

LEARNER NUMBER	51707063
NAME	Jessica da Conceicao Barreto
COURSE	Bachelor of Arts (Honours) in Accounting & Finance
DISSERTATION TOPIC	How has the use of Artificial Intelligence impacted auditing procedures in large companies?
SUPERVISOR	Lucas Cardoso
WORD COUNT	6505
DUE DATE	30 Nov 2022

I certify that:

I consent to having my dissertation be retained in the library for the purpose of future research.

Yes ☒

No ☐

[Note that if no check boxes are selected, this dissertation will be regarded as NOT properly submitted, and may be subject to a late submission penalty]

INTELLECTUAL PROPERTY STATEMENT

By checking the box below: I/we (if submitting on behalf of a group) certify that this assignment is my/our own work and is free from plagiarism. I/we understand that the assignment may be checked for plagiarism by electronic or other means and may be transferred and stored in a database for the purposes of data-matching to help detect plagiarism. The assignment has not previously been submitted for assessment in any other module or to any other institution.

☒ Agree

Signature: Jessica Barreto

Date: 28th November 2022

Notes:



How has the use of Artificial Intelligence impacted auditing procedures in large companies?

Compiled by

Jessica da Conceicao Barreto

This project is submitted in part fulfilment of the Degree of Bachelor of Arts (Honours) in Accounting &
Finance

Independent College, Dublin

Nov 2022.

Abstract

Technological innovations have developed wildly in recent decades, and humans have enjoyed more and more facilities and benefits that these technologies have provided. Artificial Intelligence, something that would never have been imagined in the past, today can imitate human actions and behaviour, allowing time-saving in tasks considered more routine and repetitive. Therefore, this research focused on understanding how the use of Artificial Intelligence has impacted the routine of auditors in large companies.

The methodology that was best applied in obtaining information was the interpretivist, as it has an inductive approach that focuses on the context in which a situation takes place. Thus, five qualitative interviews were carried out with audit professionals to better understand from the point of view of those who experience the use of AI daily.

The purpose of the research was to identify the effects of using AI for the audit profession, showing, in addition to the benefits, negative points that this immersion can entail. Thus, it can be concluded that the auditor has good expectations regarding the technologies used. Through the benefits mainly of time-saving, the auditor can focus more on the analytical part of the projects, which enables greater credibility and reliability in the results. Another factor that supports this idea is that, in general, the interviewees see the need to keep up to date with the functionalities of these technologies and intend to continue studying and evolving in the profession. However, the research detected concern from some participants that some professionals tend to be overreliant towards technology and end up not bothering to do their validation work correctly.

Therefore, it can be concluded that Artificial intelligence has been fundamental as a support tool for auditors thus giving companies a competitive advantage. Professionals also do not see this immersion as a threat to the extinction of the profession they see it as a facilitator so that they can focus on other activities.

List of tables

Table 1– Nvivo coding.....26

List of Acronyms

- AI – Artificial Intelligence
- SME – Small and Medium-Sized Enterprises
- FSB – Financial Stability Board
- SQL – Structured Query Language

Table of Contents

CHAPTER I.....	5
1 Introduction.....	5
1.1 Background of research.....	5
1.2 Purpose of the study.....	5
1.3 Research objectives	6
1.4 Information gathering & data collection	6
1.5 Expected outcomes	6
1.6 Chapters overview.....	6
CHAPTER II	8
2 Literature Review	8
2.1 Audit risk	8
2.2 Adaptation of auditors to the new scenario	9
2.3 Challenges for the audit profession	11
2.4 Artificial Intelligence being a downside to auditing	12
CHAPTER III	15
3 Methodology	15
3.1 Introduction.....	15
3.2 Theoretical Paradigm	15
3.3 Research method	16
3.4 Research approach.....	16
3.5 Research process	16
3.6 Sampling	16
3.7 Data Analysis	17
3.8 Ethical considerations.....	17
CHAPTER IV.....	18
4 Results and findings.....	18
4.1 Introduction.....	18
4.2 Audit risk	18
4.3 Adaptation of auditors to the new scenario	20
4.4 Challenges for the audit profession	22
4.5 Artificial Intelligence being a downside to auditing	23
4.6 Nvivo coding	26
CHAPTER V	27
5 Conclusions, Limitations and Recommendations	27

5.1 Conclusions	27
5.2 Limitations	28
5.3 Recommendations	29
References	30
Appendices	32
Appendix I: Informed Letter of Consent Plain Language Statement.....	32
Appendix II: Sample Questionnaire.....	34
Appendix III: Interview Transcript (Interviewee 5)	36
Appendix IV: Contact with participants	41
Appendix V: Copy of Ethical Form A.....	43

CHAPTER I

How has the use of Artificial Intelligence impacted auditing procedures in large companies?

1 Introduction

In recent years, Artificial Intelligence has been very useful in carrying out routine tasks. Thus, what used to take much longer to execute or was practically impossible to be carried out by humans, today can be completed faster and more efficiently. Companies from different segments have invested in artificial intelligence considering all the benefits it can bring to keep them highly competitive in the market. It would not be different concerning the audit sector, where large companies have been investing heavily in these technologies so that the auditor's work can be more efficient and the analyses more accurate.

