The Effects of Digitalization on the Audit profession
- A comparative study between one developed and one developing country

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Abstract

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Title
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Digitalization is currently changing all areas of society and business. One area of business that has been significantly impacted by the developments of information technology is auditing. Currently, audit firms all over the world are implementing tools which increase the capabilities of auditing to add value. Specifically, big data analytics, artificial intelligence, and blockchain technology, have gained footing in the auditing field during the last few years. This study extends the knowledge on the effects of digitalization and emerging technologies on the audit profession. Existing literature tends to focus on more developed countries and therefore this study contributes to the existing literature by studying the perceived effects of digitalization on auditing in one developed and one developing country. To achieve the aim of the study, a qualitative research method was employed. Semi-structured interviews were conducted with four Swedish and five Liberian audit professionals. The study shows that digitalization and emerging technologies have significantly impacted audit quality and audit efficiency in both Sweden and Liberia. Furthermore, the findings indicate that digitalization is currently also changing the skills and competences needed within audit firms. The study also demonstrates the importance of emerging technologies in the context of auditing.

Keywords
Digitalization, Big data, Artificial intelligence, Blockchain, Auditing, Audit process, Audit quality, Audit efficiency, Auditor skills and competences.
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1. Introduction

In the first chapter of this thesis, the research topic is introduced, which ends with a problematization. This chapter is set to provide the reader with a general understanding of digitalization and its impact on auditing and related industries. Next, the purpose of the study, along with the research questions are presented. Finally, the section ends with a presentation of the thesis’s structure.

1.1 Background

Digitalization refers to the technical advancements that enable the creation of a contemporary world for individuals (Zuboff, 1988). According to Westerman et al. (2014), digitalization dates back to the industrial revolution, when new machines enabled a change in the process of commerce, capitalism, and, indeed, human history. Presently, it’s argued that innovation in digital tools is moving the world to “the second machine age” (Brynjolfsson & McAfee, 2014). Digitalization is taking place on a global scale and is significantly transforming society and business as we know it. Technological developments bring possibilities (Zuboff, 1988), constantly pushing the boundaries for what’s possible (FAR, 2016). Furthermore, digitalization is vastly transforming industries with the help of digital technology (Majchrzak et al., 2016). According to Gartner (2020), digitalization is “the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business”.

Digitalization has been identified as one of the major trends in society, and in business, and is arguably the most powerful driver of change in the world right now (Arsenie-Samoil, 2010; FAR, 2015, Holley, 2004). A contemporary view is that industries, and organizations have to realize the opportunities brought by digitalization, and modernize their business models, or be left behind (Arsenie-Samoil, 2010; Tugui, 2005). This shift is developing future-oriented organizations with practitioners relying even more on information and communication (Iuliana & Tugui, 2005). Arsenie-Samoil (2010) and Iuliana and Tugui (2005) argue that, whether they like it or not, companies must adapt to survive in this new age brought by digitalization. According to Hess et al. (2016), organizations are individually responsible for discovering means to implement strategies that embrace the implications of the current digital transformation, and thereby propel better operational performance.
However, only a few examples of firms that use digital technologies to drive significantly higher levels of profit, productivity and performance exist (Westerman et al., 2014), even though the potential benefits of digitalization are high (Parviainen et al., 2017). Thus, many firms are not prepared for the second machine age and will ultimately fail to thrive in this new age (Westerman et al., 2014). Companies are increasingly valuing digital information, which is the essence of today's networked ecosystems. Digitalization connects individuals, enterprises, governments, and devices, enabling easier interaction, which results in enormous accessible data sources (Shirky, 2008). Accordingly, digitalization allows organizations, suppliers, customers, and employees to collaborate in new ways, resulting in new product and service offerings. Further, Digitalization makes it possible for corporations to process, store and transmit data on a massive scale at significantly lower costs than before and therefore has the capacity to change any forms of human labor that is associated with data and cognitive non-routine processes (e.g., Frey and Osborne, 2013; Rifkin, 2014). At the same time, incumbent organizations face a challenge because of digitalization, which encourages them to reflect on their existing strategy and explore new business options (Möller et al, 2020).

Furthermore, emerging technologies have significantly influenced financial reporting in the last few decades, and the acceptance is currently accelerating (Julie et al., 2019). Artificial intelligence (AI), Big data and analytics, and blockchain are just a few examples of emerging technologies that are being implemented, all of which are significantly changing corporations’ business approaches. Following these disruptive technologies auditors have had to adapt, forcing them to transform their own processes (Julie et al., 2019). Audited financial statements are intended to meet the information needs of investors and creditors and should be useful in decision making. For auditing to remain a valuable and relevant service, it must evolve. Thus, the auditing profession is currently facing a technological transformation (Lombardi et al., 2014). Following the development of information technology, audit firms are implementing tools which increase the capabilities of auditing to add value (DeFond & Zhang, 2014). According to Kokina and Davenport (2017), the audit process is particularly suitable for the implementation of data analytics and artificial intelligence since it’s become increasingly difficult to analyze the growing volumes of data. The audit process involves the progression of activities to transform “input into output" (Zhang, 2019). The input is the financial information provided by the auditee, and the output is the auditor's opinion (I.F.A.C., 2019).
Emerging technologies in the context of auditing have led to changes in the audit process and streamlined the auditing profession (Kuruppu & Oyelere 2017). According to Banker et al. (2002), information technology (IT) made streamlining possible by automating parts of the audit process. Automating parts of the audit process, that were formerly done manually (Sjöberg & Johansson, 2016), enables a faster and easier completion of audits, while maintaining the integrity of the data. E.g., A.I can transform the audit through automated analysis of accounting entries (Baldwin et al., 2006), which is beneficial since it reduces the risk for human error, and it can effectively detect fraudulent behavior (Moffitt et al., 2018). According to KPMG (2017), the three main digital trends are: data analytics, robotics, and artificial intelligence and blockchain. Developments in these emerging technologies have significantly impacted the auditing profession, since they are changing the responsibilities and functions of audit professionals (ICAEW, 2017). According to FAR (2015), this continuous transformation could potentially reshape the whole auditing environment. Digitization is therefore considered to have a continual role in the development of the auditing profession and is thus an interesting research endeavor.

Nevertheless, Nearon (2005) and Bierstaker et al. (2001) argue that the auditing profession will need to adapt even more as a result of information technology's effects (IT). This notion is supported by Lombardi et al. (2015), who argue that the auditing industry still hasn’t realized the full potential of digital technologies in auditing. Data review, and data audit are key difficulties for the audit profession in today's golden age of digitization. Changes in the auditing profession will continue to be influenced by advancements in digital technology and information technology. Accordingly, the services and professional practices supplied by audit companies will also continue to be reshaped because of these changes (Adiloglu & Gungor, 2019). Although several studies have shown that the auditing profession will benefit from the use of digital technologies in terms of productivity, it’s still important to explore the effects of digitalization on the auditing profession, since the effects of disruptive technology in the context of auditing are yet to be fully determined.
1.3 Problematization

In the contemporary world, digitalization, and big data analytics - or datification - is penetrating all areas of society and business, creating new ways of working, communicating, and cooperating (Loebbecke & Picot, 2015). Digitalization connects individuals, enterprises, governments, and devices, enabling easier collaboration and social interaction, which results in enormous accessible data sources (Shirky, 2008). Digitalization makes it possible for corporations to process, store and transmit data on a massive scale at significantly lower costs than before and therefore has the capacity to change any forms of human labor that is associated with data and cognitive non-routine processes (e.g., Frey and Osborne, 2013; Rifkin, 2014). Moreover, increasingly sophisticated software fosters machine-based interpretation of data and thus enables autonomous decision-making and a deeper integration of big data applications in traditional value creation activities (Loebbecke & Picot, 2015). According to Varian and Choi (2009), such data allows for predicting the present and to some extent the future, which has impacted managerial and other cognitive processes. For instance, data-driven managerial decision making is seemingly replacing the ‘Highest Paid Person’s Opinion’, which used to be the norm in the past (Loebbecke & Picot, 2015).

Digitalization has forced businesses to change the way they conduct business, and an area of business that has been altered by the increased use of information technology (IT) tools is financial reporting (Julie et al., 2019). According to Mansour (2016) and Shaikh (2005), IT has changed how businesses record and disclose financial information. Presently, more and more businesses are compiling and disclosing financial information using various digital tools and gathering data digitally (Foneca, 2003; Khemakhe, 2001; Mansour, 2016). Accordingly, auditors of modern firms have encountered huge challenges due to advances in information technology (Mansour, 2016), since auditors are expected to be equally informed, and equipped with advanced technology for auditing to continue being a valuable service for investors, creditors, and other users of financial information (Lombardi et al. 2015; Alles 2015). Hence, the public accounting industry, which was once a slow-paced and conservative industry, has been forced to undergo tremendous changes since the turn of the millennium due to rapid advancements in information technology (Elliott, 1998).

To combat the challenges brought by the advances in information technology, audit firms are implementing tools which increase the capabilities of auditing to add value (DeFond & Zhang,
2014). Specifically, developments in big data analytics (Alles, 2015; Earley, 2015; Alles & Gray, 2014), artificial intelligence (AI) (Agnew, 2016; Kokina & Davenport, 2017), and blockchain technology (Liu et al., 2019; Kokina et al., 2017), have influenced the auditing profession during the last decades. According to Deloitte (2018) these technologies, along with other advanced technologies, makes it possible to capture and analyze previously unimaginable types and volumes of data. Several studies have shown that there are many positive effects of digitization in the auditing industry (e.g., Lombardi et al., 2015; Ghasemi et al., 2011; Raphael, 2017). For example, Lombardi et al. (2015) states that new technology in the auditing field will make fieldwork more effective and efficient and hence argue that technology will enable auditors to analyze risk and detect fraud. Lombardi et al. (2015) also argue that technology provides auditors with means to complete mundane tasks in a timely manner, allowing them to focus more time on complex judgmental areas. This notion is supported by Tiberius and Hirth (2019), who argue that automation relieves auditors from routine tasks in favor of more complex tasks. According to Ghasemi et al. (2011), advancements in information technology have brought opportunities for companies to perform accounting functions with significant time and cost savings and allowed companies to progress toward paperless offices which in turn has been beneficial for auditors since audit trails and details are automatically maintained. Raphael (2017) believes that digitization does not only increase the efficiency and quality of an audit, but it also creates value for clients because they can access more relevant and valuable information. There are, however, a few studies that have reported on the negative aspects of digitizing the auditing process as well, such as the security risk that companies share sensitive information online (Ali et al., 2015). It is therefore interesting to consider the negative aspects of digitalization as well.

Although these technologies exist, and in theory allow for a more comprehensive and automated audit, the process of implementing these technologies has been long, which is mainly due to the considerable costs associated with implementing these digital technologies (Lombardi et al. 2015; Hunton & Rose 2010). Hence, there is reason to believe that the implementation of digital tools is uneven, depending on the size of the audit firm and perhaps the geographical contexts in which the audit firm operates. Corporate investment in Big Data increased from $34 billion in 2013 to $232 billion through 2016, and the Big 4 (i.e the four biggest accounting firms in the world) declared that they aim to be at the forefront of Big Data implementations (Alles & Gray, 2016). Small and mid-sized audit firms lack the funds to implement Big Data to the same extent as the Big four firms and thus, several studies discuss
the implications of digitalization for small and mid-sized audit firms (e.g., Tiberius & Hirth, 2019; Chaney et al., 2004; Manita et al., 2020). Tiberius and Hirth (2019) suggests that technological changes in the business environment may displace most small and mid-sized audit firms, since they will struggle to afford the investments in technological infrastructure and new competencies needed to remain competitive. This raises the question of whether audit firms in developing countries are facing the same challenges. According to Petersen (2019) the worldwide advance of the digitization process is a double-edged sword. On the one hand, it offers technological advances in productivity that can improve the economic situation for less-developed countries and reduce poverty and on the other hand there is a danger that these countries will be technologically left behind and no longer be competitive if they can't afford to implement the costly technologies. It’s therefore important to explore how digitalization has impacted the audit profession in less-developed countries as well. There is strong evidence suggesting that the digital tools that modern audit firms are implementing are increasing the audit quality and enabling auditors to detect fraud more effectively, which in turn increases transparency (e.g., Manita et al., 2020). Hence, less-developed countries would certainly benefit from modern information tools in combating corruption and fraud.

In summary, it’s clear that the audit profession faces both opportunities and challenges following digitalization, but since it’s a continual transformation, the implications for the auditing profession are yet to be fully determined. Changes in the audit process are, however, unavoidable as the profession undergoes a paradigm shift toward a more digital organization (Breman & Felländer, 2014; Byrnes et al., 2015; Caster & Verardo, 2007; Lombardi et al., 2015; Spraakman et al., 2015). Scholars have argued that the digital development of the auditing industry will lead to a changing organizational structure, which also means changing skills needed within the auditing firms. According to Appelbaum et al. (2017), the increased digitization and the constantly changing nature of clients’ business models, may result in more complex auditing and auditor requirements. Hence, more IT specialists and data scientists might be employed in auditing firms due to the changing requirements. This raises the question of whether business administration, accounting, or auditing graduates will continue to staff auditing firms, rather than IT-oriented employees (Tiberius & Hirth, 2019). Nevertheless, auditors must gain the skills to use computerized accounting systems. Lombardi et al. (2015) maintain that the rapid advancements of technology has resulted in a gap between the profession and education that should be shortened in order to properly educate and prepare students for the audit profession.
1.4 Purpose of the study

With this background our study seeks to extend the knowledge on the effects of digitalization and emerging technologies on the audit profession. Furthermore, existing literature tends to focus on more developed countries (e.g., Tiberius & Hirth, 2019), and therefore this study intends to contribute to the existing literature by studying the effects of digitalization on auditing in one developed and one developing country. This study will also seek to examine auditors’ perceptions toward the importance of digital tools in auditing, in a developed and a developing country.

1.5 Research questions

This study will seek to answer the following research question:

➔ How do Swedish and Liberian auditors perceive the effects of digitalization on the audit profession?

➔ What are Swedish and Liberian auditors’ perceptions toward the importance of digital tools in auditing?

