



RESEARCH ARTICLE

Proposal for a Conceptual Model on the Role of Digitalization in Improving External Audit Quality

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ABSTRACT

In the current context, external audit firms are confronted with a range of managerial and organizational dysfunctions that hamper the achievement of their objectives, which have a negative impact on the quality of external audit. In this context, this quality is only improved when external audit firms adopt an efficient digitalization of their external audit processes that promotes the achievement of their objectives while ensuring a very strong competitive position in the market. Indeed, for it to really participate in the creation of value, the digitalization of external audit quality requires the introduction of mechanisms such as Big Data, Artificial Intelligence, Blockchain, Business Intelligence for the achievement of these objectives. These mechanisms allow audit firms to provide assurance on the degree of risk control, the responsibility of external auditors, the fight against fraud and the creation of value, as well as an independent and continuous assessment of the external audit process. In this context, the objective of this study is to analyze the role of digitalization in improving the quality of external auditors, in particular with regard to the dimension of competence and independence of external auditors in external audit firms. On the basis of an in-depth analysis of the literature review and the proposal of the conceptual framework for research on the subject, we can consider that digitalization, in particular artificial intelligence, is considered as a fundamental lever capable of improving the quality of external audit within audit firms. It is an important tool to strengthen the resilience of external auditors. In this context, AI is able to improve the quality of external audit in audit firms and maintain their trust in its stakeholders while fostering value creation.

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1. INTRODUCTION

Nowadays, external auditors face challenges and opportunities to keep their skills and professional knowledge up-to-date in order to adapt to changes in the digital world (Açık Taşar & Erkuş, 2022). Indeed, according to the empirical study carried out by the Big Four firm "FIDAROC" in partnership with Dauphine-PSL University in 2022, on the contribution of artificial intelligence to external audit on a sample of 120 companies. The study found that **AI contributes to several benefits for auditors and audited, including** the improvement of sampling quality and scope of controls, the reduction of on-site checks and mobility, and the non-performance of low value-added tasks. Indeed, the external audit has undergone a rapid evolution in recent years, expressed in a very remarkable way, due to the effect of globalization, technological innovation and the exponential increase in financial data. This development enables the external audit to evolve in particular in an ever-changing economic context where traditional methods are increasingly unsuited to this evolution. This is why AI has

become an increased necessity for all external audit firms with the potential to significantly improve the process and quality of external audit.

Indeed, the aim of this paper is to study the theoretical joints that study the impact of AI on external audit, by facilitating the understanding of the advantages and benefits of AI on external audit quality, while testing a body of academic and empirical work and concrete examples on this topic. The main objective of this paper is to present a rich literature review followed by a homogeneous conceptual framework explaining the role of artificial intelligence on the quality of external audit. In this sense, our research problem is formulated as follows: **how does the digital transformation, especially artificial intelligence, allow us to improve the quality of external auditors?**

For this purpose, this article first defines the basic concepts of this relationship between AI and external audit quality, then studies the impact of artificial intelligence (AI) on both dimensions of external audit quality, competence and independence of external auditors, highlighting the contribution of technology expectation theory in the interaction between AI and external audit quality which shows that performance expectations play an important role in the acceptance of technology by external auditors.

2. LITERATURE REVIEW

2.1 Definition of external audit quality:

The external auditor plays a key and crucial role in improving corporate governance and continuously contributes to ensuring the transparency of financial and non-financial information, in order to enhance stakeholders' confidence in the certification of company accounts. However, the main responsibilities of an auditor concern the detection of anomalies, the prevention of material errors and fraud or misrepresentation of financial data (Halbouni, 2015). The external audit is considered an effective external mechanism to improve the quality of the corporate governance body (Almasria, 2022).

In this context, a large part of the research studies on audit quality have been developed and enriched on the basis of the DeAngelo studies (1981a; 1981b) which showed that the achievement of a high-quality external audit mission is conditioned by the combination of the two variables: its competence and its independence. Indeed, the quality of external auditing is a subject of interest to a various researchers and professionals and remains an important topic of interest in the academic and professional literature. Previous studies have shown that the quality of the audit ensures investor confidence, financial market stability and good corporate governance (DeAngelo, 1981; Simunic, 1980). Indeed, the competence of auditors is a key factor in the quality of external audit. D'Angelo's research (1981) highlights the importance of technical expertise and knowledge in improving the skills of external auditors in the conduct of quality external audits. In addition, the independence of external auditors is a necessary element contributing to the quality of the external audit and indicates the ability of external auditors to communicate all misstatements and irregularities detected in the financial statements to the corporate governance body.