1.1 Background of research

During the Accounting and Finance course, I became more interested in auditing. I began to understand the importance and responsibilities that the auditor has in validating the results presented by a company since this directly interferes with the interests of its stakeholders. At the same time, I like to keep up to date with what new technologies are bringing to our lives. Thus, I linked the two subjects to better understand how Artificial Intelligence has been impacting the procedures and work of the auditor and to know the pros but also cons that can be observed from this immersion in the technology.

1.2 Purpose of the study

The purpose of this research was to answer the research question: How has the use of Artificial Intelligence impacted audit processes in large companies? Thus, the research addressed through the literature review and primary research whether authors and participants shared similar points of view regarding the use of these technologies in analytical procedures and impacts on the present

and future of the profession.

1.3 Research objectives

To help answer the research question, the research was divided into four themes and each of these with a sub-research question.

- 1 - Focusing on understanding how AI has helped auditors to mitigate audit risk;
- 2 - Determining how auditors have been dealing with adapting to these technologies;
- 3 - Showing in which aspects the use of these technologies has been challenging for auditors;
- 4 - Showing how the use of AI can harm the auditor's profession.

1.4 Information gathering & data collection

The information for the analysis of the research were collected through interviews with auditors who work in large renowned companies, thus meeting the requirement of a qualitative research method. The questions were open-ended, enabling the researcher to collect richer information and leaving participants free to demonstrate their opinions.

1.5 Expected outcomes

Initially, what was expected from this research was that the participants would describe specific situations where the use of AI was fundamental to completing a task or detecting misstatements. However, despite being very useful and a great facilitator in the auditors' routines, especially in time-saving, the professional's analysis and validation work is still fundamental.

1.6 Chapters overview

Chapter I - Chapter that introduces the research, showing its background and purpose. It also introduces the themes into which the research was divided, how the data were collected and compares some outcomes that were expected but which at the end of the research turned out differently;

Chapter II - Chapter that addresses the secondary research formed by the literature review. This chapter addresses what different authors have stated about each of the four research themes;

Chapter III - Approach to the methodology that best applied to the research and consequent method

for data collection, and details about sampling and how the analysis of the collected data was carried out;

Chapter IV - Chapter where the data obtained in primary research were triangulated with the data stated by the authors. Where it was possible to assess whether primary and secondary research agree or disagree with each other;

Chapter V - Conclusion of the research and consequently where the research question was answered. Limitations during the process and recommendations for future research were also included in this chapter.

CHAPTER II

How has the use of Artificial Intelligence impacted auditing procedures in large companies?

2 Literature Review

2.1 Audit risk

The Audit Risk approach is a technique that, when contrasted to typical audit methodologies, promises to improve audit performance and thus audit effectiveness. This is accomplished by the auditor's purposeful increasing recognition of organisation threats. The extent to which this technique may deliver risk-adjusted and more effective inspections is gaining traction (Martinis & Houghton, 2019).

Cheng & Huang (2019) highlighted that corporations might meticulously plan fraud to conceal losses or increase profits. Most illegal actions are frequently well-planned and collaborative, involving not just altering business statements but also forgery on authentic papers. Even when competent auditors have developed sufficient audit processes, this form of fraud is hard to detect, subjecting auditors to the risk of non - compliance and lawsuit. Traditional auditing is fraught with complications in addition to the potential of fraud.

Combining Audit Risk ideology with technological development includes especially Artificial Intelligence, resulting in improvements in the whole process of identifying misstatements. Complementing the research of previous authors, Stancheva (2018) stated that the use of AI can be very useful in fighting intentional misstatements. Unlike humans, machines are not corrupted by money and work as they were programmed to. Various types of fraud related to assets, taxes, and cash theft can occur within a company and with the use of machine learning these detrimental actions can be predicted and detectable. Also, as computers and artificial intelligence permeate most other

innovations, they have altered the corporate landscape. Lim (2013) as cited in Odoh et al (2020) stated that most organizations, from huge businesses to microenterprises (SMEs), are supported by technologies. FSB (2017) also cited in Odoh et al (2020) stated that artificial intelligence technology is used by both public and private sector organizations for compliance with regulations, monitoring, proper data evaluation, and fraud detection.

One of the fundamental elements of technological innovation is data analytics. Cristea (2020) explained that data analytics is useful in executing misstatements investigation, and it might be viewed as an auditing technology that improves the performance and reliability of the capabilities provided. The availability of dashboard scenarios, such as graphical displays, and anticipated trends, enables simpler surveillance of business models, allowing for the prompt discovery of abnormalities. ‘By understanding emerging technologies, auditors will acquire new working skills’ (Cristea, 2020, p.748.).

Mosteanu and Faccia (2020) stated that artificial intelligence is a contemporary technical innovation that, when integrated with manufacturing development, aids in the elimination of numerous human mistakes, outperforming human results in specific sectors. IT systems are more and more precise, identifying and manipulating items more accurately than humans.