➔ In what ways, if any, do Swedish and Liberian auditors differ in their perception towards the effects and importance of digitalization in auditing and why?

1.6 Potential contributions

Despite its importance, technological foresight for the auditing industry in less developed countries is scarce. While there are many studies investigating auditors' perceptions regarding the effects of emerging technologies in the audit process, few studies have been directed at less developed countries. Hence, this study intends to fill the existing gap in the literature and is set to explore the perceptions of auditing professionals about the effects of digital tools in the audit process, in the auditing industry of developing countries such as Liberia.

1.7 Structure

The remainder of the paper is organized as follows. The next section presents the theoretical framework, which ends with a presentation of the research model. The section is followed by the literature review, which reviews literature relating to the effects of digitalization on the audit profession. Next, the paper discusses the methodology, which is followed by a
presentation of the results of the interviews. Finally, the paper provides a conclusion of the study, discussing its limitations and offers avenues for future research.
2. Theoretical framework

In this chapter, the theoretical framework is presented. The section starts by introducing the stakeholder theory, which is followed by agency theory. Both theories are commonly used theories in the auditing literature. Next the theory of inspired confidence is presented. Then the technology acceptance model is presented. Finally, the research model summarizes the theories and key concepts.

2.1 Stakeholder theory

Stakeholder theory explains the interaction between organizations and the people affected by the activities of the business, i.e., the stakeholders. The idea that organizations have multiple stakeholders has become commonplace in the management literature, according to Donaldson and Preston (1995). Stakeholder theory suggests that various social contracts have to be negotiated with different groups of stakeholders due to the fact that different stakeholders have different views on how the business should be conducted (Harrison & van der Laan, 2015; Hörish et al, 2020). Thus, stakeholder theory aims to identify these actors to increase the knowledge of what and who affects the organization's management decisions (Jensen, 2002). Organizations have both internal and external stakeholder groups, who have an interest in how the business operates. Internal stakeholders’ groups include employees, managers, and owners, all of whom have a clear interest in the performance of the firm. The external stakeholders on the other hand, such as suppliers, customers, creditors, and society constitute a network that the organization is dependent on (Wicks et al, 1994).

The auditor is ultimately responsible for providing confidence in the quality of the financial reports produced by businesses, ensuring that they meet the information needs of investors and creditors (Porter et al., 2014). Hence, satisfying the information needs of the organizations many stakeholders is the main scope of auditing. Harrison and van der Laan (2015) argue that the reporting environment has changed dramatically due to the worldwide interest in environmental sustainability. Conventional accounting has been heavily criticized for being too focused on financial stakeholders (e.g., Harrison & van der Laan, 2015; Brown & Dillard, 2015; Mitchell et al., 2015). Thus, the notion of stakeholders has been picked up broadly in the accounting literature during the last decade (Hörish et al, 2020). For instance, stakeholder theory has been discussed widely in relation to concepts such as Corporate Social
Responsibility and Sustainability Reporting (Jachi & Yona, 2019). Silva et al. (2019) maintain that stakeholder expectations are mostly not considered in the existing performance measurement of firms, since they do not capture environmental and social topics sufficiently.

Moreover, with the development of information technology, audit firms are implementing tools which increase the capabilities of auditing to add value (DeFond & Zhang, 2014). According to DeFond and Zhang (2014) the capability of the audit to add value is determined by the quality of the audit. Emerging technologies in the context of auditing have made streamlining possible by automating parts of the audit process (Banker et al., 2002). Automating parts of the audit process, that were formerly done manually (Sjöberg & Johansson, 2016), enables a faster and easier completion of audits, while maintaining the integrity of the data. For instance, A.I can transform the audit through automated analysis of accounting entries (Baldwin et al., 2006), which reduces the risk for human error, and it can effectively detect fraudulent behavior (Moffitt et al., 2018). Hence, the digitization of auditing will ultimately improve the transparency of financial statements, which in turn will enable stakeholders to make more informed decisions (Manita et al. 2020). According to Jachi and Yona (2019), the use of tools such as artificial intelligence enhances the effectiveness and quality of the audit, which thus benefits the stakeholders by increasing the reliability of the financial statements.

2.2 Agency theory

Agency theory is one of the main theories used in auditing literature, and it’s directed at the ubiquitous relationship between the principal and the agent (Thomsen & Conyon, 2012). The principal is the party delegating the work to the agent, who performs that work on behalf of the principal. Agency theory attempts to describe this relationship using the metaphor of a contract (Eisenhardt, 1989). The relationship between a business owner and his manager is a given example of an agency relationship. The owner (of the capital) wants the manager (of the capital), to perform their tasks in a way that maximizes the firm's profits, but the manager may have their own ideas about how they would like to perform their tasks since their interest is to get greater compensation, which could result in an agency problem (Thomsen & Conyon, 2012). The conflicting incentives between the principal and the agent is often referred to as a conflict of interest (De Franco et al., 2014). Conflicts of interest between the principal and the agent result in problems called agency problems that lead to agency costs, such as moral hazard and adverse selection (Handoko & Lindawati, 2021).
According to Eisenhardt (1989), agency theory is concerned with resolving two agency problems that can arise in agency relationships. The first agency problem is when the desired goals of the principal conflicts with the agents. The agent may be tempted to act in his own interest rather than in the principals and only maximizing his own utility. Thus, the problem is verifying whether the agent is behaving appropriately (Eisenhardt, 1989). The second agency problem is concerned with the principals and the agents' conflicting attitudes toward risk. The agent, performing the tasks on the principal's behalf, may prefer different actions because of different preferences on risk.

As mentioned, the main role of independent auditors is to provide confidence in the quality of the financial reports produced by businesses, ensuring that they meet the information needs of investors and creditors (Porter et al., 2014). However, it’s also argued that auditing can be viewed as a mediator between two parties: the shareholders and the board (Carrington, 2014). Hence, auditing plays a significant role in resolving agency problems, since it functions to assure the investors (principal) that their interests are being upheld (Commerford et al., 2019). According to Handoko and Lindawati (2021) the auditor is responsible for detecting material misstatements and indications of fraud, which could arise from conflicts of interests between the principal and the agent.

However, due to the rapid growth of companies it has become increasingly difficult for auditors to manually analyze the growing volumes of data (Kokina & Davenport, 2017). Thus, auditors have implemented digital technology in the audit process to ensure that they continue providing timely and reliable information to investors, and that auditing remains a valuable and relevant service (Handoko & Lindawati, 2021). Following the development of digital technology new auditing techniques, such as CAATs, were introduced. These technologies are useful for auditors in the collection and evaluation of electronic data, or audit evidence. This is where the auditor can detect fraud in the client’s financial statements and resolve agency problems. This is supported by Lombardi et al. (2015), who states that new technology in the auditing field will make fieldwork more effective and efficient and argues that technology will enable auditors to analyze risk and detect fraud.

Manita et al. (2020) conducted a study assessing how digital transformation of the external audit has impacted the role of auditing as a corporate governance mechanism, confirming that the digital technology will enhance the auditor’s role in resolving agency problems in several
ways. According to Manita et al. (2020) digital technology will enable auditors to evolve towards a better control of the client’s data and will improve the relevance and quality of the audit. Accordingly, new digital technology enables a more relevant analysis of the clients’ processes and data and makes it possible to identify errors and anomalies more effectively, allowing the audit to fully play its role as a governance mechanism. This is consistent with prior studies on big data, which shows that digital tools in auditing could improve the quality of financial statements and anomalies detection (Lombardi et al, 2015; Krahel & Titera, 2015; Cunningham & Stein, 2018).

Moreover, digital tools have evolved the audit offer towards the validation of forecast data, which according to Manita et al. (2020) will further reduce the risk of misappropriation and opportunistic managers. This is in line with prior work on the effectiveness of machine learning techniques in detecting fraudulent financial statements (Kotsiantis et al., 2006). Finally, the advances in digital technology will also benefit audit committees since it can help them to improve internal systems and processes aimed at improving the corporate governance of the firm, hence limiting the risk of earnings management by opportunistic directors (Manita et al., 2020).

2.3 Theory of inspired confidence

During the 1920s, Theodore Limperge a Dutch professor, introduced the theory of inspired confidence also known as the theory of rational expectation (Hayes et al., 2005). This theory asserts that the demand and supply of audit services are driven by the participation of external stakeholders who steer the affairs of organizations. Stakeholders who give resources to ensure the organization's existence and survival demand accountability from those in charge of the organization's day-to-day operations. Because there is a possibility that management's information on the organization's activities may not accurately reflect the situation due to potential conflicts of interest between management and stakeholders and the need for a financial audit may arise. The theory suggests that the information should be exposed to independent scrutiny and during such an independent assessment, the auditor should make use of all resources at his disposal to guarantee that stakeholders' expectations are satisfied by providing an expected degree of assurance (Mathias & Kwasira, 2019).
As the integration of digital applications is making a huge impact on organizations and companies, the theory of inspired confidence demonstrates that the effects of digitalization in audit processes are strategic, and it has long-term positive advantages on organization growth. According to Mathias and Kwasira (2019), most modern companies with large operations have a huge amount of data to be audited, and since human auditors may not be able to cover the vast amount of information in each time frame, the audit profession will gradually lose value and become a failure. As stated by Mathias and Kwasira (2019), the timely provision of information enhances the quality of audits and the use of digital applications in the auditing process saves time and enables accurate collection of data. Additionally, digitalization in the auditing process improves the auditors’ speed to handle and manage huge amounts of data in real-time and allows auditors to provide significant information to stakeholders and easily detect irregularities in the financial statements.

### 2.4 Technology Acceptance Model

The technology acceptance model (TAM) was first developed by Davis (1989) and assumes that technology will be “accepted” or used if it’s deemed useful and easy to use by the user. According to Kim et al. (2009) TAM explains the determinants of computer acceptance in general and uncover the impacts of internal beliefs, external factors, and intentions. It’s argued that system usage is the primary indicator of technology acceptance (Kim et al., 2009; Thompson et al., 1991; Adams et al., 1992), which is measured in terms of frequency and time (Davis et al., 1989). The two belief constructs, i.e., perceived usefulness and perceived ease of use, are fundamental constructs that influence the decision to use computing technologies, mediating the influence of external variables of computer usage behavior (Kim et al., 2016). Davis et al. (1989) states that perceived usefulness is defined by the subjective probability that the specific application will increase the users job performance, and perceived ease of use is determined by how free of effort the application is to use. Thus, there is a positive relationship between the two constructs and technology acceptance (Kim et al., 2016). Accordingly, the more users who find that the application will make their job easier to perform; the higher the probability that the technology will be accepted.

According to King and He (2006), TAM is one of the most widely used models for determining the degree to which a technology is accepted. The model can be found in several auditing studies (e.g., Kim et al., 2016; Kim et al., 2009; Rosli et al., 2012). Kim et al. (2016) conducted
a study exploring the usage of generalized audit software (GAS) features among Egyptian external auditors, applying the TAM to assess how the complexity of GAS features impact the usage of GAS. The authors found that Egyptian auditors' usage of GAS is more influenced by perceived ease of use, rather than perceived usefulness. Consequently, Egyptian auditors are more likely to use the basic features of GAS, which have low conceptual complexity, than GAS features with higher conceptual complexity. Hence, complexity is argued to be a significant obstacle to overcome in the adoption of more sophisticated audit technology, although the perceived usefulness of such technologies is high (e.g., Rapoport, 2016; Kokina & Davenport, 2017; Earley, 2015). The acceptance of emerging technologies such as AI, Big Data and Blockchain is evidently high in the field of auditing, especially in Big four audit firms, who are investing considerable amounts of money to develop and adopt these technologies (Alles & Gray, 2016). However, several studies have found that the acceptance may be lower in less developed countries (e.g., Albawwat & Al Frija, 2021; Afroze & Aulad, 2020; Ismail & Abidin, 2009). For example, Albawwat and Al Frija (2021) states that autonomous AI systems are perceived as complicated to use and hence deemed not useful by auditors in Jordan. Consistently, Afroze and Aulad (2020) found that audit professionals in Bangladesh have not realized the benefits of AI in auditing.

2.5 Research model

The theoretical framework presented in section 2, will be used to understand the factors influencing auditors to implement new technologies (i.e., AI, Big Data and Blockchain) to the audit process. First, stakeholder theory, which explains the interaction between organizations and the people affected by the activities of the business, suggests that the implementation of emerging technologies in the context of auditing will benefit stakeholders through increased transparency and reliability in the financial statements of organizations. Second, agency theory recognizes the auditor as a controlling body, assuring the principal that his interests are being upheld. Third, the theory of inspired confidence reiterates that the auditor should make use of all resources at his disposal to guarantee that stakeholders' expectations are satisfied. Lastly, the technology acceptance model is used to determine the degree to which emerging technologies (AI, Big Data and Blockchain) are accepted in the auditing field, both in Sweden and in Liberia. The audit process includes a variety of audit procedures, many of which can be facilitated with new digital technologies. The main benefits of digitizing the audit process include automation and increased audit quality. Digitalization is, however, changing the
auditing industry fast, which has created a gap between the profession and education. Thus, these variables will also be considered to study the effects of digitalization on the audit profession. The research model is summarized in the figure below (figure 1)

**Figure 1: Research model**
3. Literature review

The following sections review the existing literature. First, a brief discussion is provided on auditing and how it relates to digitalization. Next, the four steps of the audit process are presented, i.e., pre-engagement, planning, evidence, and reporting. The currently trending emerging technologies are then discussed in 3.3. Finally, prior studies have shown that the main effects of digitalization in the field of auditing include, automation, improved audit quality, and changing skills. These effects will be reviewed in sections 3.4 through 3.6.

3.1 Auditing and digitalization

Kishore and Peshori, (2014) classified auditing as the process to ensure the accuracy, security, and confidence of the accounts or reports being audited. The initial goal of auditing, according to Flint (1988), is to determine whether certain responsibilities were carried out honestly, properly, and in compliance with regulations and specific instructions. Flint (1988), termed auditing as a type of examination that is used to ensure accountability and is carried out by someone who is not a party to the transaction, an objective individual who compares performance to expectations and reports the findings. Additionally, Wallerstedt et al. (2006) hold the position that auditing is an essential function in society.