2.2 Definition of generative AI

Generative AI has been introduced since the early 1960s in terms of chat bots. However, it was only in 2014, with the birth and emergence of generative adversary networks (GANs), that generative AI was able to build and create authentic and convincing images, videos and sounds of real people.

Generative artificial intelligence remains an important technological advance in the field of AI, since it allows the creation of synthetic data perfectly representing real data.

Thus, generative artificial intelligence (AI) represents a branch of AI that focuses on creating data that is similar to the existing data. In contrast to other classical AI models that aggregate and anticipate while relying on models in the data, generative AI models are able to introduce new synthetic data based on the models they have learned.

Simply put, the generative concept implies the verb generate, or in other words produce and create. As a result, Generative Artificial Intelligence is able to build content. "Generative artificial intelligence

(AI) refers to algorithms such as ChatGPT as an example that are ready to be exploited to create new content, audio, code, images, text, simulations and also videos [McKinsey & Company 2023]

This technology, which is widely used, for example Dall-E 2, GPT-4 and Copilot, is currently revolutionizing the way we work and communicate with others.

As a result, generative AI, while creating complex scenarios and simulations from existing data, offers unprecedented opportunities in a variety of areas. In particular, the technology is beginning to transform the external audit industry, improving the accuracy of analysis and optimizing audit processes.

2.3 Artificial intelligence and external auditing in the context of the theory of technological expectancy

Performance expectation refers to how the use of technology enables users to perform their daily tasks more efficiently (Venkatesh et al., 2012). The literature suggests that this performance expectation positively influences the intention to adopt a specific technology in general (Martins et al., 2014; Venkatesh et al., 2012).

Performance expectations is a separate concept that assesses the extent to which the auditor believes that robotics will improve the way he or she works. This includes the perception of the impact of robotics on productivity, efficiency and professional development.

In such contexts, including risk management, the potential of AI becomes increasingly significant (Deloitte 2019; Hodge 2020; Saeidi et al. 2019; Taarup-Esbensen 2019).

The audit standards and guidelines indicate that the use of technological tools can improve the effectiveness and efficiency of the work of internal auditors (see for example IIA Standard 1220.A2). In addition, other publications on transaction auditing and analysis technology tools have found that auditors adopt these tools to perform various functions, such as: testing program controls (Pogrob and Isenberg, 1999; Javnrin et al., 2009); obtaining an overview of their IT controls (Neuron, 2003); facilitating risk assessment during audit planning (Paukowits, 2000); and improving the effectiveness of audit testing (Hudson, 199) 98).

Previous studies of audit technologies have also shown that performance expectations play a key role in the acceptance of the technology by auditors. Ferri et al. (2020) noted that the intention of auditors to adopt a technology was strongly influenced by their expectation of performance with respect to that technology.

Concerning the relationship between performance expectation and behavioral intent, Mahzan and Lymer (2014), Shihab et al. (2017) and Al-Hiyari et al. (2019) claim that technological advances in auditing have improved the performance of auditors, making their work faster and more efficient, notably by reducing costs and time. According to Calderon and Gao (2021), auditors are developing a better understanding of how to conduct risk assessments, leading to more sophisticated and transparent audit testing processes.

Indeed, performance expectation impacts ethical perceptions of AI in recruitment, which, in turn, influences perceptions of trust within the organization.

Performance expectation influences people's ethical perceptions about the use of AI in the recruitment process. These ethical perceptions, in turn, have a positive effect on people's trust in the organizations that embed AI.

3. THE IMPACT OF DIGITAL TECHNOLOGY, ESPECIALLY AI, ON EXTERNAL AUDIT QUALITY: PROPOSAL FOR A CONCEPTUAL FRAMEWORK

In this section, we will examine the impact of AI on the quality of external audit, in particular the competence and independence of external auditors, while drawing on the literature developed by researcher De Angelo in 1981 on the quality of external audit.

3.1 The impact of AI on the competence of external auditors:

Elliott (2002) argues that audit firms and auditors more generally are affected by the evolution of information technology. In particular, these include big-data analytics, artificial intelligence, and, most recently, blockchain technology. Digitalization and its impact on the audit profession is still not well disclosed in the sense that this impact is emerging. As a result, according to the FAR 2016 report, digitalization and process automation will certainly bring about changes in the accounting field, leading to a change in the audit profession.