The authors described the importance of technology in auditing processes and how it makes the work more efficient and reliable, being a great ally in mitigating misstatements. Therefore, as the research aimed to show how technology has impacted the work of auditors at large companies, the interviewees were asked how they experienced these changes daily and if they noticed the benefits of mitigating audit risk.

2.2 Adaptation of auditors to the new scenario

Professionals have been adjusting to technology improvements for some years to automate some work processes and therefore facilitate the attainment of outcomes. Ahmad (2019) as cited in Atayah & Alshater (2021) described that as fast technology innovation reshapes the structure of the accounting

profession, emerging technologies have intensified stakeholder's interests. These innovations increase the necessity to investigate this subject in depth and provide a complete perspective (Atayah & Alshater 2021). Fotoh & Lorentzon (2021) have defined Audit digitalization as the integration of digital technologies within the audit procedures to assist companies to transform their business style, therefore enabling new income sources and chances to add value. Frey & Osborne (2017) as cited in Alles & Gray (2020) stated that the functions of an accountant or auditor are very likely to be developed by artificial intelligence as technology advances. The fundamental difference between generating financial records and auditing them, however, is the importance of trust. Without trust, the audit offers little value; consequently, technology must ensure confidence for those interested in the results of the audit when using technological resources (Alles & Gray 2020).

Atayah and Alshater (2021) performed a study in which they assembled 120 questionnaires to better understand how auditing works in the digital era. They were able to assess in the surveys that modern technologies are relevant and may be employed in the audit industry since these innovations boost audit accuracy, dependability, and efficiency. Also, Omitogun & Al-Adeem (2019) explained that spreadsheets, digital work documents, extended auditing systems, built-in audit modules, SQL database search and retrieval, simultaneous simulation tools, and test data are now used in traditional auditing procedures. Furthermore, Frey & Osborne (2017) as cited in Omitogun & Al-Adeem (2019) stated that the automated decision-making process has been gaining importance in the financial business for many years now.

Unlike auditors in the past, who claimed that Artificial Intelligence would be unsafe for human analysis jobs, today's auditors are more conversant with and receptive to incorporating technological innovations into their work. As a result, auditors are seeking for new study tools to adapt to the new technologies that become accessible. Al-Tarawneh et al (2020) stated that there is a need of improving auditors' capabilities to comprehend audit digital systems in general. 'External auditors need to have

enough knowledge in informatics fields. In addition, they should have enough skills parallel with new technologies' (Al-Tarawneh et al, 2020, p.5.).

The authors discussed how Artificial Intelligence has been a focus of interest to stakeholders and how the auditor professional has seen these changes. Therefore, as the research aimed to show the impact of the use of Artificial Intelligence on the work of auditors, the interviewees were asked how they have adapted to this scenario that has been developing rapidly in recent years.

2.3 Challenges for the audit profession

Artificial intelligence is an essential technology nowadays; it is therefore a computer's capacity to emulate human actions such as analysis and decision-making. Many of the advantages of applying AI systems, including the ability to generate better precise information and save time while processing massive amounts of data, are already well recognized in several fields of activity (Stancu & Dutescu, 2021).

Reddy et al. (2019) stated that artificial intelligence can be applied in a variety of operations such as manufacturing, delivery, sourcing, operations & marketing, finance and accounting, audit and personnel management. Accounting and auditing, as fundamental parts of a corporation, are likewise subject to the benefits and drawbacks of AI technology. Although, Stancheva (2018) described that the accounting profession has been evaluated as having a high potential for automation in various well accepted academic research. However, such statements must be disregarded since the field is far from an end. Artificial Intelligence should be viewed as the start of its rejuvenation, as it will once again demonstrate the ability to adjust to contemporary market opportunities and shifts in management needs.

Stancu & Dutescu (2021) stated that auditors have already been incorporating advanced technologies into their everyday operations to enhance performance and save effort. Therefore, for instance, implementing AI technologies would not be a big phase in their profession. Auditors could indeed gain from AI because they will be capable of resolving some issues with their funds: strategic

planning, getting access to faster and safer data, deeper data analysis and offering fresh perspectives into the organisation, and improve efficiency due to AI applications (Stancheva, 2018).

Stancu & Dutescu (2021) stated that the auditing profession's threat of losing individual control as a result of the use of Artificial Intelligence applications is a lie. AI is a supplement to general intelligence, and this will improve the auditors by helping the auditing field to create high quality with and assist more of the company's business managerial activities. Because of the influence of artificial intelligence on auditors, there has been a genuine demand for education in this field, as well as a shift in the curriculum to guarantee that learners are more equipped for their professional prospects (Stancheva, 2018).

Even with several benefits presented for the accounting sector, including the audit sector, Makridakis (2017) showed some concern about potential problems and outlines potential adverse effects of AI application, these include loss of jobs, economic disparity, the end of human domination, and the approach of a digital revolution. Mohammad et al. (2020) stated some obstacles to the adoption of AI such as the development of an AI strategy with clear benefits, finding talent with the appropriate skill set, managing issues brought on by end implementation, and leaders' lack of enthusiasm and commitment to AI.

