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TECHNOLOGIES AND THEIR IMPACT ON AUDIT

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Abstract: *As technology has become indispensable in any field of life and therefore in auditing, this paper aims to study the influence of technology on the audit and how this process can be improved. In an economic environment characterized by frequent changes, technological information and increasingly specialized software are essential and are an invaluable help in conducting a modern audit. Given the pace at which technology is advancing like never before, allowing organizations to process and analyze large amounts of data, the audit is driven to adapt and make profound and rapid changes. The paper analyzes the effect of technology on the skills required by auditors in order to perform a high-quality audit in a digital world.*

Keywords: *audit, technology, Big Data, digital world, challenges*
JEL Classification: *M40, M42, Q55*

Introduction

In the contemporary economic environment, the audit plays a vital role in the business, government, and economy of each country. Investors, financial analysts, bankers, bondholders, and other creditors appreciate the work of auditors and rely on audits of financial statements to ensure that they use reliable information when lending to public and private companies. The management of a company needs reliable and timely information to make different types of business decisions.

Over time, external stakeholders - customers, creditors, banks, governments, the business and financial community, investors, and regulators - have increasingly sought information on the activities, governance, decisions, and strategic direction of companies, based on which they can take important investment or business decisions. In other words, the audit is the way through

which managers find out if the business they lead is reliable and whether it's ready or not to meet potential challenges, and it is the way through which stakeholders receive the assurance on the financial, operational, and ethical well-being of the organization. Moreover, studies argue that both the technology and the work undertaken by the auditor have a major role in guaranteeing the integrity of financial statements (Taremwa, 2019).

As new technologies are accepted and adopted, giving clients accessibility to a great amount of data, investors are looking for broader assurance services in order to reduce risks in their business, beyond the focus on historical information. Certainly, auditors should adapt to the new requirements to benefit from more information available to further improve the quality of the audit of financial statements and to provide an additional perspective.

Internationally, institutions are beginning to use digital and automation technologies, but it will take some time before they begin to understand how to capture value from them. Financial professionals need to start assessing how these technologies will affect their work, as well as the type of talent needed to deliver on the promise of digital instruments. Technology has become indispensable, but it is also very important that these tools be used correctly and efficiently.

If the financial-accounting function had in the past the role of "technical support" then this function must be considered today as a "business partner" that offers vision for the future, helping the company to achieve its objectives and contributing to its long-term success (IFAC, 2019).

Auditing at the Speed of Change

Due to advanced technology, important changes are expected in the field of accounting and auditing, in terms of speed and accuracy of information, but also the adoption of new technologies such as tax software and tools that help accountants improve their traditional working methods, thus reducing the number of mistakes made. In a rapidly changing environment, information technology is becoming an important strategic business partner. The use of IT — the technology used to process, store, and transmit information — improves the organization's performance by helping management make decisions. The digitalization of the business model is the main factor for competitiveness and long-term success.

According to Ursillo (2018), the partner in Cherry Bekaert's Risk Assurance & Advisory Services (RAAS) group, "new accounting technologies

are likely to significantly impact the way auditors execute engagements and client services," even though traditional audit will remain essential. Until recently, auditors worked in an office. Due to the evolution of technology, auditors can now work remotely, using data and analytics, automation and visualization in real-time. Traditionally, an audit process is performed by following several stages such as accepting and planning the audit mission, evaluation of the internal control, verification of financial statements, and audit report. As organizations increase the adoption of big data, the audit profession is forced to evolve and change the methods employed in audit processes oriented towards improving engagement output (ICAEW, 2018b). It is important for the information systems (IS) auditors "to understand the associated risk and consider approaches to ensuring that the risk is properly managed" (McDermott, 2018).

According to a survey conducted by Harvard Business Review Analytic Services, 72% of the 600 respondents found that the strategies and operations of the institutions they run are sensitive to digital disruptions generated by their competitors that offer simpler and cheaper solutions. These business leaders understand that their ability to perceive and react in time to ever-changing conditions such as internal operational problems as well as external market conditions, all of these are a matter of survival and that only those who are able to use data, analysis and automation to anticipate and take the necessary action will have a competitive advantage. All these realities help us understand the important role that both financial audit and financial accounting activity play in meeting these challenges.