According to Gartner (2020), digitalization is “the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business”. Currently, the developments in information technology are transforming all areas of society and business, creating new ways of working, communicating, and cooperating (Loebbecke & Picot, 2015). Technological advancements and the resulting digitization of data and processes have had a significant impact on the inputs, tools, and information available to the auditor during the audit process. Therefore, the advancements in digital technology during the last decades have significantly transformed the audit processes, which are now generally carried out digitally with computer aid (Handoko & Lindawati, 2021). Digitalization allows audit firms to increase their capabilities of adding value for their clients (DeFond & Zhang, 2014).
3.2 The audit process

Understanding the audit process is essential for understanding how digitalization has changed auditing. The main purpose of auditing is to provide confidence in the quality of the financial reports, ensuring that they are true and without material misstatements (Porter et al., 2014). Audit processes are the activities undertaken by the auditor to obtain evidence to form appropriate opinions on the financial statement of an entity. Although audit processes tend to not look exactly alike, since the procedures involved depend on the client’s risk factors and effectiveness of their internal control systems (Kearney, 2013), authors tend to agree that there are some main audit procedures that together constitute the audit process. Authors do, however, not always agree on how many procedures should be involved in the audit process. According to Knechel and Salterio (2016), there are seven main steps of the audit process which are pre-planning (Pre-engagement), planning, understanding the entity, risk assessment, documentation, completion, and reporting. According to Carrington (2014), however, the audit process involves only four steps i.e., evaluation of the statements from the management team, affirmative actions, documentation, and reporting.

3.2.1 Pre-engagement

Several authors do, however, argue that the first step is aimed at getting acquainted with the potential client and deciding whether it’s prudent to work with the potential client (Porter et al., 2014). Knechel and Salterio (2016) refers to this step as the pre-engagement. Professional standards require audit firms to establish policies and procedures for deciding whether a new client should be accepted or whether a current client should be retained (Eilifsen et al., 2013). According to Eilifsen et al. (2013), the purpose of such policies is to mitigate the risk that an auditor will be associated with clients who lack integrity. Hence, auditors will ordinarily confer with the predecessor auditor and conduct background checks on the top management for a prospective new client. Equally important, however, is ensuring that the audit team understands the entity and the environment in which it operates. This includes understanding the industry, how the entity measures its performance, and the quality of its internal control (Eilifsen et al., 2013; Knechel & Salterio, 2016). This helps the audit team in assessing the risk of material misstatements and setting the scope of the audit. Furthermore, it’s important that the client is not accepted if the audit cannot be adequately staffed with personnel possessing the necessary levels of independence, competence, and capabilities (Porter et al., 2014).
3.2.2 Planning

If the auditor decides to accept the client, the next step of the audit process is to plan the audit, which is aimed at developing an overall audit strategy (Carrington, 2014; Eilifsen et al., 2013; Kearney, 2013). The auditor needs to plan what evidence to collect to be able to express an opinion, amongst other things, on whether the financial statements give a true and fair view of the state of affairs and profit and loss of the reporting entity, and how and when to collect such evidence (Porter et al., 2014). According to Carrington (2014) and Eilifsen et al. (2013), proper planning is important to ensure that the audit is conducted in an effective and efficient manner. This step involves making a preliminary assessment of the client’s business risks and determining materiality, based on the auditor's understanding of the entity. The audit team relies on these judgements to then assess the risk relating to the likelihood of material misstatements in the financial statements (Eilifsen et al., 2013). According to Porter et al. (2014), planning the materiality refers to the amount of error the auditor is prepared to accept in the financial statements while still maintaining that they provide a true and fair picture of the state of affairs of the reporting entity. This provides a basis for planning the nature, timing, and extent of procedures to be performed during the audit (Porter et al., 2014).

Furthermore, in the process of planning the audit, the auditor follows a risk assessment process to identify the risk of material misstatements in the financial statement accounts. This process is referred to as the audit risk model (Eilifsen et al., 2013; Houston et al., 1999). Audit risk is the risk that the auditor expresses an inappropriate audit opinion when the financial statements are materially misstated (Porter et al., 2014). According to Eilifsen et al. (2013), audit risk is a fundamental concept that underlines the audit process. Auditors are only required to provide reasonable assurance, as opposed to absolute assurance, that the financial statements are free of material misstatements. This is due to the nature of audit evidence and the characteristics of management fraud. Hence, auditors consider audit risk at the relevant assertion level because this directly assists the auditor to plan the appropriate audit procedures. Moreover, audit risk comprises three main components i.e., inherent risk, control risk and detection risk (Carrington, 2014; Eilifsen et al., 2013; Porter et al., 2014; Houston et al., 1999). Inherent risk is the probability that the pre-audited financial statements are materially misstated in one or more respects, before considering the effectiveness of the entity's internal control. Control risk is the risk that a material misstatement is not prevented or detected on a timely basis by the entity's internal control. Lastly, detection risk is the risk that the auditor will not detect a misstatement.
that exists and that could be material that was not discovered and corrected by the entity's internal control (Carrington, 2014). The relationship between inherent risk, internal control and detection risk is demonstrated as follows: Audit risk = Inherent risk • Control risk • Detection risk (Carrington 2014).

When the auditor has gained an understanding of the client, its internal and external environment and identified and assessed the risk of material misstatements in the financial statements, the next step of the audit process is understanding the entity's internal control (Bailey et al., 2018; Eilifsen et al., 2013; Porter et al., 2014). As indicated by the previous section, a major part of the auditor's understanding of the entity involves knowledge on the entity's internal control. Internal controls play a major role in how the management meets its responsibilities and are designed to provide reasonable assurance that assets and records are properly safeguarded and to ensure that the entity's information systems generate reliable information (Eilifsen et al., 2013). The quality of the entity's internal control over their financial reports is of direct relevance to auditors and usually has a significant impact on the audit. How the entity’s internal control system is designed will ultimately provide the basis for the auditor’s preliminary assessment of the internal control risk. If the internal controls are deemed effective, then the auditor will be reasonably confident that material errors and irregularities in the accounting data are prevented and in that case the control risk will be fairly low (Porter et al., 2014). Moreover, many companies have implemented increasingly sophisticated information systems to their internal control. According to Chen et al. (2014), IT capability can increase the effectiveness of companies internal control, and thus also decrease the audit risk.

3.2.3 Evidence

The next step of the audit process is to collect audit evidence, which involves performing a series of tests to gather evidence to support the audit opinion. At this stage, the auditor can choose to follow two audit strategies: a substantive strategy and a reliance strategy (Carrington, 2014; Eilifsen et al., 2013). A reliance strategy means that the auditor intends to rely on the entity's internal controls, and a substantive strategy means that the auditor has chosen to use substantive procedures as the main source of evidence. The overall objective of substantive testing is to verify the validity and accuracy of the entity's financial statements (Porter et al., 2014). According to Porter et al. (2014), the auditor's assessment of the entity's internal control has a significant impact on the nature and extent of the substantive tests that will be performed. If the auditor believes that the entity's internal control systems are effective, and the control
risk related to the audit is low, the need for more extensive and less timely substantive audit procedures will be reduced (Bailey et al., 2018). Furthermore, sampling methods allow auditors to focus on the critical control accounts or areas where weaknesses are common (Shen et al., 2017). Auditors are not required to be concerned about the statements' absolute accuracy. Hence, sampling techniques are used to draw conclusions about the population.

3.2.4 Reporting

The final step of the audit process is reporting, where the auditor is expected to assess the sufficiency of the evidence and if necessary, obtain additional evidence (Żytniewski, 2017; Eilifsen et al., 2013). The auditor will evaluate the results of the audit tests and identify contingencies. For the audit to be properly completed, it’s important that the process has been documented and that the evidence is appropriately organized (Sikka, 2018). The audit process is summarized in the figure below (see figure 2).

![Figure 2: The audit process](image)

- Get acquainted with the potential client
- Confer with the predecessor auditor
- Develop an overall audit strategy
- Preliminary assessment of the client’s business risks and determining materiality
- Perform a series of tests to gather evidence to support the audit opinion
- A substantive or a reliance strategy can be adopted
- Evaluate the results of the audit tests and identify contingencies
- Distribute a final report
3.3 New technologies in the context of auditing

3.3.1 Artificial intelligence

Undoubtedly, artificial intelligence, or AI, is one of the most significant and at the same time intimidating disruptive technologies as of yet (Clifford, 2019). AI was first founded in 1955 and has since then undergone several waves of changes (Huang & Smith, 2006). According to While O’Leary (1987), AI is a broad term that includes various activities such as deep learning, pattern recognition and reasoning by computers. Ransbotham et al. (2018) presents a more contemporary view of AI, arguing that AI is the integration of human-like intelligence in machines. The basic idea behind AI is that it’s put in a context to make intelligent decisions based on the information at hand. AI has become an integral part in many industries including marketing, healthcare, and cybersecurity, etc (Nadikattu, 2016). According to Nadikattu (2016) AI uses algorithms to execute tasks, which are set on explicit instructions that a computer can run. Similarly, to when a person uses his intelligence to analyze a situation based on his own experiences, AI algorithms are capable of learning from data. AI algorithms evolve by analyzing which strategies have worked well in the past or they can rewrite algorithms all by themselves (Katsikeas et al. 2016).

Advances in AI are fundamentally transforming the auditing field (Agnew, 2016). In the field of auditing, the focus of AI capabilities is mainly on the automation of labour-intensive tasks (Rapoport, 2016). More specifically, structured, and repetitive tasks that are performed as part of the audit process (Kokina & Davenport, 2017). Agnew (2016) argues that the effects of AI will be most prominent in audit tasks that were once performed manually but have already been supported with computer aids. Currently, the impact of AI in audits is especially pronounced in the process of data acquisition (Brennan et al., 2017). According to Kokina and Davenport (2017) AI-enabled technology can locate relevant information, process it and make it usable for the human auditor, who can focus more on complex judgmental areas. For instance, AI enables full automation of substantive audit tests such as payment transaction testing. Examples of AI-enabled technology that can be adopted by auditors include deep learning, natural language processing and machine learning (SAS, 2018). According to Sun and Vasarhelyi (2018) deep learning can be used to notify auditors of possible threats in the client's internal control. Natural language processing refers to the capability of computers to understand human language, which combined with machine learning can be useful in extracting information that
is of relevance to the auditor (Yordanov, 2018). The biggest advantage of natural language processing is that it operates at previously unimaginable speeds. Lastly, machine learning can be applied in audit tasks such as ratio analysis and journal entry testing (Hoogduin, 2019).

3.3.2 Big data and analytics

Big data is defined as “high-volume, high velocity, and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision-making” (Gartner, 2013). According to Alles and Gray (2014), the three Vs of Big Data, i.e., volume, velocity, and variety, describe the features that make Big Data unique. However, for Big Data to be relevant and useful for decision making it must be processed and analyzed in an innovative way (Earley, 2015). Hence, Big Data is often discussed in conjunction with analysis of the data. As noted by Alles and Gray (2014), Big Data in the accounting literature is often defined by the types of analysis that can be performed with the capabilities of Big Data, such as DA and predictive analytics, rather than the type of data source. Meuldijk (2017) argues that Big Data is a significant tool for auditors that can facilitate the audit in areas such as scoping, risk assessment, trend analysis, and judgments. According to Earley (2015), the amounts of computerized data in companies have been steadily increasing over the years and recent advancements in, e.g., processing speed and cloud storage has eased the access to data and thus enabled companies to capture and store enormous amounts of data for later use. At the same time, software to analyze large volumes of data, i.e., data mining tools, have enhanced the capabilities of Big Data to add value (Earley, 2015), by increasing the ability for companies to understand the story that the data is telling (Capriotti, 2014; Whitehouse, 2014). Accordingly, Big Data enables auditors to perform prescriptive analytics (e.g., Holsapple et al., 2014; Delen & Demirkan, 2013; Lee et al., 2014), and implementing practices to computationally verify existing actions and their outcomes (Lee et al., 2014). Following several accounting scandals, such as Enron (2001) and WorldCom (2002), auditors are encouraged to incorporate Big Data to their practices to enhance the success and integrity of their services (Alles, 2015). According to (Earley, 2015), there are four main benefits of Big Data in audits. First, Big Data allows auditors to test greater numbers of transactions. Second, audit quality can be increased since Big Data can provide greater insights into client’s processes. Third, Big Data enhances auditors’ ability to detect fraud and fourth, Big Data allows auditors to provide services and solve problems that go beyond current capabilities by utilizing external data (Earley, 2015). The impacts of data analytics on audit quality are summarized in the figure below (figure 3).
3.3.3 Blockchain technology

Blockchain technology has become very popular during the years, as the underlying technology powering Bitcoin (Bonyuet, 2020). However, the advantages of blockchain technology further surpass just supporting cryptocurrencies. Blockchain can be defined as a digital ledger that enables the capture of transactions between several parties in real-time and serves as a decentralized database where each participant keeps an identical copy of the ledger (e.g., Bonyuet, 2020; Jansen et al. 2019; Narayanan et al. 2016). According to Vaidyanathan (2017) Blockchain allows all parties in the distributed ledger to get a common view of the records. No intermediaries are needed to settle a transaction and validation is performed by multiple users. Once a transaction is validated, all copies of the ledger are updated. Multiple transactions form blocks that “chains” (hence the name “blockchain”), which cannot be altered and deleted. Thus, there are several benefits with blockchain networks, including authentication of peer-to-peer transactions and automated, encrypted, and real-time registry of such transactions (Bible et al., 2017). Further, there are two major classifications of blockchain networks: private and public (Bonyuet, 2020). A public blockchain can be set up so the data can be shared with anyone who has access to the internet, this is also referred to as a permissionless blockchain. A private, or a permissioned blockchain, only allows certain participants with reading and writing rights (Jansen et al. 2019). While both types of networks are based on the same consensus
mechanisms, private blockchain networks such as Hyperledger are designed to be faster than public networks (Vaidyanathan, 2017). Hyperledger is significant for companies, focusing on developing an open source DLT network that will facilitate business transactions (Hyperledger, 2018).