The authors discussed the facilities that auditors have when using artificial intelligence but also mentioned the need to develop other skills to keep up with the technology. Therefore, as the research aimed to show the impacts of AI on the auditor's work, the interviewees were asked if they have found this immersion challenging or even if there were feelings involving fear or insecurity.

2.4 Artificial Intelligence being a downside to auditing

Several studies show the countless advantages that the use of artificial intelligence has brought to organizations. Handoko et al. (2020) have stated that Big Data Analytics for example can infiltrate consumer privacy as information in an online format, purchases that the parent firm can observe, thus enabling the company to benefit from their client databases. Despite the benefits, Issa et al. (2016)

stated that computerization is already affecting the accounting area, for example with the use of software in tax management. With this, auditors also wonder if Artificial Intelligence will continue helping or can completely replace them. In the case of routine tasks, technology can easily do all the work, but in cognitive tasks that require intellectual capacity, the technology still needs to be improved. However, eventually, with automated processes the authors believe that auditors will be replaced by robots.

Barnes (2004) as cited in Salijeni et al (2019) stated that auditors have shown some concern about using Big Data Analytics for testing entire populations. They are worried that this tool can frequently illustrate outliers that are referred to as 'false positives,' assuming that Big Data Analytics may create evidence that indicates a concern, demanding auditor attention when there is no need for it. Handoko et al. (2020) completed that there are several challenges to overcome when incorporating data and analytics into audits. To begin with, the auditors require time to acclimate to the new system. Furthermore, the author emphasized that his study has revealed enormous amounts of data that impact the auditor's judgment capacity in terms of constraining the data processing. Consequently, adequate software capable of doing the analysis efficiently would become prohibitively expensive.

Another system that has been developing in recent years is the Blockchain. Yermack (2017, pg. 1) has defined blockchain as 'a sequential database of information that is secured by methods of cryptographic proof, and it offers an alternative to classical financial ledgers'. According to Rozario and Thomas (2019), as referenced in Jumah and Yuan Li (2020), blockchain can enhance audit quality while also increasing the applicability and dependability of accounting reports. However, Jumah and Yuan Li (2020) stated the downside of artificial intelligence related to blockchain adoption might be attributed to the well-being of people, businesses, and society. The negative aspects of information technology include ethics, governance, the law, safety, confidentiality, intellectual theft, automation-induced unemployment, and technological susceptibility impacts and ramifications. Furthermore, the blockchain's apparently irreversible security features are not dependable in a financial situation.

Because blockchain is a new technique, auditors should consider the alternatives between being an early blockchain user and employing an established and mature technological solution.

The authors stated that artificial intelligence, even with numerous advantages, can be a topic that demands attention from those who make use of it. Hence, the research aimed to show how technology has impacted the work of auditors in large auditing companies, the interviewees were asked their opinions about this transition.

CHAPTER III

How has the use of Artificial Intelligence impacted auditing procedures in large companies?

3 Methodology

3.1 Introduction

This chapter aims to explain the type of methodology that the researcher considered most appropriate to be applied in the research. Within this theme is included a philosophical explanation of the methodology, approach to the method used for data collection, details about the sampling, the type of analysis applied to the collected data and a session on ethics demonstrating how the research was applied to avoid bias by part of the researcher.

3.2 Theoretical Paradigm

Among the types of methodologies used to guide research, the researcher identified interpretivist research as the most appropriate to assist in primary research.

Interpretivism studies that humans and physical phenomena cannot be studied in the same way because when it comes to human behaviour there are no standards, experiences vary according to the circumstances in which each individual finds himself and according to cultural characteristics and beliefs.

‘The purpose of interpretivist research is to create new, richer understandings and interpretations of social worlds and contexts’ (Saunders et al, 2009, p.151). Therefore, contact with people who are experiencing a certain experience and the possibility of answering open-ended questions brings a wealth of content for better analysis and response to the research question.

3.3 Research method

The interpretive methodology uses the qualitative method for data collection with an inductive approach since this approach focuses on the context in which situations occur. 'Researchers in this tradition are more likely to work with qualitative data and to use a variety of methods to collect these data to establish different views of phenomena' (Saunders et al, 2009, p.147). Therefore, the research was done based on the observation of people's reality considering their opinions and experiences.

3.4 Research approach

The research involved five qualitative interviews (Appendix III) where participants were invited to answer questions based on the sub-themes of the research. All interviewees work in auditing and were important in the qualitative method since the questions were open-ended, which allowed the researcher to obtain richer results focused on the experience and beliefs of each one.

3.5 Research process

In April, when the first part of the research was being prepared, the researcher who already knew two of the interviewees contacted them informally and explained a little about what the research was about and if they could participate and indicate other people from their work environment to also participate. In the beginning, the five participants were in Brazil, however, with the supervisor's encouragement, the researcher got a participant here in Dublin.

The questionnaire was sent by email (Appendix II). The four interviewees from Brazil answered the questions via email in the same week, whereas the interviewee from Dublin chose to answer the questions by phone call the day after the questionnaire was sent.

3.6 Sampling

This research, by using the qualitative technique, could bring comprehensive data to answer the research question. All participants work in large auditing companies in different segments, some with a little more experience than others, but as the research is focused on the impact caused by considerably new technologies, everyone was able to answer all the questions based on knowledge.