Some researchers (Griffin & Wright, 2015; Earley, 2015) have complained about the lack of big data in the audit. Earley (2015) argues that big data could be a game-changer in auditing. Researchers as Brown-Liburd et al. (2015), Moffitt and Vasarhelyi (2013), Yoon, Hoogduin, and Zhang (2015) embrace the use of technologies and argues that big data would add value in the audit process. In an economic environment characterized by frequent changes, technological information and increasingly specialized software are essential and are an invaluable help in conducting a modern audit. It is essential that auditors and other professionals in this field not only be informed about the recent technological developments but obtain a sufficient understanding of these new technologies to get the most out of them. These technologies require redefining audit processes, frequently updating software tools, and acquiring new skills and abilities from professional accountants.

According to Bloomberg Tax (2020), the major international public accounting firms - Deloitte, PricewaterhouseCoopers (PwC), KPMG, and Ernst

& Young - set a new record in investing billions into artificial intelligence & data analytics products, and changing the way they have traditionally operated. These firms, known as the *Big Four*, also want to train employees to bring advanced digital solutions to all consulting and auditing practices within companies. In an interview on December 2020, Narayanan Vaidyanathan, head of business futures at the Association of Chartered Certified Accountants, declared that "new technology was fundamentally changing the nature of accounting." Although some of the jobs will no longer exist with the automation of invoices, however, accountants and auditors "will be expected to become business advisers, not just number checkers. They need to be on top of technology and train staff to use it."

All these technological advances certainly lead to a rethinking of the audit process and we need to recognize that this requires time to happen. Auditors not only need to be sharp as they understand and adopt these new tools, but they must be well ahead of these changes to be able to provide relevant counseling and support services. Before using the new technologies, auditors first need to understand them (Appelbaum et al. 2017).

An overview of technologies that can change audit

In today's digital transformation, technology and tools such as artificial intelligence (AI), cloud systems, blockchain, and data analytics are key challenges for any organizational activities and processes. In the last 10 years, Big Data has been one of the most frequently discussed phenomena as well as a challenge in many organizations around the world. However, when we are talking about big data, the audit industry lags behind.

Big Data is usually described using the three Vs model. Many information systems (IS) auditors and risk professionals are already familiar with this model, which represents the concepts of volume, velocity, and variety (McDermott, 2018).

The National Science Foundation (NSF, 2012) defined Big Data as "large, diverse, complex, longitudinal, and/or distributed data sets generated from instruments, sensors, Internet transactions, email, video, click streams, and/or all other digital sources available today and in the future." Big Data can be defined based on large volumes of extensively varied data that are generated, captured, and processed at high velocity (Laney, 2001). Drew Conway, head of data at Project Florida, concluded that "Big data, which started as a technological innovation in distributed computing, is now a cultural movement by which we continue to discover how humanity interacts with the world—and each other—at

large-scale." Kord (2012) highlighted 4 elements of Big Data ethics: identity, confidentiality, ownership and reputation. Although in the meantime things have evolved, these elements may still be relevant in risk assessment, audit planning and alignment between the company's documented values and practices in the methods and tools used (such as algorithms), buying, selling, etc.

Artificial intelligence, blockchain and data analytics are game changers for both the finance and accounting sector and the audit profession, transforming the roles of both finance professionals and auditors (ICAEW 2018b). Auditing will continue to be transformed through deep learning. With regard to auditing, it is anticipated that AI will change the definition of reasonable assurance by identifying risk-based anomalies, not just rules.

Blockchain can be defined as a network software protocol, which is a set of rules and conventions which allow network devices to communicate with each other (ICAEW 2018b). Blockchain is like a protocol, a way for recording transactions. Unlike the internet, in which data is shared, blockchain ownership can be transferred from one party to another. The good thing is that "Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system." (ICAEW 2018b).

Related to Big Data is also the development of cloud computing. One of the advantages of using cloud services is that users can benefit from these services without having to maintain and operate their own IT infrastructure. According to the US National Institute of Standards and Technology (Mell, and Grance, 2011), cloud computing is a "model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." Cloud computing is the best way to manage information technology (IT) resources, as companies manage to store as much data as they need (Bhardwaj et al. 2010). According to KPMG (2018), auditors need to integrate more cyber security capability in the audits and also, they need to rethink their approach in providing assurance around cloud systems.