Thus, blockchain technology offers a drastically new way to record, process, and store financial transactions and information (Liu et al., 2019). Accordingly, blockchain has the potential to create an entirely new ecosystem for the handling of accounting information (Dai & Vasarhelyi 2017; Kokina et al., 2017). The Big Four auditing firms and many institutions have begun to appreciate the potential benefits of blockchain technology and are actively engaged in its development (Bajpai, 2017). Deloitte launched their first blockchain initiative in 2014 (Deloitte, 2016). Ernst & Young (EY) became the first advisory firm to accept bitcoin for its services in 2017 and has since rolled out a number of services and applications to facilitate the commercial use of blockchain technology (EY, 2017).

Many benefits of blockchain can be found in the accounting and auditing literature. According to Appelbaum and Smith (2018), blockchain transactions are expected to become the “single source of truth”, since they are recorded automatically, encrypted, and immutable. Blockchain technology allows for a detailed audit track (Liu et al., 2019), along with the ability to detect irregularities from an entire population rather than a sample (Kokina et al., 2017). Thus, blockchain could fundamentally change the audit process. Blockchain enables auditors to conduct audits on a continuous basis based on trusted data and therefore tasks such as reconciliations and confirmations may no longer be needed (Bonyuet, 2020). As a result, the adoption of blockchain would free up resources and allow auditors to focus more time on complex judgmental areas.

3.4 Automation

According to FAR (2006), auditing involves several mundane and labour-intensive tasks, such as reconciliations and confirmations. However, in the auditing literature it’s clear that advances in technology allows auditors to automate parts of the audit process and thereby eliminate some standardized and repetitive tasks (e.g., Kokina & Davenport, 2017; Raphael, 2017; Banker et al., 2002; Agnew, 2016; Lombardi et al., 2015; Tiberius & Hirth, 2019). According to Lombardi et al. (2015), new technology provides auditors with means to complete mundane
tasks in a timely manner, allowing them to focus more time on complex judgmental areas. This notion is supported by Tiberius and Hirth (2019), who argue that automation relieves auditors from routine tasks in favor of more complex tasks. According to Ghasemi et al. (2011), advancements in information technology have brought opportunities for companies to perform accounting functions with significant time and cost savings and allowed companies to progress toward paperless offices which in turn has been beneficial for auditors since audit trails and details are automatically maintained. Therefore, Raphael (2017) believes that digitization does not only increase the efficiency and quality of an audit, but it also creates value for clients because they can access more relevant and valuable information.

Specifically, AI in auditing is heavily focused on the automation of mundane and labour-intensive tasks (Rapoport, 2016). According to Kokina and Davenport (2017) AI-enabled technology can locate relevant information, process it and make it usable for the human auditor, who can focus more on complex judgmental areas. For instance, AI enables full automation of substantive audit tests such as payment transaction testing. However, the benefits of Big data analytics and Blockchain clearly also include automation capabilities (e.g. Appelbaum & Smith, 2018; Liu et al., 2019; Earley, 2015). Blockchain transactions are recorded automatically, encrypted, and immutable (Appelbaum & Smith, 2018), allowing for a detailed audit track (Liu et al., 2019), along with the ability to detect irregularities from an entire population rather than a sample (Kokina et al., 2017). According to Earley (2015) Big Data analytics will also allow auditors to automate transaction testing and similarly to Blockchain technology, Big Data analytics will also enable testing 100% of the population.

However, there is evidence indicating that auditing professionals in less developed countries don’t perceive new technologies, like for instance AI, as useful in automating parts of the audit process (e.g., Albawwat & Al Frija, 2021; Afroze & Aulad, 2020; Ismail & Abidin, 2009). Hence, the acceptance of such technologies is lower in less developed countries than in developed countries. For example, Albawwat and Al Frija (2021) states that autonomous AI systems are perceived as complicated to use and therefore deemed not useful by auditors in Jordan.
3.5 Audit quality

Audit quality can be determined by the timeliness and usefulness of audit reports (IFAC). Evidently, many scholars argue that a significant benefit of digitalization is increased audit quality and effectiveness, by enabling smarter analysis and continuous auditing. Manita et al. (2020) argue that digital technology will allow auditors to get a better control of the client’s data, and thus improve the relevance and quality of the audit. New digital technology is also believed to enable a more relevant analysis of the clients’ processes and data, which makes it possible to identify errors and anomalies more effectively. This is consistent with prior studies on big data, which shows that digital tools in auditing could improve the quality of financial statements and anomalies detection (Lombardi et al, 2015; Krahel & Titera, 2015; Cunningham & Stein, 2018; Earley, 2015). Further, the automation of repetitive and labour-intensive tasks allows the auditor to focus more time on complex judgmental areas. Hence, digitalization allows audit firms to increase their capabilities of adding value for their clients (DeFond & Zhang, 2014). Clearly, digitalization and digital technologies also enable a faster and easier completion of audits, while maintaining the integrity of the data. Lombardi et al. (2015) supports this notion, suggesting that new technology in the auditing field will make fieldwork more effective and efficient. According to Jachi and Yona (2019), the use of tools such as artificial intelligence enhances the effectiveness and quality of the audit, which in turn increases the reliability of the financial statements.

Furthermore, professional judgment is a prerequisite for the provision of useful and timely audit reports (Oleksandr, 2016). According to Adrian and Viorica (2015), professional judgment is critical for auditors since they are required to make sound and informed decisions about the courses of action throughout the audit engagement. Professional judgment is highly subjective and for auditors it means making decisions, analyses, or evaluations on the basis of knowledge, skills, training and experience. Several accounting standards include specific sections on professional judgment, discussing the stages in which the auditor must rely on his professional judgment. For instance, ISA 200 asserts that judgment should be exercised when making decisions, especially in risk assessment and determining materiality. Furthermore, the auditor should use his professional judgment when planning what evidence to collect in order to be able to express an opinion, and how and when to collect such evidence. The auditor is also expected to use his professional judgment when determining the sufficiency and appropriateness of the obtained audit evidence, according to ISA 200 (IAASB Handbook,
Moreover, existing research indicates that digitalization and emerging technologies may impact the auditor's professional judgment. According to Brown-Liburd et al. (2015), Big data and analytics could impair auditors’ professional judgment due to information overload and ambiguity. Other studies (e.g., Salijeni et al., 2019), provide conflicting results, instead suggesting that emerging technologies provide auditors with the means to automate some repetitive and routine tasks, giving the auditor more time to focus on the complex areas such as risk assessment. In turn, the authors believe that auditors' professional judgment will be improved following advances in technology.

### 3.6 Competencies

According to researchers, competence plays a significant role in the field of auditing, directly impacting the effectiveness and the value of audits (Nearon, 2005). Thus, most auditors agree that it’s important for them to keep up with the current developments in technology for auditing to remain a valuable and relevant service (Karlsen & Wallberg, 2017). Therefore, scholars argue that the digital development of the auditing industry will lead to a changing organizational structure, which also means changing skills needed within the auditing firms (e.g., Ghasemi et al., 2011; Appelbaum et al., 2017; Lombardi et al., 2015). According to Appelbaum et al. (2017), the increased digitization and the constantly changing nature of clients’ business models, may result in more complex auditing and auditor requirements. For instance, while blockchain offers a completely new way to record financial transactions and information, and brings new business to auditors, such as verifying the existence of digital assets and reviewing certain transactions, it’s believed that these new tasks can be challenging for auditors who are not IT experts (Earley, 2015). Especially when there are no centralized authorities on the blockchain. Hence, more IT specialists and data scientists might be employed in auditing firms due to the changing requirements. This raises the question of whether business administration, accounting, or auditing graduates will continue to staff auditing firms, rather than IT-oriented employees (Tiberius & Hirth, 2019). Furthermore, Lombardi et al. (2015) maintain that the rapid advancements of technology has resulted in a gap between the profession and education that should be shortened in order to properly educate and prepare students for the audit profession. Manita et al. (2020) also agrees that it’s important that auditors possess the technical skills necessary to perform audits with the use of these new technologies. Thus, Manita et al. (2020) suggests that audit professionals should be properly
trained to gain specific technical skills to understand how the client’s data is designed and generated.

Furthermore, audit firms have generally relied on recent graduates to perform the more repetitive and administrative tasks in the audit process. However, since disruptive technologies allow auditors to automate parts of the audit process, thereby eliminating some standardized and repetitive tasks, it’s argued that audit firms will hire significantly less new audit and accounting graduates in the future (Kokina & Davenport, 2017). Since the audit industry is changing in conjunction with digitalization, the universities will also have to change parts of their curriculum to cater for the new competencies that auditors are expected to have (Issa et al., 2016). Although senior auditors in large audit firms agree that the need for human auditors won't go away anytime soon (Agnew, 2016), and that it’s likely that the auditing field, like many other business fields, will be augmented by technology rather than fully automated (Davenport & Kirby, 2016), there is evidence indicating that some audit professionals are worried about the technological developments (e.g., Afroze & Aulad, 2020). While studying the perception of audit professionals on AI in the context of auditing in Bangladesh, Afroze and Aulad (2020) found that auditors in Bangladesh believe that AI pose a direct threat to the jobs of grass-root employees. According to the authors, AI has made manual and repetitive auditing tasks a lot simpler and quicker which is seemingly intimidating for some auditors.
4. Methodology

At the beginning of this chapter, the authors give pre-understandings and a description of digitalization and auditing. This section also gives a clearer perspective regarding this research. Furthermore, the research philosophy on the ontological and the epistemological will be presented. The motivation for this research approach, the design, methods, and research strategy will be discussed. A detailed explanation of the literature review will be provided and lastly, a thorough empirical analysis will conclude this chapter.

4.1 Pre-Understanding

As stated by Saunders et al. (2016), researchers should provide detailed motivation and justification as to why the specific research was proposed. Hence, the following sections will include clarification of the author’s perspectives and knowledge on how digitalization impacts the audit profession. The process of digitizing auditing is evolving, and the authors are interested in learning from audit firms in two different geographical locations developed and less developing countries' perspectives on how digitalization impacts the audit process and what insight can improve some audit gaps.

Additionally, the thesis presented an amazing opportunity for the authors to explore their personal interests in the areas of digitalization and in relation to our studies. We saw this as an interesting area because the digital world is evolving and there are some challenges that come with the actual application in the audit process and digitalization in our world today, opens new opportunities for professionals in every field including auditors. In other to present a clear understanding of our thesis research, we focus on our master’s level courses in audit and control to explore the reality of digitalization on the audit profession but not much will be said in the presentation from the literature review until we carefully listen to audit practitioners from audit firms in two different geographical setting Sweden and Liberia respectively, to share their perspectives on the effects of digitalization in on auditing as we are more interested in the actuality of the practices and the implementation in order to compare and draw a conclusion for our thesis.
4.2 Our perspective

As some challenges in the implementation of digitalization in the audit process were mentioned in the problematization, the study focuses on the effects of digitalization on the audit profession and in comparison, with auditor’s perspectives from audit firms in two different geographical settings. The authors are more interested to understand how audit practitioners within these firms perceive the audit processes, the changes that come as the result of digitalization, and the effects of these changes from a personal or holistic perspective. And as the digital era is quickly developing, we are interested to see how the changes are shaping the future of the audit profession and present relevant findings for further research. Future researchers can then use findings and contextualize them when looking at digitalization and other change drivers that impact the audit profession.

As we conduct a comparison study with auditors from different perspectives, the research will approach problems related to the continuing change in the audit processes and understand how auditors perceive these changes from an academic or practical perspective. The findings can also be employed to learn more about the commonalities that auditors have when it comes to their perceptions of the future effects of digitization on the audit profession; insights from their perspective can be useful for both auditors and other stakeholders. The digital effects on the audit processes can be seen as universally significant from existing research, but it is as well complex to find an exact prediction of the effects of digitization on the future of audit processes. Although it might be somewhat difficult to conduct such research from two different perspectives, we fully understand that the experiences of audit practitioners from these different perspectives will provide useful insights as to how changes in the audit processes will be significant in the coming years, and those practical insights can be important from a researcher’s perspectives.

4.3 Research Philosophy

According to Burrell and Morgan (2017), philosophical assumptions and methodological assumptions are the foundation when conducting research and the ideas that knowledge produces are based on realities. Tuli (2010) classified research methodology or research strategy as concepts that explain epistemology and ontology research studies. The paradigm that leads the research activity, more particularly, views about the nature of reality and
humanity (ontology), the theory of knowledge that informs the research (epistemology), and how that knowledge may be achieved, all influence research methodology selection. An examination of the nature of social science research should include a discussion of epistemology, ontology, and methodology, as these factors influence and define how the research is conducted. He further added that research methodology in social sciences is related in the sense that they are all means of soliciting information about human nature from human participants and there are varieties of research methodologies pointing out quantitative and qualitative methods. He claims quantitative research methodologies for “uniformities and principles” and in the analyses, researchers determine based on the overall design, how the variables describe, compare, predict, and contribute to explaining the analysis to answer the purpose of the study. On the other hand, he claims that qualitative research seeks out understanding real-life experiences of concepts experienced by one or more individuals (Tuli, 2010). However, the authors seek to employ the qualitative method for this study as a way of understanding the actual effects of digitalization on the audit profession. As qualitative methodologies focus more on a deeper understanding that describes, interprets, and explains a belief from diverse backgrounds in a unique context, qualitative researchers are less concerned with generalizability (Tuli, 2010). Mutch (2005) classified these concepts of reality as a human construct. To carefully answer the research questions, the findings will be shown at the end of the study after exploring and gathering empirical data from auditors within audit firms in Sweden and Liberia respectively, who are currently implementing digital applications in their audit processes. The findings will give a detailed analysis of auditors’ experience and the effects of digitalization on the audit process in comparison with auditors from developed and developing countries’ perspectives.