In conducting this research, the researcher sought to understand how these professionals have experienced the introduction of artificial intelligence in their daily lives and how, from their point of view, this has also impacted the companies in which they work.

3.7 Data Analysis

Once the information was collected through the questionnaire and interview, it was possible to carry out a thematic analysis to understand the primary raw data and point out patterns that collaborated to answer the research question. Thus, inductively, it was possible to observe and understand the reality of those who are experiencing these technologies in their work environment, giving the researcher new understandings and a broader view of the research subject.

3.8 Ethical considerations

When carrying out the primary research necessary for the development of the thesis, the researcher was careful to meet the ethical requirements and necessary values. The questionnaire was produced with clear language and direct questions that had no persuasive power over the participants' answers, thus making it possible to obtain valid and reliable results. Beliefs and judgments on the part of the researcher were set aside to avoid any possible bias.

When contacted, the participants voluntarily made themselves available to collaborate in the research and were informed that it would be anonymous. Along with the questionnaire, a consent form (Appendix I) was sent via email so that participants could have full knowledge of the purpose of the study and its reliability.

CHAPTER IV

How has the use of Artificial Intelligence impacted auditing procedures in large companies?

4 Results and findings

4.1 Introduction

This chapter's principle is to show the results and findings obtained through primary research and compare them with what was said by the authors in chapter 2 of the literature review. The chapter will be divided into four themes relating to primary and secondary research and at the end of each of them, the researcher will be able to assess whether each sub-research question can be answered completely or partially, thus having the basis to answer the main research question.

4.2 Audit risk

This theme addressed the importance of artificial intelligence as an ally in the performance of Audit Risk.

Cristea (2020) stated that one of the fundamental elements of technological innovation is data analytics, therefore, it is useful in executing misstatements investigation, and it might be viewed as an auditing technology that improves the performance and reliability of capabilities provided. Reinforcing the statement above, Stancheva (2018) said that the use of AI can be very useful in fighting intentional misstatements. Unlike humans, machines are not corrupted by money and work as they were programmed to. However, none of the five interviewees had experienced any identification of fraudulent behaviour through AI, but interviewees two and three identified some misstatements that according to them only using qualified auditors would be much more time-consuming.

‘I have had an experience where technology was a fundamental tool for identifying a

misstatement. Given the large volume of information, technology allows us to organise, filter and select operations indicating inconsistencies for a more critical analysis, which would not be possible visually or would take much longer than necessary.’ **(Interviewee 2)**

‘I have already been able to participate in projects in which the use of technology was essential; however, it would also be possible to detect misstatements with knowledgeable professionals.’ **(Interviewee 3)**

Through the analysis of primary research, the interviewees brought up time-saving as a relevant topic to be considered as one of the main advantages of using artificial intelligence in auditing.

‘The difference between using technology as an aid in audit processes is reflected in time-saving. Surely, the audit professional would take much more time in the execution of the process.’ **(Interviewee 3)**

‘With the use of technology, I can say that we audit professionals gain by optimising time. Some functions that used to take three to four days to be completed, today with the use of artificial intelligence we have these same procedures completed in a matter of a few hours.’

(Interviewee 4)

Mosteanu and Faccia (2020) stated that artificial intelligence is a contemporary technological innovation that, when integrated with manufacturing development, aids in the elimination of numerous human mistakes, outperforming human results in specific sectors. IT systems are more and more precise, identifying and manipulating items more accurately than humans. Four participants demonstrated confidence in the accuracy of results through artificial intelligence, thus primary research supports the literature review.

‘I trust a hundred per cent in the systems and tools I work with. All the reports processed and extracted and the tests carried out so far complied with the accessory obligations, and I have never had a divergence in any analysis.’ **(Interviewee 1)**

‘I feel quite secure in using technological tools as they make my day so much easier. I use a

system via Power BI (software and applications that allow access to data sources) that allows me, for example, to know a new client in a much faster and more accurate way.'

(Interviewee 4)

'I feel a hundred per cent confident in using technological resources because I know that before they were approved, many tests have been done. I work in one of the Big four and I know how much they invest heavily in the technological sector, mainly because we deal with confidential data that needs to be encrypted.'

(Interviewee 5)

However, one of the participants showed some concerns about relying entirely on artificial intelligence.

'I think that technology brings us countless benefits, but I do not trust them entirely because I believe that our human skills are fundamental for an accurate analysis.'

(Interviewee 3)

By interpreting the information collected from different sources, it can be concluded that all five participants agreed with the literature review regarding the benefits of artificial intelligence in mitigating Audit risk. In addition, primary research enabled the researcher to identify time-saving as a common benefit among participants that was not included in the literature review.

4.3 Adaptation of auditors to the new scenario

This theme presented the importance of the auditor in investing in digital education to accompany the development of technology.