In this period of increasing digitalization, it is clear that data processing and auditing is a major challenge that bypasses the audit and accounting professions.

Artificial intelligence technology is not only capable of carrying out cognitive tasks, but is also capable of solving difficulties encountered in terms of auditing, which encourages its implementation and practice

The academic literature represented by the various authors (Kokina & Davenport, 2017; Moffitt, et al., 2018; Moll & Yigitbasioglu, 2019), emphasizes that the overarching objective of AI in the field of auditing must focus on structured and repetitive tasks. This view has also been raised and advocated by practitioners (EY, 2019; PwC, 2017)

Advancements in technology, data analysis and AI in auditing will become more important in the years to come. AI is conditioned by the use of big data and intensive data processing. The impact of AI on audit is very evident in the areas of data acquisition, transaction processing verification and reporting [Kokina, J. & Davenport, T.H., 2017].

Today, a variety of powerful data analytics tools allow auditors to process customer data comprehensively. Instead of manually reviewing the data in a sample, the auditor becomes able to quickly process and view complete data to improve the quality and efficiency of the audit. The documentation of audit files is also better represented, as digitization opens up a real traceability process, while offering the ability to re-check later. As a result, the auditor gains a better understanding of the client and its environment and, in addition, the auditee can easily access information in order to perform its own risk control.

Moreover, artificial intelligence (AI) is transforming the process of planning and executing audits, while providing advanced risk-assessment capabilities that surpass traditional methods in terms of accuracy, speed of processing, and completeness. By leveraging machine learning algorithms and big data analysis, AI-enabled tools are able to identify patterns and detect anomalies that human auditors may neglect, leading to a more focused and efficient audit (Al-Ateeq et al., 2022)

Identifying and managing risks is critical to ensuring the accuracy and reliability of financial statements.

By minimizing the risk of human error, AI increases the reliability of risk assessment results and optimizes the quality of audit.

Indeed, one of the major objectives of digitizing audit firms is to detect fraud while improving the understanding and quantification of risks for their clients (Brown-Liburd et al., 2015).

The emergence of artificial intelligence (AI) represented a significant turning point in fraud detection. With machine-learning algorithms that can learn from data and identify patterns without requiring explicit programming, AI offers a dynamic and adaptable solution. These AI systems are able to analyze large data sets, subtle anomalies, and continuously evolve to adapt to new fraud tactics (Gautam, 2023).

AI systems are capable of simultaneously taking into account a variety of factors, such as transaction history, user behavior and contextual information. This holistic approach allows AI to examine complex relationships and detect anomalies that may indicate fraudulent activity. Continuous learning ensures that the system continuously adapts to emerging threats, providing proactive and dynamic defense against evolving fraud patterns.

(E&Y, 2018) summarizes the impact of artificial intelligence on the audit profession, since machine learning supports the automatic recording of accounting transactions and the creation of models according to this sub-concept of AI and facilitates the detection of fraud to auditors. This technology

also allows for the analysis of unstructured data, as well as the optimization of time for auditors while processing a very large data set. IBM Watson, for example, uses artificial intelligence to read, listen, learn, and process billions of documents per minute.

Automation of structured and repetitive audit tasks (e.g. Moffitt et al., 2018; Moll & Yigitbasioglu, 2019) allows auditors to redirect their time to secondary tasks, thus providing the opportunity to focus on high value-added missions (Kruskopf et al., 2020; Shimamoto, 2018).

Integrating robotic process automation into auditing improves audit efficiency and reduces workload by optimizing the use of auditors' time and skills. This allows them to focus on higher-level tasks that require increased professional judgment (Huang & Vasarhelyi, 2019).

Applying robotic process automation to audit procedures can increase the efficiency and quality of audits by minimizing human error when performing audit procedures.

Automation of robotic processes can enhance the audibility, security and governance of audit engagements (EYARC, 2023). Given the confidential nature of audit data, automation of robotic processes automates the collection and transfer of data, limiting the number of people with access to sensitive information.

However, integrating AI into auditing will lead to significant changes that auditors will need to be prepared for (Lin & Hazelbaker, 2019). Therefore, training for new auditors will need to be adapted to ensure that they have the skills, knowledge and experience to evolve in the AI-driven audit environment (Giles, 2019). Auditors were encouraged to switch from conventional auditing techniques to more computer-assisted methods (Bierstaker et al., 2014).