4.4 Epistemology Position/ Interpretivism

Epistemological assumptions consider what knowledge can be and the relationship between the person who has knowledge and the person who is seeking knowledge (Guba & Lincoln, 1994). In terms of performing social science research, the crucial epistemological question is whether the social world can be examined using the same principles as the natural sciences (Bryman, 2001). And there are two main epistemological positions: positivism and constructivism (interpretivism). The epistemology assumption poses the following questions, what's the connection between the knower and the thing that's known? What evidence do we have that we know what we know? What constitutes "knowledge"? The positivists believe that
the main purpose of research is for scientific explanation and the belief, largely evolved from around the nineteenth-century philosophical approach. According to Tuli (2010), positivists claim that social reality has the following characteristics which include empirical facts that exist independently of personal ideas or thoughts; they are administered by laws of cause and effect; social reality patterns are stable, and knowledge of them is additive. As stated by Ulin et al. (2004), the main assumption for this positivist paradigm is that science's goal is to develop "the most objective methods possible to get the closest approximation of reality". The emphasis is on the closest approximation to reality rather than reality itself. With the position that knowledge is "objective and quantifiable," this paradigm invariably separates people from their reality (Antwi & Hamza, 2015). Quantitative research is primarily associated with this school of thought because it is "concerned with investigating things that can be observed and measured in some way" (Antwi & Hamza, 2015). The interpretivist-constructivist sees the world "as constructed, interpreted, and experienced by people" in their interactions with one another and with social systems in general (Tuli, 2010). In this paradigm, the nature of inquiry is "interpretive, with the goal of understanding a specific phenomenon rather than generalizing to a population" (Farzanfar, 2005). Conducting interviews to understand everyone’s perspective aligns more with an interpretivist viewpoint, and because human interpretation will be used, completely unbiased judgments are difficult to achieve. As a result, interpretivism is the dominant epistemological position in this study. This is where most qualitative researchers draw their conclusions (Bell et al., 2019)

4.5 Ontology Position/ Constructionism

Saunders et al. (2009, P.133),” classified ontological assumptions as the nature of realities and these assumptions shape the way we see and study research objects. The ontological assumptions, therefore, determine how we see the world in business and management and these objects include organizations, management, individual working lives, organizational events, and artifacts”. Additionally, Ahmed (2008), citing (Crotty M, 2003), defines ontology as "the study of being." It's about "what kind of world we're looking at, the nature of existence, and the structure of reality as a whole." To further clarify, Guba and Lincoln (1994) define ontology as the nature of reality and how it is shaped and Knowledge regarding reality will be seen differently depending on a researcher's ontological assumptions. In our effort to discuss how digitalization and its effects on audit firms is shaping the audit profession, the authors seek to
employ the constructionism position because auditors with the research are social actors that have different realities or perspectives and are often influenced by social processes.

4.6 Research Design

Researchers are faced with the dilemma of deciding which approach to take in their attempt to establish a link between theory and research (Awuzie & McDermott, 2017). This is due to the supposed problems of the two most widely used approaches, inductive and deductive reasoning. According to Bryman (2012), the task of establishing a clear link between theory and research remains onerous for qualitative researchers. Eriksson and Kovalainen (2008) present three research approach that researchers can use: a deductive approach, an inductive approach, and an abductive approach.

As stated by (Eriksson & Kovalainen, 2008), the fundamental concept of the deductive approach is that existing theory is the initial source of knowledge, and hypotheses are created to be tested based on the knowledge gained by previous theories. The deduction is better suited to quantitative research than qualitative research. Additionally, Saunders et al. (2016), discuss several distinguishing characteristics of the deductive approach. As the first characteristic of deduction, relationships and correlations between variables are sought. The second characteristic is that concepts must be measurable (Saunders et al., 2016). Finally, the findings presented in a deductive research approach should be generalizable, which would compel a sufficiently large sample size from a carefully selected sample.

Eriksson and Kovalainen (2008), also classified the inductive research approach as the inverse of the deductive research approach. And in research, induction implies that the theoretical result is the result of empirical research. Saunders et al. (2016), added that even though theory is a product of data collection, the same theory could be the result of research using an inductive approach as well as a deduction approach and researchers who collect data using qualitative methods are more likely to use an inductive approach because understanding about respondents' interpretations of their social world is desired to understand and explain why certain problems occur. Additionally, Saunders et al. (2016), explained that the advantage of induction is that researchers can discuss what is going on with multiple explanations rather than just causes and effects between variables within a stated hypothesis as in a deductive approach.
Saunders et al. (2016) discuss the third approach as an abductive approach, which combines features from both deduction and induction in the sense that a researcher moves back and forth between theory and data, rather than just in one direction as the previous two approaches do. This research follows the abductive research approach to understanding the effects of digitalization on the audit profession from two different perspectives. And McDermott and Awuzie, (2017), claim that knowledge never emerges from data alone, but from the relationship between empirical substance and theoretical models and notions.

4.7 Data Collection

As research is conducted the data collection is one of the significant processes and the data contribute a better description or understanding of the theoretical framework. As stated by Tuli (2010), interpretive researchers through research place more emphasis on how the world or phenomenon can be understood through personal experiences, that incorporate truthful reporting, and quotations of actual conversation from personal perspectives. The data collection method for this study were done through interviews with auditors from different audit firms in Sweden and Liberia respectively where digital audit is being implemented in the audit processes to give broader insights from developed and less developed country perspectives and experiences of the phenomenon being studied. The thesis incorporates interviews from nine practicing auditors from different audit firms. The interview sessions were recorded for verbatim transcriptions, their names were omitted to ensure anonymity. The interviews were done via different social media platforms. For the analysis, the interview sessions include the dates, positions of the auditors at the audit firms, gender, the medium through which the interviews were conducted, and the length of each interview will be presented in a table format to ensure credibility of the study. The names of audit firms of the participants were omitted to ensure anonymity as promised. The interview sessions were done in English and recorded for proper analysis and reliability.

4.8 Sampling Method

In the process of research, there are several sampling methods researchers can choose from. And with the aim of the author’s, the thesis explored the effects of digitalization on the audit profession, which involved interviewing auditors about their expertise in the topic under study.
The study targeted respondents are auditors from audit firms in Sweden and Liberia. Taherdoost (2016), described the sampling frame as a list of the actual cases from which a sample will be drawn and sampling methods can generally be divided into the probability and the non-probability methods. Etikan et al. (2016) added that non-probability sampling is said to have limits due to the subjective nature of sample selection; yet it is very effective when the researcher has limited resources and time and does not want to generalize the results to the entire population. In the study of this case, the study used a non-probability sampling method. This method is deemed necessary for this thesis because the authors aim to collect first-hand information from auditors’ experiences on the effects of digitalization on the audit process and how these digital applications are being implemented and its effects on the audit profession. The targeted participants are auditors from audit firms in Sweden and Liberia that are using digital applications in their everyday audit activities. It is also necessary that the respondents possess sufficient knowledge on the audit process and hence we choose to disregard auditors who have worked in the auditing field for less than a year. Furthermore, the nine respondents were conveniently sampled, and hence a convenience sampling method (Bell et al., 2019) was adopted. Initially, two respondents were contacted, and the initial contacts then led to more auditors being contacted, all of whom accepted.

4.9 Interview process

According to Saunders et al. (2009), research interviews are usually characterized as structured, unstructured, and semi-structured interviews. Structured interviews, which are known for being strict, and with the focus of this research, conducting structured interviews will not reveal all the information needed concerning the effects of digitalization in auditing because they provide very little opportunity for follow-up questions to probe comments that demand more in-depth and extensive observations. While the unstructured interview is described as conversational with the goal but without a list of present questions and it gives the interviewee the opportunity to discuss whatever questions the interviewer asks. The unstructured interview is also described as a shared experience because the interviewer and the interviewee work together to create a background of familiarity in which the respondents are willing to tell their stories. And this interview appears to be an oddly private process that is half suited for a professional setting and researchers are interested in getting respondents' opinions in a reasonable amount of time and avoid wasting their time. Looking at the downsides of both the structured and unstructured
interview methods, the semi-structured interview structure will be employed in this research because it includes the benefits of both. It is also regarded as a flexible strategy that allows the interviewee to convey additional thoughts on a topic after the question has been posed (Drever, 1995). Its main drawback is that it isn't well suited to studies with a big number of participants. Because of the limited sample size of this research, it works well for this study.

4.10 Interview Guide

The questions for the interview were developed with the main purpose of having in-depth knowledge and experience with the interviewees and gathering rich data from the different interviews. Inspiration and ideas were gathered from other researchers’ work through systematic literature of related articles in the formulation of the interview guide. The review process included literature on the importance of digitalization in audit processes, audit professions, the future of digitalization in future audits, and other related literature were considered such as: Digitalization in Auditing, (Alexander & Nurnberg, 2019), Digitalization of Accounting-Trend and Perspectives (Gherman et al., 2019), Qualitative Interview Design (Turner, 2010, 2021), Qualitative Inquiry and Research Design, (Creswell & Poth, 2016), Impact of Digitalization on Auditing, (Tiberius & Hirth, 2019). As the digital phenomenon is evolving, there is however a growing number of research on the effects of digitalization on the auditing profession. For the aim of the study, the questions were developed based on digitalization in each stage during the audit process to gain practical knowledge from the experience of participating auditors.

The questions were organized into the following categories: the first section focused on the respondents’ background information, including their position at the firm, years of audit experience, professional qualification, and primary responsibilities. The second section highlighted the respondent’s competence and their experience level with digital applications for their work and personal use. The third section focused on auditors’ perceptions of how digitalization is influencing the audit processes. The fourth section focused on the effects and the quality of audit reports when digital applications are used to generate findings. The fifth section highlighted competencies, what skills and training will be better suited in the preparation of future auditors. The final section was to evaluate the future impacts of digitalization in the audit process and the ethical concerns of digitalization. These questions were to understand their perspectives of digitalization as a requirement for accounting/auditing
standards and to understand if the digital applications impair the professional judgment of auditors. Lastly, the questions were also developed to evaluate the positives and negatives of implementing digital applications in the audit processes and the challenges they have experienced in the process.

4.11 Interpreting the data

Analyzing the data collected from the interviews is a significant part of the study. As a qualitative study, the data must be organized in such a way that it follows a pattern and is easy to comprehend for the readers. During this step, the researcher must make "meaning" of what has just been discovered and organize the data into sections or groups of information, which are referred to as themes or codes. These themes or codes are recurring phrases, expressions, or thoughts that were shared by all participants in the study (Turner, 2010). During the analyses, the data were divided into separate sections according to the interview guide which was structured in the research model. Participants, respondents, auditors, or informants were used interchangeably. The primary information which was significant in the gathering of foundational knowledge or experience was firstly analyzed and the remaining sections were checked on the competence of auditors in the use of digital applications in the audit process and each level of the digital applications process was examined for ethical considerations. Direct quotations from some respondents were quoted, to represent their viewpoints. The word-for-word quotation is an underlying strategy that the data are facts and that respondents spoke for themselves for reliability of the data. (Wolcott, 1994). For proper interpretation, a discussion is done after each section to point out commonality among themes in respondents’ responses. Additionally, to maintain and include the essential information gleaned from the data may differ from or add to the prior predetermined framework to build on the framework and support the abductive approach used in the study. Connecting all pertinent aspects of the analysis to theories.

According to Saunders et al. (2016), a thematic analysis method can be applied to analyze qualitative data. Hence, this study will adopt the thematic analysis approach. Braun and Clarke (2006), states that the thematic analysis is the process of identifying patterns within qualitative data. The process involves identifying patterns, or themes for further examination and explanation. Saunders et al. (2016) argues that the thematic analysis approach is a systematic way to analyze large volumes of qualitative data. According to Braun and Clarke (2006), the thematic analysis approach involves six steps, which are presented in figure 2:
Accordingly, the tape-recorded interviews were first transcribed word by word, to avoid any misinterpretations. Next, the data was put in a table form, following the structure of the interview guide, enabling the authors to generate initial codes and identify relevant data. In the end, this allowed the authors to achieve a precise and logical presentation of the empirical data.

### 4.12 Bias in Data Collection

In research, bias is described as any tendency that inhibits unprejudiced consideration of a question choosing or promoting one outcome or response over others. Bias can occur at any stage of the process of research, such as study design or data gathering, as well as the data collection and procedure research (Pannucci & Wilkins, 2010). Simundic (2012), also claimed that we usually examine a phenomenon of interest in a representative sample because investigating a population is often infeasible due to time and money constraints. We hope that by doing so, what we will learn from a small sample may be applied to the full population. To accomplish so, a sample must be representative of the entire population. Additionally, Pannucci and Wilkins (2010) stated that because every study has some level of bias, reviewers must assess the impact of bias on the findings and conclusions. During the selection of the population to be interviewed/explored, selection bias may occur. There was a selection bias in the data

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**Figure 2: Phases of the Thematic Analysis (Braun & Clarke, 2006, p. 87)**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarizing yourself with the data:</td>
<td>Transcribing data (if necessary) reading and re-reading the data, noting down initial ideas.</td>
</tr>
<tr>
<td>2. Generating initial codes:</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collecting data relevant to each code.</td>
</tr>
<tr>
<td>3. Searching for themes:</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>4. Reviewing themes:</td>
<td>Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic map of the analysis.</td>
</tr>
<tr>
<td>5. Defining and naming themes:</td>
<td>Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.</td>
</tr>
<tr>
<td>6. Producing the report:</td>
<td>The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.</td>
</tr>
</tbody>
</table>
gathering for this study. This is because the study seeks a perfect population capable of achieving the study's goal. The target audience is auditors who have already implemented digital applications in their auditing processes, rather than auditors in general. The ideal population is one that is well-defined, dependable, and easily accessible (Creswell, 2007).