Fotoh & Lorentzon (2021) have defined Audit digitalization as the integration of digital technologies within the audit procedures to assist companies to transform their business style, therefore enabling new income sources and chances to add value. Adding to what was stated before, Atayah and Alshater (2021) performed a study in which they assembled 120 questionnaires to better understand how auditing works in the digital era. They were able to assess in the research that modern technologies are relevant and may be employed in the audit industry since these innovations boost audit accuracy,

dependability, and efficiency. Four participants declared an effort to keep up to date on the functions of artificial intelligence applied in the audit. This synergy enabled greater efficiency and precision in the results, as the authors declared in the literature review.

‘Knowing more technological features provides a more completed presentation of work to our clients and thus we gain credibility to meet their needs.’ (**Interviewee 1**)

‘I think technology has come to make our lives a lot easier. Back in 2017 in Brazil I used to count inventories in industries manually, the chance of error was very high, and today I see that my colleagues can manage stock even when they work from home as everything is done by system’. (**Interviewee 5**)

However, one of the participants, despite claiming that the use of artificial intelligence brings benefits, again reinforced the concern about the accuracy of the data resulting from the use of AI software.

‘Undoubtedly, the information is generated and analysed much faster, but I do not always see complete accuracy in this data. However, I recognize that this gain in time benefits us a lot because we can focus on more sensitive analyses that the technology has not been developed to the point of meeting them yet.’ (**Interviewee 3**)

Al-Tarawneh et al (2020) recognized the significance of improving auditors' abilities to comprehend audit digital systems in general. ‘Auditors need to have enough knowledge in informatics fields. In addition, they should have enough skills parallel with new technologies’ (Al-Tarawneh et al, 2020, p.5.). All participants showed awareness of having other skills along with technological knowledge, thus agreeing with the literature review.

‘In my opinion, it is very important to keep up to date with the functionality of the technologies. I have been working for less than a year in this company and I have participated in more than 70 training sessions as every day there is something new to learn in these systems.’ (**Interviewee 5**)

‘Knowing the functionality of new systems is important to adapt to the constant changes that

occur in the audit'. **(Interviewee 3)**

'Technology has been developing very fast and to keep up with its benefits we as professionals must be willing to develop our skills as technology advances.' **(Interviewee 2)**

According to the authors, artificial intelligence drove the development of more effective and accurate results, so for better use of these technologies, they reinforced the need for trained professionals. Thus, with the results obtained in the primary research, it can be concluded that they supported the literature review.

4.4 Challenges for the audit profession

Stancu & Dutescu (2021) saw that the auditing profession's threat of losing individual control as a result of the use of Artificial Intelligence applications is a lie. Although, Makridakis (2017) was concerned with potential problems and, outlines potential adverse effects of AI applications, such as loss of jobs, economic disparity, the end of human domination, and the approach of the digital revolution. As described in the literature review, the two authors do not share the same theory. In this way, analysing the responses of the interviewees, it can be concluded that they all agreed with the statement of Stancu & Dutescu (2021) as they did not see a negative impact on the auditor's work.

'In the company I work for, I have not observed significant changes in this regard. The company continues to grow and hire more people because with the optimization of time in repetitive activities, we have more time to do the analysis and thus the company can increase its client portfolio'. **(Interviewee 3)**

'There is a certain turnover in the audit, but not because the company is facing downsizing, but because it is a very competitive area, people find better offers in other companies. Technology has the function of helping us, I believe that this type of negative impact on employers happens more in industrial sectors.' **(Interviewee 5)**

Because of the influence of artificial intelligence on auditors, there has been a genuine demand for

education in this field, as well as a shift in the curriculum to guarantee that learners are more equipped for their professional prospects (Stancheva, 2018). The primary research identified that all participants agreed with the literature review that the modern market requires them to maintain their technology-oriented professional qualifications.

‘I feel that there is a pressure for constant improvement in the quality of our work in the audit. Once the professional enters this field he/she may not see this need immediately, but in the long term, the professional must qualify to excel and develop in the profession. Therefore, I particularly press myself to have this development and maintain a professional qualification that can meet the market demands with quality.’ **(Interviewee 2)**

‘In this field, the study must be constant and we must always keep up to date, seeking innovations and understanding the fact that technology is part of our reality.’ **(Interviewee 1)**

‘I know the importance of keeping up to date in professions that are immersed in technologies, and as I graduated recently I know that I will soon specialise because I know that promotions or even better offers will only come if I keep myself updated.’ **(Interviewee 3)**

By analysing what the authors described and comparing it with primary research, it was possible to identify that Artificial Intelligence requires a certain commitment and effort on the part of the auditors; however, there are no indications of threats.

4.5 Artificial Intelligence being a downside to auditing

This theme focused on showing some concerns regarding the use of artificial intelligence in the auditor profession.

Issa et al. (2016) stated that auditors wonder if Artificial Intelligence will continue helping or can completely replace them. In the case of routine tasks, technology can easily do all the work, but in

cognitive tasks that require intellectual capacity, the technology still needs to be improved. However, eventually, with automated processes the authors believe that auditors will be replaced by robots. The literature review demonstrated that the authors believe that many of the tasks performed by the auditors can be replaced by artificial intelligence, which until then is agreed with primary research. However, the authors believe that the profession could be replaced by robots in the future. Thus, primary research does not fully support the literature review as all participants do not believe in the extinction of the profession.

