were investigated. According to the results arising from the report, over 10.0000 accountants and auditors were participated in the research. According to the results from the report, 53% of the participants stated having difficulty in client services, 36% of them stated being insufficient in preparing reports on due dates, 25% of them stated having difficulty in obtaining audit evidence (ACCA Global COVID-19 Audit Impact Report, 2020).

Along with the pandemic process, auditors have used different ways of controlling financial information due to requirements of lockdowns. In other words, audit firms have started remote auditing by using current technologic tools they have already used. According to Naveen Kalia, Partner in Charge in KPMG Canada, remote auditing is not the same thing as auditing by video chatting. Even though the computer screen of the client has been shared, clear and documented audit evidence is still needed. Otherwise, this process is not named as audit work, it is only a video call (Kalia, 2020).

In pandemic process, remote auditing provides that the auditor to be interacted with client company through cloud-based software and web streaming platforms. Remote auditing is not only the result of pandemic process, but also the audit used for companies operating their financial, operational and product supply chain efficiently in all over the world (Cotton, 2021).

On the other hand, as it is indicated before, especially international audit firms have experienced new technologies before pandemic in order to perform better quality and more efficient audit works. For instance, there has already been technologic tools such as risk evaluation tools supported by advanced technologies, data and analysis and artificial intelligence tools in KPMG Canada office before pandemic (Kalia, 2020).

4.1. Advantages and Disadvantages of Remote Auditing

Remote auditing is the paperless, electronic audit process which is performed without face-to-face interaction between the auditor and the client business. Remote auditing has some advantages with respect to traditional auditing. These are (Cotton, 2021):

• *Costs decrease:* Due to remote auditing, both client company employees and auditors have the chance to work from their homes rather than company's office. Thus, the costs of travel and accommodation will decrease significantly.

• *Efficiency increases:* The auditors used to lose time travelling to their clients' office; however remote auditing creates more efficiency with higher concentration of audit works without tiredness of long distance travelling.

• *Risk decreases:* Due to the digital infrastructure, clients can easily share their documents and sources. When the highest reach of auditors to clients' documents and sources is provided, the company will deal with less external risks.

There have been also disadvantages of remote auditing. These are listed below (bcubeanalytics.com):

- *Not suitable for every client*: Remote auditing is not suitable for every client due to being unable to meet the conditions of the client. For instance, auditing the welding process of a steel producer remotely is not possible.
- *Network connection problems:* Remote auditing depends on a good internet connection, therefore a poor connection causes waste of time and efficiency of the auditor.
- *Loss of interaction with the client directly:* Remote auditing approach provides communication with the client virtually, which causes loss of direct interaction with the clients.

5. EXPECTATIONS OF AUDIT FIRMS IN TERMS OF ADAPTATION TO THE DIGITAL AGE IN TURKEY

Until recently, while investments in digital transformation varied according to sectors and proceeded uncoordinated, a holistic and harmonious plan in which different functions could work together was not established. However, it shows that an efficient, effective and sustainable digital transformation is inevitable for businesses to overcome potential risks in the future, as risks that affect the world such as the Covid-19 pandemic affect businesses at unexpected times.

As in all other business functions, the adaptation process of audit activities has started by starting the digitalization studies or accelerating their current works after the pandemic. However, although it is observed more clearly in Turkey, the audit function lags behind functions such as accounting, finance and human resources when it comes to digitalization in the rest of the world (Gençer, 2021).

The use of technologies such as machine learning and artificial intelligence in independent auditing is not very common in Turkey. Currently, audit studies are carried out with package programs in independent auditing. These package programs do not have a cloud-supported infrastructure. According to the study conducted by Soğuksu (2020), it was concluded that independent auditing

companies preferred the independent auditing software offered as a package program, while some companies developed computer-based independent auditing software specific to them (Soğuksu, 2020).

Potential business outcomes delivered through digital-based technologies can be an attractive prospect for audit firms. In other words, technologies such as machine learning and artificial intelligence can provide audit firms with benefits such as improving client segmentation and targeting, discovering and applying patterns and correlations in the audit business, and ultimately improving their firm's revenue and market position.

6.CONCLUSION AND RECOMMENDATIONS

The global economy is changing rapidly with the help of new technologies challenging traditional business manners and very large firms' economic superiority. Audit profession has also significantly changed recently due to globalization and economic crises. Among the major changes observed, making local auditing standards as international and increasing role of audit quality in the process of financial reporting can be expressed. However, digital era predicts that the audit profession being advanced like any other professions.

The aim of the study is giving general information on digital developments in independent audit sectors. Firms need to think ahead and be insightful about technological trends that have the potential to change the industry rules and create new competition (Hamel and Prahalad, 1994). Especially, during the difficulties such as global pandemic, the competition of firms is determined how the firms are adapted technical tools in order to eliminate that difficulty on time. As COVID-19 pandemic has changed the way of every profession does business in all over the world, auditors have had to work from home as much as possible. In other words, because of lockdowns during pandemic, the audit processes have been performed remotely rather than the client companies' offices.

It was not difficult for auditors to switch their traditional working model to the remote working during the pandemic. Thanks to the major technologic developments in recent years before pandemic process, the auditors adapted remote auditing in lockdown conditions easily. Innovations such as artificial intelligence, data analytics, developments in software, predictive analysis, workflow automation, digital hubs and electronic audit applications will make auditors more knowledgeable about their clients and performed remote audit works continuously.

The improvements in digital data science can be used for planning and performing more effective audit works, providing new forms of audit evidence, determining risks and evaluation procedures. On the other hand, due to digital distributors, auditors can remotely control their clients' transactions continuously. Thus, auditors can perform audit works not only during the busy seasons of the year, but throughout the year. They can identify potential problems and adapt their audit plans due to these problems previously. Auditors have to be involved in all these developments by updating themselves. In this sense, the changes that should be implemented by the new generation auditors are suggested as follows:

- *Education needs must be met:* The university students who are interested in audit professions and current auditors need to get educated on information technologies, statistics, modelling and machine learning methods.

- *Audit firms need to improve their assurance services:* The assurance services that the audit firms given is not only consisted of annual financial statement audit works, but also performing internal control, data quality, data security, fraud detection and avoidance.
- *Auditors need to benefit from technological improvements:* It is necessary that the auditors ameliorate the quality of audit they performed, by using all technological improvements expected to be applied in audit profession.
- *Audit procedures must be continuous:* Audit procedures need to be applied throughout the year and auditors perform audit tests more frequently instead of once in a year. Besides that, auditors need to educate their clients on the advantages of continuous audit.
- *The audit standards need to be updated:* In order to adapt the changes of business environments, the audit procedures and approaches should be updated to provide the assurance needed.

This study contributes to the literature on the digital transformation of the independent audit profession and audit firms. It is also thought that this study will help highlight the need to transform audit services by integrating new technologies and diversifying studies on audit quality. The study also focusses on some of the most prominent digital improvements such as artificial intelligence, predictive analytics, workflow automation, smart digital hubs and electronic audit applications in independent audit sector, however in future researches, other improvements can be discussed.

Although digital-based technologies are currently in use in the world in auditing, audit firms in Turkey have not yet come a long way in this regard. In fact, audit firms in Turkey can increase their efficiency and effectiveness in their audit work with the business results, time and cost savings they can obtain from digital technologies, and as a result, they can provide benefits such as improving the income and market position of their companies.

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