4.13 Trustworthiness, Credibility and Authenticity

Guba and Lincoln (1994) pointed out two significant measures that are used in the evaluation of qualitative research: trustworthiness and credibility. In this case, they classified trustworthiness as credibility and the transferability of research data. And credibility in this case simplifies that the interviewee’s contribution to the research was correctly done without bias. And, to ensure the actual credibility of the study, the interviews were recorded and transcribed word-for-word for analysis, and the voices of the interviewees were quoted, this is done to improve the data's credibility by removing any assumptions or prejudice. According to Gill et al. (2008), for researchers to guide against biases in their data collection and present evidence as expressed, transcribing interviews as they were recorded is one of the significant ways of ensuring credibility in the research data and the transferability of the research data in contexts by other researchers. Malterud (2001) also added that the primary aim of any research is to produce and share information that is relevant beyond the study settings. Furthermore, he claims that no study, looking at the method employed can present findings that are universally transferable. It is usually determined by the research question and what extra information is required to successfully answer the research question in the environment in which it is being used. Additionally, Smallbone and Quinton (2004) described the authenticity of the study as confirming that all opinions in each environment are well represented in a larger context. And the targeted audience in this study essentially represents all levels of auditors engaged in the audit process from a developed and less developed country perspective. Fairness in representation is signified by this term.
5. Empirical results and findings

In the following sections, the empirical data from the conducted semi-structured interviews is presented and discussed. This chapter provides a general background of the respondents, then the data is presented following a similar structure as the literature review chapter.

5.1 General background

This thesis is set to explore the perceived effects of digitalization on the audit profession in one developed and one developing country, i.e., Sweden and Liberia. Hence, a series of semi-structured interviews were conducted to collect the relevant data. The targeted participants were audit associates with at least more than one year experience to ensure that they were knowledgeable about the audit processes. We chose to include both Big four audit firms as well as non-big four audit firms in this study, since this would enable us to determine whether there are any differences in the implementation of emerging technologies between bigger and smaller audit firms. In the end, 9 semi-structured interviews were conducted between 3 May and 11 May 2022. Table 1 includes a description of the respondents' respective roles, work experience and educational background as well as their assigned codes.
<table>
<thead>
<tr>
<th>Code</th>
<th>Role</th>
<th>Experience (in years)</th>
<th>Education</th>
<th>Organization</th>
<th>Duration (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Manager</td>
<td>6</td>
<td>Bachelor’s degree in accounting and auditing</td>
<td>Big four firm in Sweden</td>
<td>35</td>
</tr>
<tr>
<td>R2</td>
<td>Senior audit associate</td>
<td>3</td>
<td>Master’s degree in business and economics</td>
<td>Big four firm in Sweden</td>
<td>40</td>
</tr>
<tr>
<td>R3</td>
<td>Manager</td>
<td>6</td>
<td>Master’s degree in economics</td>
<td>Big four firm in Sweden</td>
<td>32</td>
</tr>
<tr>
<td>R4</td>
<td>Senior audit associate</td>
<td>3</td>
<td>Bachelor’s degree in accounting and auditing</td>
<td>Big four firm in Sweden</td>
<td>27</td>
</tr>
<tr>
<td>R5</td>
<td>Internal auditor</td>
<td>5</td>
<td>Master’s degree in auditing and control</td>
<td>Bank</td>
<td>38</td>
</tr>
<tr>
<td>R6</td>
<td>Audit associate</td>
<td>3</td>
<td>Bachelor’s degree in accounting</td>
<td>Big four firm in Liberia</td>
<td>40</td>
</tr>
<tr>
<td>R7</td>
<td>Audit Manager/Chartered accountant</td>
<td>6</td>
<td>Master’s degree in business and finance</td>
<td>Big four firm in Liberia</td>
<td>36</td>
</tr>
<tr>
<td>R8</td>
<td>External audit supervisor</td>
<td>5</td>
<td>Bachelor’s degree in business and economics</td>
<td>Non-Big four firm in Liberia</td>
<td>25</td>
</tr>
<tr>
<td>R9</td>
<td>Audit associate</td>
<td>4</td>
<td>Bachelor’s degree in accounting Bachelor’s degree in management</td>
<td>Big four firm in Liberia</td>
<td>42</td>
</tr>
</tbody>
</table>

Table 1: Participants background
R1 is a manager, working at a Big four firm in Sweden. R1 has worked at the firm for six years and is responsible for audits and most of the contacts with the clients. The auditor has a bachelor's degree in accounting and auditing. R1’s responsibilities also include planning the audits and setting the risks.

R2 has a master’s degree in business and economics and has been working at a Big four firm in Sweden for three years. R2 has been a senior audit associate for a year and the auditors responsibilities include planning the office's resources.

R3 has a master’s degree in economics and works at a Big four firm in Sweden. R3 has been working at the firm for six years and is also a manager. R3’s responsibilities include managing the audit team, new recruitments, and wage setting.

R4 is a senior audit associate, working at a Big four audit firm in Sweden. R4 has a bachelor’s degree in accounting and auditing and the auditors’ responsibilities include performing the audits, mainly the more difficult tasks in the audit process. As a senior, R4 also reviews the junior auditors in his audit team.

R5 works as internal auditor at a Bank in Liberia. R5 has a master’s degree in auditing and control and has been working in the internal audit department for four years. R5 currently serves as the head of the credit audit and is responsible for reviewing both the credit admin department and the marketing unit, ensuring that they are in line with bank credit policies, the various standard operating procedures and best practice. R5 also assesses the various risks i.e the market risks, credit risks, and liquidity risks.

R6 has a bachelor’s degree in accounting. After working at a non-Big four audit firm for two years, the auditor started working at a Big four firm in Liberia. R6 has worked at the firm for almost a year and is currently an audit associate. R6’s responsibilities include preparing and maintaining the audit budget, planning, and directing the financial audit performance of substantive tests on lower-risk areas as established by the audit team during the planning stage. As well as ensuring that the client follows statutory or industry best practices and verifying companies’ financial information.
R7 is an ACCA chartered accountant, working at a Big four audit firm in Liberia. R7 has a master’s degree in business and finance and has six years of audit experience in Nigeria and Liberia. Currently, R7 serves as manager for audit services, and provides audit and other advisory services to a portfolio of clients in Liberia. The auditor handles risk management across the region in terms of quality management agenda. R7’s responsibilities also include staff utilization, managing staff resources, learning and development, and business development, and setting the strategic agenda for the firm.

R8 is an external audit supervisor in Liberia, with a bachelor’s degree in business and economics. R8 is currently working at a non-Big four firm and has five years of experience in the field, having several certificates in different auditing programs and a diploma in accounting. R8 supervises an audit team of four junior auditors.

R9 has two bachelor’s degrees, one in accounting and another in Management. R9 is currently also an MBA candidate and ACCA student. R9 has four years of practical experience in external auditing and is an audit associate at a Big four audit firm in Liberia. R9 is responsible for providing auditing services to clients.

The interviews were tape recorded and ranged from 30 to 45 minutes. The interview guide (see appendix) was developed to include all aspects of the literature review and to cover the diverse topics to answer the research questions. The first section focused on the respondents’ background, including their position at the firm, years of audit experience, and primary responsibilities. The section also contained questions aimed at exploring how familiar the respondents were with the concept of digitalization. The second section included questions regarding which technologies the respondents used in their everyday work and the perceived ease of use and usefulness of emerging technologies in the context of auditing. We also wanted to explore if and how the respondents had been trained to effectively use these technologies. The third section revolved around the automation of the audit process using emerging technologies and the advantages associated with it. Next, we wanted to discuss the effects of digitalization on audit quality in depth. The fifth section included questions about the changing skills and competencies auditors are expected to have following the technological developments and lastly the respondents were asked to look ahead and reflect on the future implications of digitalization for the field of auditing.
When asked to define what digitalization means to them, several respondents agreed that digitalization involves working on computers and the implementation of technology to existing tasks:

“That we don’t use papers or that we work more remotely. That we can work from anywhere we want. You are not tied to a specific location, you can do much via the computer.” (R1)

“I’m thinking that digitalization is making things that already exist more effectively and digitized. That you take an existing work task and make it with the help of technology, try to develop that process with tasks that already exist.” (R2)

“Essentially, you use more digital tools.” (R3)

“That we work almost exclusively on a computer.” (R4)

“I will say, the adaptation of a system, or process, to be operated with the use of computers and the internet or basically, I would say digitalization is just the conversion of text or picture into those digital forms. That can be processed by a computer.” (R5)

“Digitalization, basically I will say that it has to do with the complete transformation of the business process. So that is operations are run using digital technologies, for example, a food delivery app instead of the traditional way of ordering food.” (R6)

“I will say, digitalization is a medium in which information is communicated or processed through digital applications.” (R9)

Two respondents discussed the effects of digitalization on the auditing field:

“Digitalization in my view is a new way of defining our audit process in terms of leveraging technology to provide services to clients, in short, that is my understanding.” (R7)

“I will say digitalization is a new era, where audit firms are leaving manual paper audits for more digital and advanced auditing.” (R8)
5.2 The audit process

Next, the respondents were asked to give a couple of examples of current digital trends in the context of auditing. AI, blockchain and Big Data were all mentioned by the Liberian respondents:

“Currently, there are different technological software’s that is used in the audit process, as per my experience, I will say power BI, AI, and blockchain technologies.” (R9)

“I will say blockchain, AI, and maybe power BI.” (R8)

“So, for me and from where I come from, we are trained on the usage of different software’s such as AI, blockchain, and power IB to carry out our audit processes.” (R7)

Interestingly, not one Swedish auditor mentioned these technologies by name when they were asked to discuss the current digital trends in the auditing field. However, R1, R2 and R3 all discussed the analysis tools that they use to perform audits, which enables them to capture and analyze huge amounts of data:

“Otherwise technical trends is that we have left the classic audit behind, which perhaps the other firms still do, where you take a bunch of samples. We gather all the data from the client and it can be several systems that interact with each other so we get connections between the systems which allows us to analyze deviations rather than looking at individual samples.” (R1)

“... that you can follow the whole population which was not possible before. Perhaps you tested 50 samples, but we can analyze the whole flow and see maybe we have one deviation here. Why is that?” (R2)

“... mainly digital analysis tools which we call it and the use of them has increased.” (R3)

The Swedish respondents focused more on the digital audit approach and the digital communication that digitalization has enabled:
“... file transfers and we document in a system digitally and the client has a portal on
the other side where they add documents. So, we get access to those documents, and
they automatically fall under the right review step when we have linked it.” (R1)

“Emailing and digital communication has increased a lot (...) and the more digital
audit approach has just bloomed now that we work more remotely. Which we are able
to do thanks to digitalization.” (R3)

“... we have always used excel but now it’s used extremely extensively. Our entire
review is done in excel.” (R4)

Evidently, Swedish Big four audit firms have progressed towards fully digital and paperless
audits. R2, who has been working at her firm for three years has not done any audits using pen
and paper.

“... we don’t have any papers at all, everything is digital, and the clients have learned
to work like that as well. So, they have also become very digital.” (R1)

“I have not done any audits using pen and paper.” (R2)

“We do not have any papers anymore, everything is on the computer nowadays, the
whole review so that has done a lot for our way of working.” (R3)

The respondents were then asked if Big data and analytics, Blockchain or AI had been
implemented in their audit department. The findings suggest that there are differences in the
implementation of these technologies depending on firm size and geographical context.
Interestingly, while the Swedish respondents had been trained to use all of the mentioned
technologies, they were essentially only using Big data and analytics in their respective
departments. The respondents did, however, use Big data and analytics very frequently.

“It’s basically everything we do. Especially in bigger engagements but also in smaller.
Especially on earnings we do a lot of analyses and above all on bigger engagements
we can use it on inventory and on fixed assets and we just enter the data we get from
the client in excel which automatically performs several analyses and then we can see
where it deviates and we have a preset expected outcome...” (R1)
“We have a lot of analysis tools but also there is a very big engagement throughout the firm (...) we can analyze the whole stream of transactions to see that it’s actually that sales is booked against receivables and then receivables is booked against bank for instance. That you can follow the whole audit trail and a whole population which was not possible before. Perhaps you tested 50 samples but we can analyze the whole trail.” (R2)

“Absolutely, analysis in general we have always done either using digital tools or not. But analysis is a huge part of our work and analyzing trends and such. And that has been extended a lot and can now be done in a completely new way with the digital tools.” (R3)

Similarly, all Liberian auditors working at Big four firms had received internal training in Big data and analytics, Blockchain and AI, and like the Swedish respondents, they were using Big data and analytics in most of their audits. Unlike the Swedish respondents, the Liberian auditors were also using Blockchain. Big data and analytics is adopted in a similar way in Liberia, i.e. to follow audit trails and analyze transactions. Blockchain technology, however, is according to R6 and R9 used to view colleagues’ transactions:

“Blockchain is incorporated in our work and it’s a kind of digital ledger. It is one of the major online tools where staff from various locations have assigned digital ledgers.” (R6)

“We have digital ledgers which allow us to view other colleagues’ transactions.” (R9)

Both Swedish and Liberian respondents did, however, agree that the implementation of advanced technology depends on which clients are being audited. For instance, smaller clients tend to not have that many transactions to analyze, which mitigates the need for advanced audit techniques. Smaller clients tend to also have less sophisticated systems, which further mitigates the need for advanced technologies. Thus, smaller audit firms with smaller clients will have fewer incentives to incorporate technologies like Big data and analytics, Blockchain and AI. R1 and R4 did therefore argue that Blockchain and AI are more likely to be used in the bigger offices:

“Perhaps they are only necessary in Stockholm and Gothenburg.” (R1)
“Maybe not as much here in this office but I know that it’s a lot more in the bigger offices, where they have a bit bigger clients.” (R4)

Accordingly, the demand for advanced technology in a small economy like Liberia may not be that high as suggested by R7:

“Normally, the series of training is rolled out on a global level, but how it is implemented at the level of your local firm depends solely on how the market you operate and how sophisticated the market is. And a small economy like Liberia, we are aware of these technologies, but we are not using them.” (R7)

Furthermore, the two Liberian auditors working at non-Big four firms were not using any of the mentioned technologies in their audits, nor had they been trained to utilize them as indicated by the following quote:

“No, we are a smaller audit firm, and we are still doing audits manually.” (R8)

### 5.3 Usefulness and ease of use of emerging technologies in auditing

Next, we wanted to explore the perceived ease of use and usefulness of emerging technologies in the context of auditing. Unsurprisingly, the respondents agreed that digital audit tools are very useful since they help auditors to perform audits more efficiently and to collect more relevant audit evidence. The improvements in audit efficiency and quality will be discussed more in depth in sections 5.4 and 5.5.