‘I believe that technology and computerization will be allies and facilitators for us humans, but I do not believe that they will replace our work in auditing. Considering, for example, the analysis of legislation that I do and all the processes involved, I do not believe that a system can deliver analyses as complete and with expertise as a person does.’ **(Interviewee 1)**

‘I believe that there may be in the future a decrease in the demand for auditors due to the computerization of repetitive tasks, but I believe that the professional will always be necessary for critical analyses.’ **(Interviewee 2)**

‘I do not believe that the auditor's role will be completely extinguished, but I believe that in a more distant future, naturally, there will be less need for the profession. With the use of artificial intelligence, our job will end up being much easier to the point that the validation process will be completed much faster so companies will not need as many people to carry out the analyses.’ **(Interviewee 5)**

Barnes (2004) as cited in Salijeni et al (2019) stated that auditors have shown some concern about using Big Data Analytics for testing entire populations. They are worried that this tool can frequently illustrate outliers that are referred to as 'false positives,' assuming that Big Data Analytics may create evidence that indicates a concern, demanding auditor attention when there is no need for it. Considering the author's concern about possible errors such as the one mentioned, all the interviewees

demonstrated that there is a need for a professional to validate the data obtained by artificial intelligence.

‘The professional will need to adapt the way of working because he/she will no longer perform operational tasks and will have a total focus on interpreting and analysing data, which will require much more of a critical sense and technical knowledge.’ **(Interviewee 3)**

‘I know that some of the procedures that are part of the auditor's job have a great chance of being performed by these technologies that develop absurdly fast. However, I see that there will always be a need for the auditor to validate the procedures as a guarantee.’ **(Interviewee 4)**

When interpreting the information collected, it is concluded that despite the great benefits it offers, the use of artificial intelligence must be done carefully and reviewed before disclosing any final statement. In addition, primary research enabled the researcher to identify in three participants a concern that these facilities are making people lazy and overconfident in artificial intelligence.

In part, primary research agreed with the literature review, however, when it was discussed about a possible replacement of professionals by AI in the future all participants disagreed. Thus, they did not support fully what was presented by the literature review.

4.6 Nvivo coding

Through the data obtained in the primary research, it was possible to make a thematic analysis. Thus, in addition to allowing a more complete analysis of the research, it was possible to create a Nvivo theme. (Table 1)

Table 1– Nvivo coding

Interviewee 5	Keywords in the interview - Codes
Audit risk	Technology advances fastly; fewer mistakes now; systems analysis veracity of invoices; confident; tests are done before approval.
Adaptation of auditors to the new scenario	70 training in less than a year; stock count via home office; better quality of life at work nowadays; critical analysis is our differential.
Challenges for the audit profession	Market demands a lot from us; if I do not follow up I might be replaced by someone else; no downsizing; some people's resistance to change.
Intelligence Artificial being a downside for auditing	Fewer people will be necessary to carry out the analyses; technology is making some people get lazy; a broad area that requires qualified professionals.
Nvivo Theme Dependence on artificial intelligence	Confidence; tests are done before approval; better quality of life at work nowadays; technology is making some people lazy.

CHAPTER V

How has the use of Artificial Intelligence impacted auditing procedures in large companies?

5 Conclusions, Limitations and Recommendations

5.1 Conclusions

Artificial Intelligence is a technology that is dominating most fields as it can perform tasks that previously could only be done by humans. The rapid development of these technologies has been following the human need and bringing benefits never imagined in the past. As a result, companies that have been investing in the use of AI have obtained faster and more accurate returns on the data collected, thus facilitating the auditor's work routine.

The study aimed to analyse how the use of Artificial Intelligence in auditing has been occurring, showing its benefits but also any existing drawbacks.

One of the main benefits of using AI in auditing is in combating audit risk, which has misstatements as its main worrying factor. The study demonstrated that AI is programmed to obtain maximum accuracy and efficiency, thus being fundamental to identifying errors or even intentionally caused misstatements.

Research showed that digitalization in auditing enables a change in the business style of companies that can result in new income and competitive advantage in the market. Another important aspect observed in the research is that the audit professional understands the proportion that AI has been gaining in the corporate environment and is willing to follow this technological development, thus, this professional understands that there is a need to seek technology-oriented qualifications.

Despite all the benefits, some questions are very frequent regarding the application of Artificial Intelligence. Can they provide that total accuracy and reliability? Are humans at risk of being replaced

by them in the future? The study also drew attention to the fact that some professionals may be over-relying on technology and failing to fulfil their analysis role.

Therefore, the study concluded that despite these issues, the use of Artificial Intelligence is much more beneficial and adds competitive advantages for large companies. The audit professional recognizes the benefits of AI but also recognises the importance of their analysis and validation work, so this fear of replacement by AI is something that will not be a concern for auditors for a long period of time.

5.2 Limitations

The research was completed and had its objectives achieved, but there were some limitations faced during the process. As it is a very specific and considerably new subject, there were difficulties on the part of the researcher in finding articles that fit the research themes. As well as it was very challenging to formulate the questions of the questionnaire applied to the interviewees.