According to Deloitte (2018), it is crucial to have auditors with a thorough understanding of the risks associated with emerging technologies, including AI applications and robotic process automation. Increased digitization will require organizations to pay more attention to inherent risks, such as cybersecurity, privacy and data security. (Saul, 2018, Boulianne 2016) stresses the importance for auditors to have advanced training in computer science and recognizes that the challenges of integrating this increased training into the curricula of higher education institutions will remain a problem. Auditors also need analytical skills to master new audit techniques using a variety of data sources (Jackson, 2020).

In Canada, KPMG has chosen to strengthen the skills of external auditors so that they can master and adapt the technology to the specific needs of their clients (KPMG, 2022). It is crucial that listeners develop their skills and understanding of digital technologies, data analytics and other areas related to information technology (Stumke and Swart, 2020).

The information technology (IT) skills required by auditors encompass a wide range of areas that are crucial for effective evaluation of information systems. First, a deep understanding of IT infrastructure, including IT operations, is critical to understanding how systems influence audits. Cybersecurity and data protection skills are critical to securing sensitive information from threats and unauthorized access. Auditors must also be proficient in data analysis and visualization to interpret complex datasets and present clear conclusions. The ability to extract relevant information through data mining is also essential to uncover meaningful patterns and trends. The use of computer-aided audit techniques (CAATS) and the management of electronic working documents are essential skills to improve the efficiency of audit procedures. Data risk assessment helps identify potential problems and establish appropriate controls. With the emergence of technologies such as robotics, blockchain and artificial intelligence, it is becoming increasingly crucial to understand these innovations. In addition, a good understanding of cloud computing environments is crucial to assess their impact on data security and audit processes. The introduction of continuous auditing allows controls and risks to be continuously monitored and assessed. Finally, knowledge of the different IT control frameworks enables auditors to assess the effectiveness of IT controls within organizations. These skills are essential to navigate the complex IT landscape and ensure comprehensive and effective audits. Therefore, Omoteso (2012) explains that AI only supports auditors, because machines lack the human qualities needed for complex judgment. Thus, the auditor always remains ultimately responsible for decision-making. Alexander (2018) shares a similar perspective in pointing out that while AI can identify anomalies, this does not guarantee that they are incorrect.

Therefore, auditors need to exercise professional judgment and maintain critical skepticism to evaluate automated procedures. Based on research studies, we believe there is a positive relationship between digital tools and external audit quality. Therefore, we hypothesize:

H 1: Digital tools have an impact on external audit quality, particularly on the competence of external auditors.

3.2 Impact of digital technology on the independence of external auditors:

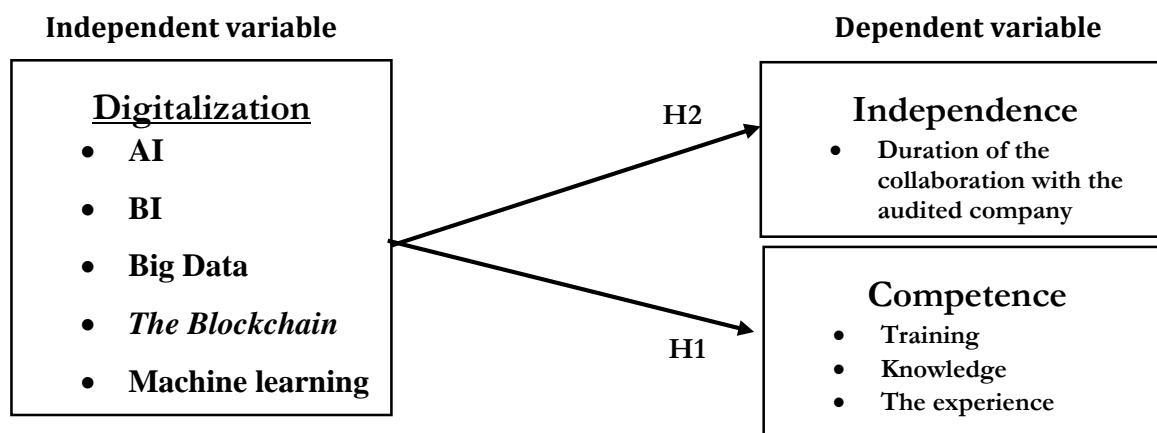
As part of the relationship between AI and the independence of external auditors, we conducted an in-depth study and analysis on the relationship between digital technology, especially AI, and the independence of external auditors. Indeed, few research studies have examined the interaction of AI variables and the independence of external auditors, unlike the same impact on the competence of external auditors.