“They are fantastic (...) and we evolve from that as well. We have noticed that the staff evolve way faster from understanding why things are like they are so it’s way better. You evolve more analytically. So I think that they are fantastic and they save a lot of time. And we can look at actual deviations instead of looking at individual samples. It creates more value. (R1)

“It makes my job more fun since they enable us to capture where there are actually things to review. Rather than just trying to spot-test things and doing very repetitive tasks for say 3 hours, I can look at the whole audit trail in less than 30 minutes. So, there is a huge difference. “ (R2)
“We would not be able to do the audits we do without the tools that we have.” (R3)

“The technology that we use here has made our work a lot more effective really.” (R4)

“Yes, they are very useful because they help auditors be very effective. When producing an audit report, with the help of these technologies, reports are more accurate and less time-consuming.” (R5)

“Yeah, I will classify technologies as very useful to our work because they enhance the quality of work and with these technologies, we work smart and not hard.” (R6)

“Yeah, so they are very useful and in short, you will be very efficient, and effective and you will save time and it may have some implication on the clients.” (R7)

“Yes, I see these technologies as very useful, although we are efficient with the ones we are using, I think if you had some of this technological software, we would do more.” (R8)

“... they are very useful, they improve the quality of our work, and we save more time on things like the manual auditing process. For eg. We have this platform where clients upload documents.” (R9)

The findings suggest that the advanced technologies are also easy to use, as stated by both Liberian and Swedish respondents. Hence, the acceptance of advanced technology in the field of auditing is generally high, in smaller as well as bigger economies. The Liberian respondents added that they were trained on a global level on how to utilize the emerging technologies and therefore they did not have any difficulties using the technologies once they were implemented.

“Very easy. Very pedagogical. It says what to do under every step. They are connected to the review tasks that we are doing. We have 7 or 8 different review tasks on inventory and they automatically fall under their respective tabs with these analysis tools. And it says what to do (...) So they are very pedagogical.” (R1)

“Yeah I think that they have made the tools very easy to use and there are direct links too. And via these technologies you can get access to the entire voucher and you don’t have to work in several different programs. There is a direct link to the client’s records. It’s very easy to use I think.” (R2)
“Yeah! They are designed in a way which makes them easy to use. There is always some form of guide or formula that you can go by. So they are easy to use.” (R4)

“And they are easy to use, once you are trained and you start using them.” (R6)

“In my opinion, yes, once we are trained.” (R8)

“Yes, as I mentioned we are trained on a global level, so they are easy to use as I will say.” (R9)

5.4 Automation

In order to explore the effects of digitalization on the automation of audit tasks, we asked the respondents questions about the impacts of emerging technologies on audit tasks and the advantages associated with it. Generally, the respondents agreed that digitalization and emerging technologies has and will continue to automate audit tasks that were formerly done manually. Furthermore, the respondents also agreed that the automation of repetitive and time-consuming tasks has significant effects on how the service is delivered and the value they can create for their clients. First, the respondents were asked if they believed or had experienced a reduction in repetitive audit tasks due to digitalization and emerging technologies. The respondents all agreed that digitalization had reduced the number of repetitive tasks, as indicated by the following quotes:

“Yeah absolutely.” (R1)

“Yeah, it's very beneficial to use these tools (...) you streamline in a completely new way. And it's only the fun tasks that remain.” (R2)

“Yeah certainly. There are a lot of tools that we can use that basically just do the tasks for us. So yeah for sure.” (R4)

“Yeah, sure. So that's the essence of digitalization. So, things that we used to do manually with the evolution of digitalization, I think are moving from one stage to the other, trying to minimize costs, and maximize productivity.” (R5)

“Yes, with digital technologies responsibilities are allocated per the different line items. Like my previous job, where we did everything manually, there were days we repeated tasks several times because we had to be very sure before issuing an opinion. But now
the repetition of tasks has reduced following the use of these digital technologies, which also impacts the effectiveness of the audit process.” (R6)

Next, we proceeded to ask the auditors where advanced technologies are being implemented in the audit process and how they facilitate audits. The findings indicated that advanced technologies are used in essentially all parts of the audit process in both Sweden and Liberia, from the pre-engagement to the completion of the final report. According to respondents R1 and R4, however, advanced audit technologies are especially helpful while analyzing the heavier accounts:

“Mainly when we do our sampling. Eh mainly on income and inventory. Eh and some analyses which formerly involved a lot of manual work are done automatically now. Some analyses which you had to construct manually before are automated. Eh but mainly it’s income and inventory where we can collect more audit evidence.” (R1)

“Yeah essentially in almost every part I would say. If you look at planning, execution and conclusion. In the planning phase it’s part of our inquiry work to investigate how the trails look like. And that’s also what we see when we do these tests. For us to be able to perform the tests we have to, already in the planning phase, have an expectation on how we think it’s going to be. And also in our conclusions that we have evidence. What we get from our data analyses is the basis for our conclusions. That we have not found an error or that we assess that the risk is very low since we see that the statement of income has been handled correctly during the year. I would say that it’s something that we take with us throughout the entire audit.” (R2)

“... it’s mainly in the closing procedures. Or the operative work where we audit the final accounts. There we have a lot of use for analysis tools in that way. But then you have to have the data analysis way of thinking throughout the audit. That we can utilize it in the planning phase as well. Where we can analyze the whole audit trail.” (R3)

“... mostly in the heavier entries like for instance inventories and accounts receivables and accounts payable. In many cases these entries are material and bigger, there we have a lot of tools that we can use to make these tasks so that we can focus on the essential.” (R4)
“For me, it is used in every stage of the audit process, the first one is to plan the audit and then also do the fieldwork. From the planning to the submission of the result, digital technologies are included in the different stages with the use of different audit software.” (R5)

“It is being implemented in the entire audit process.” (R6)

“So, I will say, the entire process.” (R7)

“In the entire audit engagement process.” (R8)

“There are notably three levels, namely the planning execution, and the completion, at each level these technologies are useful.” (R9)

Finally, we wanted to explore how digitalization and the automation of audit tasks impacts audit efficiency. While R1 and R2 maintained that the time spent on each audit is not significantly lowered by advanced technology, both Swedish and Liberian auditors tend to agree that digitalization has improved audit efficiency.

“Yeah. Perhaps we don’t spend a lot less time on the audits. It’s not like we spend 50 hours now on audits that we used to spend 100 hours on. But perhaps we spend 85 or 90 hours now and more importantly we spend time on the things that will result in a better audit.” (R1)

“Yes, we have become more effective. And above all that we can spend time on other things as well. As I mentioned, perhaps it’s more fun for the client to pay since they feel that they actually get something out of it, that we can provide important insights. (…) Perhaps it’s something that they themselves have not thought about since they can’t do these types of analyses by themselves. So I would say that we have become more effective in some tasks and more thorough in others. We can deliver value to the client in a new way. And also it results in more fun tasks for us.” (R2)

“Absolutely. It has really become way more efficient.” (R3)

“Yeah absolutely they have.” (R4)

“Sure. They have a great impact on the audit quality, and the quality of the audit reports. Efficiency also helps the auditor to still be effective and efficient because every
audit you carry out has a timeline that is attached. So, from the starting period to the ending period, say anything in the audit cycle starts when probably the engagement is made." (R5)

“Yes, it has improved the effectiveness of audits because every information input into our systems can be traced back even after a very long period. So, if there is a need to make any adjustment it can easily be done by any team member. Of course, I see that as accuracy. Again, with these technologies, I sit in my office most of the time and work on client reports, again I am effective.” (R6)

“Yeah, because in the digital era, with most of these tools’ auditors will work smart and not hard.” (R7)

To summarize, the automation of repetitive and time-consuming tasks has allowed auditors to complete mundane tasks in a timely manner, allowing them to focus more time on complex judgmental areas and on tasks and analyses that will add more value to the client. In the end, a more extensive and, in essence, better report will be produced, and the client will benefit from the auditor utilizing advanced technologies.

5.5 Audit quality

As mentioned, financial statements are intended to meet the information needs of investors and creditors and should also be useful in decision making. The role of the independent auditor is to provide confidence in the financial reports produced by businesses and thus the quality and reliability of audited financial statements is key to ensure that the stakeholders information needs are met. With this background we wanted to explore the effects of digitalization on audit quality and how advanced technology increases the auditors’ capabilities to add value. First, the respondents were asked if they believed that the automation of formerly repetitive tasks impacts audit quality. All respondents agreed that digitalization and advanced technologies has and will continue to improve audit quality:

“Positively yes.” (R1)

“Yeah I think that we can deliver our audits better and we can also provide more value for the customers since we perhaps can show them things that they have not thought about themselves. But I also think that it affects what we do as well but we can provide
the client with more information that is of value to them. So I would say that there are only benefits.” (R2)

“Eh yeah absolutely. That we can get... how do you say it... maybe not better, we did really good audits before as well but digitalization has facilitated a lot and we can do more efficient analyses and we can get more concrete analyses and more concrete answers on our questions with the use of these technologies. So time efficiency absolutely.” (R3)

“I believe that it’s improved the audit quality. They have allowed us to focus more on what’s essential in our audits and so that we don’t have to spend time on the tasks that basically anyone can do, which can be automated.” (R4)

“Where your fieldwork is thoroughly reviewed and because of technologies, once I am done with my work my team leader gets an immediate alert to review my work and the manager also, because of the systems we are working with, I don’t need to send an email to my supervisors. So, I will say with these automated systems, the quality of audit is improved.” (R6)

“Yes, most of the tools we are using have impacted the quality of the audit work and these tools were great during the covid 19 outbreak, we sat in our homes and the client logged into the site and uploaded documents on our request and in a few weeks, their reports were ready. Yes, it impacts audit quality...” (R7)

“... we strive towards efficiency with a higher level of input quality. So, when you have an automated system or digital system, it increases the quality of the audit work.” (R9)

The two respondents from smaller firms discussed the impacts of automation on audit quality by referring to the Big four audit firms, suggesting that they can provide higher quality services since they are able to invest in advanced technologies like AI, Blockchain and Big data and analytics:

“Yes, big institutions like KPMG, PWC, E&Y, and Deloitte are auditing firms that audit big financial institutions and are exposed to big data. So, now analyzing big data manually is time-consuming and the probability of error rate is very high. So with the use of blockchain, AI, and other digital technologies things where you have big data, for instance, they are put into computers and then they are running through analysis
are provided, I think it is far more very efficient and effective as compared to the manual form of auditing that was done years back.” (R5)

“Yes, looking at it from the big 4 perspectives, the client prefers big firms rather than smaller firms, and the explanation there is that clients want quality.” (R8)

Clearly, the respondents tend to agree that audit efficiency and effectiveness and audit quality are interrelated. Since audit quality is a multidimensional concept a few more questions were asked to determine whether digitalization and advanced technologies has in fact improved audit quality or if they, in essence, just make the auditors work easier. Hence, the respondents were asked if they believe that these technologies have the capability to improve the reliability of audited reports and the information contained in them. R1 and R2 both discussed the lowered audit risk that advanced technologies entails, which in turn increases the reliability in the audited financial statements. According to R4, the increased audit efficiency and the ability to focus more on complex judgment areas increases the reliability of audited reports and the information contained in them:

“Yeah absolutely. We have strong evidence supporting that the posts are correct. The risk for material misstatements is significantly lowered.” (R1)

“Yeah I think so. The computer is usually not wrong compared to humans. Most of the time it’s humans who make mistakes and not the computer. So I absolutely believe that it’s improved the quality. The human factor decreases.” (R2)

“Yeah. Since we are now able to spend more time on the essential parts, it enables us to underline what we do with more certainty, since we only focus on the essential.” (R4)

The Liberian auditors seemed to also agree that digitalization has increased the reliability of audited reports and the information contained in them, since they are now able to test the client's internal control systems rather than just testing a statistically generated sample of transactions according to R7 and R9.

“Yeah, even during the audit process, you have a place for the reliability of the information generated by the client, it is important. What are the systems producing these balances? How are the controls? Who does what? Can you go to sleep and sleep knowing that the controls are working? So yes, if you have these systems alone, the system alone will not improve the reliability, not because of the fact that you have good
systems, meaning that if I audit a company and defer those numbers meaning that I can actually rely on those numbers so, it is a two-way street. I have the systems and you have your controls and your processes that you would go through. So, to the extent that I can place reliance on your control or system-generated report, I must test systems.” (R7)

“Yes, as I indicated, the main aim of auditing is to assess the client’s information and an opinion that is reliable, with the client’s internal control policies and our digital systems, the reports can be trusted.” (R9)

Although the technology enabling auditors to test the client's internal controls rather than testing individual transactions has been around for quite some time, it arguably provides more reasonable assurance to audited financial statements. Moreover, the Swedish auditors R1 and R2 argued that the analysis tools that they use today allow them to test 100% of the population rather than testing statistically generated samples of transactions. According to them this has increased the quality of their work since they are now able to detect deviations more efficiently.

“We test the whole population now. We gather all the data and look at deviations from what’s expected. We know that the client books income against account receivables and sales tax and then account receivables against bank. Then we can look at that whole trail and if we don’t find any deviations then we just test 25 bank payments. Rather than taking a statistical sample of 450 income posts where we would have to look at the order, the invoice and how it was booked in the ledger, the payment etc. Rather than that we look at 25 bank payments. So it’s a little bit better.” (R1)

“We can see where the deviations actually are. We get a greater overview (…) Let’s say that the client has 300 different earnings in a year. Eh and if you review 50 of these and test a specific invoice against perhaps bank payments etc. compared to analyzing all 300. You can see that, yeah it’s as expected. We can see that the bookings are done as they should be done and if there is anything that’s not correct then we can follow that up. You can find the actual deviations in a new way, I would say.” (R2)

None of the Liberian Auditors had this technology yet. Most Liberian respondents were aware that this technology exists but maintained that they are not using it yet. R8, who works at a non-Big four audit firm, suggested that bigger audit firms may have the technology to test the whole population but maintained that smaller audit firms don’t. R5, who is also not employed
by a Big four audit firm, also argued that testing 100% of the population would be time-consuming and difficult.