Another limiting factor was reaching the sample for the research. From the beginning, the researcher realised that this research question would not be adequately answered if the method used was quantitative. With closed questions, anyone other than auditors could answer them, thus changing the result and reliability of the research. Thus, another challenge was to find the five interviewees. The researcher knew only two audit professionals at the time, the other three were indicated by other people. Once all the interviewees were contacted the answers were obtained within a week which was good to speed up the evaluation of the findings.

Finally, it was very challenging to manage the workload of the other lectures along with the research, as deadlines often clashed.

5.3 Recommendations

As the research addressed a relatively new subject and little known even by people who enjoy its benefits daily, it is recommended for future research to detail what each intelligence has been bringing to the audit. However, with more in-depth research, future researchers need to be aware that their sample will also need to be more specific, including technology professionals who will be able to discuss the subject with greater knowledge. In this way, the questions around a hundred per cent reliability in AI and about replacing the auditor with technology may be closer to having answers.

References

- Alles, M. G., & Gray, G. L. (2020). Will the medium become the message? A framework for understanding the coming automation of the audit process. *Journal of Information Systems*, 34(2), 109-130.
- Al-Tarawneh, A., Weshah, S., & Humeedat, M. (2020). The extent of external auditor relaying on internal auditor work under erp continuous auditing: The case of Jordan. *Academy of Accounting and Financial Studies Journal*, 24(2), 1-9.
- Atayah, O. F., & Alshater, M. M. (2021). Audit and tax in the context of emerging technologies: A retrospective analysis, current trends, and future opportunities. *International Journal of Digital Accounting Research*, 21.
- Cheng, C., & Huang, Q. (2020, January). Exploration on the application of blockchain audit. In 5th international conference on economics, management, law and education (emle 2019) (pp. 63-68). Atlantis Press.
- Cristea, L.M., (2020), Emerging IT Technologies for Accounting and Auditing Practice, *Audit Financiar*, vol. XVIII, no. 4(160)/2020, pp. 731-751.
- De Martinis, M., & Houghton, K. (2019). The business risk audit approach and audit production efficiency. *Abacus*, 55(4), 734-782.
- Fotoh, L. E., & Lorentzon, J. I. (2021). The Impact of Digitalization on Future Audits. *Journal of Emerging Technologies in Accounting*, 18(2), 77-97.
- Handoko, B. L., Mulyawan, A. N., Tanuwijaya, J., & Tanciady, F. (2020). Big data in auditing for the future of data driven fraud detection. *International Journal of Innovative Technology and Exploring Engineering*, 9(3), 2902-2907.
- Issa, H., Sun, T., & Vasarhelyi, M. A. (2016). Research ideas for artificial intelligence in auditing: The formalization of audit and workforce supplementation. *Journal of Emerging Technologies in Accounting*, 13(2), 1-20.

- Jumah, A., & Li, Y. (2020). Auditors' Adoption of Blockchain Technology: A Study on Antecedents.
- Makridakis, S. (2017). The Forthcoming Artificial Intelligence (AI) Revolution: Its Impact on Society and Firms. *Futures*, 90, 46-60.
- Mohammad, S. J. et al. (2020). How Artificial Intelligence Changes the Future of Accounting Industry. *International Journal of Economics and Business Administration*, 8, 478-488
- Mosteanu, N. R., & Faccia, A. (2020). Digital systems and new challenges of financial management—FinTech, XBRL, blockchain and cryptocurrencies. *Quality-Access to Success Journal*, 21(174), 159-166.
- Odoh, L. C., Echefu, S. C., Ugwuanyi, U. B., & Chukwuani, N. V. (2018). Effect of artificial intelligence on the performance of accounting operations among accounting firms in South East Nigeria. *Asian Journal of Economics, Business and Accounting*, 7(2), 1-11.
- Omitogun, A., & Al-Adeem, K. (2019). Auditors' perceptions of and competencies in big data and data analytics: an empirical investigation. *International Journal of Computer Auditing*, 1(1), 92-113.
- Reddy, P. S., Yasaswi, K. R. K., & Kumar, B. K. (2019). Accounting Intelligence—The New Era in Accounting. *Journal of Information and Computational Science*, 9, 692-697.
- Salijeni, G., Samsonova-Taddei, A., & Turley, S. (2019). Big Data and changes in audit technology: contemplating a research agenda. *Accounting and business research*, 49(1), 95-119.
- Saunders, Mark & Lewis, P. & Thornhill, A, (2009). Understanding research philosophies and approaches. *Research Methods for Business Students*. 4. 122-161.
- Stancheva-Todorova, E. P. (2018). How artificial intelligence is challenging accounting profession. *Journal of International Scientific Publications Economy & Business*, 12, 126-141.
- Stancu, M. S., & Duțescu, A. (2021, December). The impact of the Artificial Intelligence on the accounting profession, a literature's assessment. In *Proceedings of the International Conference on Business Excellence* (Vol. 15, No. 1, pp. 749-758).
- Yermack, D. (2017). Corporate governance and blockchains. *Review of finance*, 21(1), 7-31.