Firstly, digital technology, especially artificial intelligence, makes it possible to improve the quality of external audit through digital tools that make it possible to ensure the effectiveness of a better quality external audit. Indeed, (Salur & Kattar, 2021) confirmed that the use of BI (Business Intelligence) tools saves more time, these tools allow external auditors to reduce the time allocated to carry out their external audit missions. Artificial intelligence tools even if their adoption by the company requires a very high financial investment, still they make it possible to minimize the duration of collaboration between the audited company and the external audit firm, which will have a positive impact on the independence of external auditors in general and the quality of external audit in particular. However, digital technologies provide necessary benefits to the field of external audit, adding value to external auditors by reducing the time spent on repetitive tasks and collecting data.

In addition, (Thottoli et al., 2022) in India, confirmed that the use of technology in auditing ensures effective, efficient, quick and on time auditing. In the context of an external audit mission, the speed provided by digital tools is important in order to present the results of the verifications and audits of the financial statements as soon as possible and to ensure effective and high-quality external audits thereafter.

In the Moroccan context, (Harazem & ELHAMMA, 2023) pointed out that, thanks to the use of digital tools by Moroccan external audit firms, they managed during the COVID-19 health crisis to ensure the continuity of their external audit missions, maintain the duration of collaboration with the audited company and guarantee a better quality of external audit. In fact, according to the results of this study, an alternation between in-person and distance is the predominant idea among external auditors. Based on research studies, we believe there is a positive relationship between digital tools and external audit quality. Therefore, we hypothesize: **H 2:** Digital tools have an impact on external audit quality, particularly on the independence of external auditors.

3.3 Proposal for a conceptual research framework on the role of digitalization in external audit quality: Research assumptions.



Source: Self-design

Figure 1: Impact of digitalization on external audit quality

This figure above explains the role of digitalization as an independent variable on external audit quality as a dependent variable composed of the two main dimensions, which are the competence and independence of external auditors and are inspired by the design developed by Auditor De Angelo in 1981. Indeed, through this conceptual research model developed, we were able to detect the following research hypotheses:

H 1: Digital tools have an impact on external audit quality, particularly on the competence of external auditors.

H 2: Digital tools have an impact on external audit quality, particularly on the independence of external auditors.

4. CONCLUSION

This article examines the intersection of artificial intelligence (AI) and external audit quality, highlighting the transformative role those digital technologies can play in auditing. The quality of external audit is traditionally defined by the competence, objectivity and ability of the auditor to provide accurate and credible financial information. Thanks to rapid advances in generative AI, which refers to AI systems that can create new content from existing data models, the external audit landscape is poised for considerable change.

Based on the theory of technological expectations, this study examined how AI can help improve the quality of external audit by increasing the efficiency, reliability and rigor of audit processes. AI techniques can automate routine tasks, detect anomalies and provide predictive information, allowing auditors to focus more on the most complex and decision-making tasks. This strengthens the overall skills of external auditors, as AI tools make them more capable of performing analysis and making more relevant decisions.

The proposed conceptual framework defines the impact of AI on the various dimensions of audit quality, focusing on the competencies of auditors. AI not only strengthens the technical skills of auditors, but also directs the range of skills required to analyze data, manage AI tools, and process the output data generated from them. This requires continuous training and adaptation of audit professionals in order to effectively exploit AI technologies.

In conclusion, while AI offers important opportunities to improve the quality of external audit, it also raises challenges related to auditor training, ethical aspects and protecting the integrity of AI-based audit processes. The auditing profession will have to adapt to these technological advances while developing strong frameworks and guidelines that guarantee the quality of audit and maintain public confidence in the audit process. In this way, AI can become a powerful ally in strengthening the reliability and effectiveness of external audits, and ultimately contribute to improving the governance and transparency of financial reporting.

5. FUTURE RESEARCH

We recommend carrying out the same research based on qualitative methodology and a semi-directive interview guide addressed to external auditors of strategic Moroccan public companies, considered to be a strategic sector which really participates in the creation of wealth in the Moroccan economy

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