There are various technologies like Apache Hadoop, NoSQL, Data Analytics, CATT that can be very helpful in financial audit missions, by simplify audit procedures, improve organizational performance and reduce risk (Cristea, 2020). Hadoop is one of many open-source software platforms that help store and manage large amounts of data. Also, an advantage offered by Hadoop in favor of auditors is the tolerance for errors, resuming the order, allowing security analysis and storage of APT (Advanced Persistence Threats). The adoption of HDFS and Map Reduce makes it much easier and more secure for the auditor to verify information about company transactions. MapReduce can process huge amounts of data at high speed and can also remove duplicates.

These audit softwares add value to the financial auditor in conducting audit activities, creating a hybrid environment in which systems are responsible for monitoring an overly voluminous external data environment (Krahel, and Vasarhelyi, 2014). All these technological developments tend to lead to the adoption of a continuous audit and the extensive use of IT tools.

The advantages and challenges offered by technical tools

Some research (Marr, 2018) estimate that 90% of the world's data has been generated since 2016, and significant amounts of it are financial data. Furthermore, according to a survey by the International Data Group (2020), 81% of survey respondents reported already using computing infrastructure or having applications in the cloud, compared to 73% in 2018, and another 12% of them projecting to implement cloud-based applications in the near future. Cloud adoption has also reached more than two-thirds in every industry, with about 75% in financial services, and 92% of the organization's total IT environment is at least somewhat in the cloud.

An increasing number of organizations recognize the many benefits of the cloud-computing trend. Among the key benefits of cloud computing, we can list agility, scalability, greater efficiency, reduced costs, data security, business continuity and flexibility, and many others. Given the increasing use of big data by audit clients, it leads to urgency for auditors to conform to the existing trend (Appelbaum et al. 2017).

Technology has the capability to transform the audit. It increases competitiveness in the world market, having a positive impact on organizational processes, including accounting, finance, marketing and human resources. Technology offers the ability to improve the quality of audit and also to add more value (ACCA, 2019). Furthermore, technology can considerably improve the work of the accountant and the auditor, increasing the economic efficiency and speed of the processes. It reduces the time to complete the audit mission because it accelerates the identification of exceptions, simplifies the preparation of worksheets, and the reports are generated automatically. It provides immediate benefits to the audited client by reducing the daily risk, detection of irregularities and fraud, data analysis may indicate forecasts, ensuring greater independence from the audited environment. Technological advances might allow auditors to move toward a more continuous auditing and monitoring process.

The use of IT devices has changed significantly the activity of auditors, and also improves the financial reporting system. For instance, "new technological tools have the potential to enable the auditor to mine and analyze large volumes of structured and unstructured data related to a company's financial information. This capability may allow auditors to test 100 percent of

a company's transactions instead of only a sample of the population" (Harris, 2017). By adopting big data techniques, auditors could provide reasonable assurance about the relevance of the financial statements (Hogan, Rezaee, Riley, & Velury, 2008).

There is no doubt that technology presents opportunities that help increase the efficiency and quality of the audit, but along with these opportunities comes also considerable risk that must be properly managed. An important concern associated with big data is ensuring that adequate safeguards are in place to protect the data and adhere to privacy requirements, particularly for consumer information (ISACA, 2018). Another concern is, When AI and other technologies are fully accepted and put into practice, what happens to the independence of the auditor?

The rapid technological evolution brings opportunities but also challenges for the financial-accounting function. The only thing we know for sure so far is that technology cannot completely replace the "auditor's knowledge, skill, judgment, and exercise of professional skepticism" (Harris 2017), and human involvement is still necessary to effectively communicate and advise investors and information users. Despite these advantages offered by technology, professional reasoning will always be necessary for the audit, the financial auditor's thinking and analysis will not be able to be replaced. "The future is one where humans and machines work together" (ICAEW 2018b). What real effect the technology will have on the audit process is yet to be determined.

Conclusion

Technology has the capability to transform the audit. It enables the increase the assurance that professional auditors must give, thus contributing to ensuring confidence in the system. As recent research highlights (ACCA, 2019), a key skill for auditors in the near future will be the flexibility to adapt to a working environment that will continue to evolve. The auditing profession will certainly not disappear, however, it will need a new approach. To improve audit quality and investor protection, there are several challenges that auditors need to consider. Besides being up to date with new technologies, audit professionals must be able to find information that is important to clients, such as tracking trends and emerging issues, in order to provide more insights to help make more-informed business decisions. In addition, they need to improve their critical thinking, technology skills, professional judgment, and look ahead and provide insights on future challenges and opportunities in order to meet the rising expectations on audit quality.

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