“No, and I am speaking from a smaller audit perspective, but I am sure with a digitalized system auditors can test 100%, looking at the size of the company.” (R8)

“Well, because the auditor is providing reasonable assurance, not an absolute assurance because there will always be inherent risks. So, whether we do 100%, there are risks associated with processes and procedures that we do, we know provide absolute assurance that there are no probably that are fault and that the processes are void of errors, and we provide reasonable assurance, so even the use of digitalization for me, I don’t think we’ll be able to get rid of those inherent risk. For instance, looking at the size of an organization, testing 100% even with the use of digital technologies will be difficult and time-consuming.” (R5)

Furthermore, the findings indicated that advanced technologies like Big data and analytics, Blockchain and AI have the ability to provide shareholders with more timely and useful reports. R5 and R7 also discussed the benefits of advanced technologies in auditing, in terms of agency costs. According to the auditor these technologies have the potential to enhance the auditor’s role in resolving agency problems. Several respondents also suggested that digital tools in auditing could increase transparency, since they allow for a more effective audit process and more reliable reports:

“Yes, yeah. Because the thing about it with the use of this technology firstly, it helps provide an effective and efficient report (...) although they are expensive, they minimize our time. They are very effective. And they help reduce at least some costs for shareholders together.” (R5)

“Definitely, that is the essence of auditing, and clients or shareholders make financial decisions looking at the information contained in the reports.” (R6)

“Yes, I believe that is the essence of digital tools and shareholders can rely on the financial report to make a business decision.” (R8)

“Yes, the increased transparency looking at your internal control policies and these technologies will benefit shareholders as well. These technologies will help reduce agency cost and it also depends on what the company is doing, and how reliable the
information you are about to use with these technologies is. Because if I'm a shareholder, XYZ the managing director and then I have a very strong audit committee or I have a very strong board with the right people who are managing the board or these people are making sure that the company does the right things, yes then my technology will benefit the shareholder in terms that because their controls are working.” (R7)

“Definitely, and they increased transparency.” (R5)

“Yeah it could (increase transparency). We are able to look at things and analyze these deviations in all data.” (R3)

Next, we wanted to explore whether the respondents believed that digitalization and advanced technologies had impaired or promoted the auditor's professional judgment. Professional judgment is critical for auditors, since it’s required that the auditor makes sound and informed decisions about the courses of action throughout the audit engagement. Professional judgment is highly subjective and for auditors it means making decisions, analyses, or evaluations based on knowledge, skills, training, and experience. Professional judgment is a prerequisite for the usefulness and timeliness of audit reports. Thus, the respondents were asked if they believe that advanced technologies impair or promotes the auditor's professional judgment. The respondents all agreed that advanced technology improves the auditor's professional judgment. According to R1, digitalization and advanced technologies have evolved auditors’ critical and analytical thinking since they are now required to understand how the tools analyze deviations etc.

“Yeah now it’s very standardized how many tests should be conducted (...) but we have gone more towards that we use more professional judgment and you have to think more about why things are like they are in these analyses. So I would say that it improves professional judgment.” (R1)

“I would say that it promotes professional judgment. You can support your conclusions in a completely new way compared to testing a sample from 300 transactions, you can look at the whole income stream and see that it actually works.” (R2)

“It improves, since we can focus on what's important and the easier tasks are automated.” (R4)
“With these techniques, there are human factors. But you need those human factors for insight. For eg. If I use Power BI, to detect a company’s strength of sales, let's say last year and this year, I realized sales have increased 20% but then receivables went down about 15%. And then the cost of sales increased by 50%. By using Power BI I'll have insights to know what is the business driver driving the increase in sales by 15% and why are these increasing? Is that “why” the systems cannot explain. I will say, you can use these technologies to make you productive, and it promotes judgment.” (R7)

“I will say, they promote professional judgments.” (R9)

5.6 Competencies

Competence plays a significant role in the field of auditing, directly impacting the effectiveness and the value of audits (Nearon, 2005). Many scholars agree that the digital development of the auditing industry will lead to a changing organizational structure, which also means changing skills needed within the auditing firms. Since it’s important for auditors to keep up with the current developments in technology for auditing to remain a valuable and relevant service, the respondents were asked what skills and level of expertise they believe are required to perform an audit following the digital transformation of the auditing industry. Both Swedish and Liberian auditors agreed that, while there may be a higher demand for IT competencies in the auditing field today, auditing and accounting graduates will continue to be employed by the audit firms. According to R2 and R3 newly graduates are only required to have a basic understanding of computers:

“Of course you need to know computers since it’s a lot of work in excel and macro and everything. But really we get that delivered to us here. So I would say that the programs are very user friendly so as long as you have a basic understanding of how to use a computer you are okay. It’s not that advanced. If you work with the audit you get a lot of tools from data engineers that have developed the tools.” (R2)

“I think that our generation has grown up using computers so I don't think that any specific competence or any specific education is required. If you can use a computer then you have come a long way.” (R3)

The Swedish respondents did, however, suggest that more IT specialists may be necessary for some audit engagements, when they were asked if more IT specialists are needed. According
to the respondents, bigger clients with more advanced IT systems sometimes require more specific IT knowledge:

“We have noticed that during the last few years that it’s a lot of IT... Especially these big companies, sometimes the systems are so complex that we can’t even acquaint ourselves with them and then it’s an IT audit that is performed, which we are not even part of. There we have specialists.” (R1)

“In bigger audits it may become more necessary to have IT specialists (...) it depends on the client, if they use very advanced systems then we may need to hire IT specialists to understand where everything comes from.” (R2)

“It depends on the audit. If the client has a very complex IT operation then we need specialists in certain areas.” (R3)

“Yeah but mostly for the biggest clients. There we have a lot more heavy and big programs that we can use and there more competence is required than we need here.” (R4)

The Liberian respondents did not seem to agree that more IT specialists are necessary, rather they argued that they receive sufficient training at their respective firms. Perhaps the clients in Liberia do not have as advanced IT systems as the biggest clients in Sweden and therefore the Liberian auditors have no issues navigating in the clients’ systems.

“We are trained regularly on the usual of these technologies, so I will say no.” (R6)

“In my view not really, because we are trained on a global level on how to work with these tools.” (R7)

“I will say no.” (R8)

“I will say no, because again we are trained on how to use the technologies, except in the case of specific work beyond our level.” (R9)

Seemingly, it’s the auditors who drive the digital transformation in Liberia since they, due to their global network, have grasped the possibilities with digitalization and advanced technologies. Moreover, the Swedish respondents also seemed to agree that it’s not necessary
to make any significant changes to the academic curriculum, following the current
developments, rather they suggested that the focus should be on internal training.

“You always get internal training on how you should interpret the data and how you
should analyze it and how you should think. That’s something that cannot be taught at
universities, that has to be developed here.” (R1)

“It’s mainly internal training. We have a lot of workshops to learn how certain systems
are used and how can this analysis be used to review receivables perhaps or how can
this analysis be used to review payables and then maybe that you should be comfortable
using excel. But there are internal training opportunities.” (R2)

“We train our employees so that they can utilize these tools as effectively as possible.
So yeah, internal training is certainly very important.” (R3)

“There is a big difference between the firms. So therefore there is more focus on
internal training within the firms in our own programs rather than focusing on it in the
universities. I’m thinking that it’s more important that every firm has internal training.”
(R4)

The Liberian respondents, however, argued that the academic curriculum in Liberia should be
revised to reflect the current state of the audit profession more accurately.

*I think the Liberian Institute of Public Administration should work with the various
Universities to incorporate more accounting or auditing courses in the syllabus. (...) Yeah,
they need to do more and probably need to, although we’re not ready, open to it
right now. But you know, the world is evolving, and we Liberians must go along. So, I
think it is time that yeah, these things probably be provided the information provided
to us on the use of these technologies. So, for a new graduate, fresh from the university,
you will have a basic understanding of accounting, auditing skills, and software. And
then, you will already have that foundation. So, if you are opportune to work with some
audit firms, you know exactly what to expect because you already have basic knowledge
of all the things. (R5)

“The accounting books schools in Liberia are using are outdated and you graduate
with almost no first-hand information about what is happening in the real world. The
curriculum needs to change by 95% and programs to adequately prepare auditors should be included.” (R6)

“Looking at it from the Liberian perspective, I think the entire curriculum needs to be revised, as if I am graduating with a BA degree in accounting, I should have some basic knowledge about data analytics, and data science is very important. At this stage, young people should have an idea of what exactly they want to do. Auditors, nowadays, are not about just reading the accounting books, it is about going beyond the books and adding other technologies, and schools in Liberia should incorporate other specialized programs with the accounting programs. During my ACCA studies, I struggled a lot because of our educational setting. So, I will say more hands-on technologies programs should be included.” (R7)

Furthermore, the responses also varied somewhat when the respondents were asked if audit firms will hire less newly graduates in the future. The Swedish respondents agreed that audit and accounting graduates will continue to be hired by audit firms in the future. Although, R1 argued that the number of new recruitments may decrease somewhat due to AI cancelling out some tasks, the auditor believed that humans will always be needed in the audit process.

“Perhaps AI will cancel out some tasks but the data still has to be analyzed and we can do other things so I have a hard time envisioning that the amount of employees in ... would be cut in half. But maybe it would stagnate. So perhaps in the future 3 will be hired rather than 4. Maybe there will be higher demands on the internal training within the firms as well. So there will be higher requirements on the newly employed in the future, on how you interpret data and analyses.” (R1)

“I think that the view of auditing is being updated. There is so much more that we can do compared to... I understand where you're coming from but it’s more that the role of the auditor is changing. Time is spent on other things eh. But I don’t see a risk that our jobs would disappear.” (R2)

“Someone still has to... computers are not in any way doing our jobs for us. They facilitate the work but I still believe that we will continue hiring audit and accounting graduates.” (R3)
“It feels like people will always be needed although much can be automated, people will always be needed. So no, I don’t think so.” (R4)

Again, the Liberian respondents had different perceptions. R5 argued that this is a negative effect of digitalization and advanced technology in the auditing field, stating that audit firms may need less staff with the implementation of digital applications. The other respondents shared R5’s perceptions, as indicated by the following quote:

“Yeah, I mean, based on the level of technology, and artificial intelligence in our world today, it is possible that the level of the new hire will decrease. Automation tries to reduce or get the work done in a lesser time and a lot of work can be done. So looking from a perspective where you have an automated system to do specific testing that could be done by two or three existing auditors, I think the opportunity of new roles that will be created will be less.” (R9)

5.7 Future effects of digitalization

Lastly, we wanted to look ahead and thus we asked the respondents to reflect on the future implications of digitalization for the field of auditing. It has been suggested that technological changes in the business environment may displace most small and mid-sized audit firms, since they will struggle to afford the investments in technological infrastructure and new competencies needed to remain competitive. Hence, the respondents were asked if they believe that audit firms will have a hard time to remain competitive if they don’t implement advanced technologies in the future. All respondents agreed that technology is a prerequisite for auditing to remain a valuable service and therefore the findings suggested that audit firms, in both Liberia and Sweden must realize the benefits associated with digitalization and digital applications or be left behind. R1 mentioned that some audit firms have had to significantly lower their fees since that’s the only way they can compete with the more technologically advanced firms. As we have noticed from the findings, technology enables auditors to provide infinitely better and more extensive audits and according to R1 the clients are willing to pay for a better service offering. R4 also discussed the audit fees associated with advanced technologies and R2 discussed the added value they can provide thanks to digitalization.

“Yeah absolutely! They save so much time. And the fees differ so much if the technologies are not used.” (R4)
“Partly because the employees would sit and do these repetitive tasks rather than creating good analyses and analytically review what is actually happening within the operations. And I also believe that the client appreciates that they get confirmation that this is how we perform. Eh and it creates a value for them that we not only test samples and instead analyze how it’s going in a new way. And if you can’t provide the client with that then I absolutely believe that you are falling behind.” (R2)

“Sure, sure. You have to implement this technology. Other than that, if you stay using the old fashioned way because it will take you one month to prepare, a company like The Liberian respondents also agreed that Liberian audit firms must embrace the changes brought by digitalization and implement more advanced technologies to remain competitive. According to the Liberian respondents the clients are expecting that they deliver their services in a timelier way, which is not possible without advanced audit tools.

“The Coca-Cola financial statement, and you have PWC that can prepare it with 10 to 15 working days, businesses or companies will want to have the audited financial statements as soon as possible because shareholders or investors are depending on them to make financial decisions, so we definitely have to go along.” (R5)

“Definitely, my friends at my previous job are complaining a lot because my office is taking over the market as a big 4 firm. Smaller audit firms in Liberia should wake up to the realities or a few years from now, they will be kicked out of the market completely.” (R6)

“Oh, yes. It is very obvious. For eg, insurance companies in Liberia are now adopting IFRS 17, and you as an audit firm, if you are not up to speed in terms of some of these standards you will definitely be left behind. In 2018, when we were adopting IFRS 9 and 15, it was the big 4 firms who were auditing those companies. So, for an audit firm to stay competitive, you have to invest in your staff and as well invest in these technologies, thus they are expensive, but the auditing profession is becoming very competitive and we in Liberia have to go along.” (R7)

“The trends of technologies are moving at a very hard pace and clients don’t want excuses, for eg, a few years from now the client will start to request financial
information on a shorter date, and firms that are not up to speed will run out of business. So, I think firms should upskill to be very competitive in the industry.” (R9)
6. Analysis and discussion

In this chapter, the empirical data from the semi-structured interviews will be discussed and analyzed in relation to the theoretical framework and existing literature. The analysis follows a thematic approach, as suggested by Braun and Clarke (2006).

6.1 Differences and similarities in technology

It’s argued that the auditing profession is currently facing a technological transformation (Lombardi et al., 2014). Following the development of information technology, audit firms are implementing tools which increase the capabilities of auditing to add value (DeFond & Zhang, 2014). Unsurprisingly, there are some differences in the implementation of advanced technologies, like Big data and analytics, Blockchain and AI, between Swedish and Liberian audit firms. However, the difference is not as significant as we originally assumed. The findings indicate that Swedish auditors tend to deal with more technologically advanced clients than Liberian auditors, and therefore more advanced technologies are required to perform high quality audits in Sweden. Thus, it’s interesting that Liberian auditors, working at Big four firms, are also using advanced technologies in their audits. While the Swedish auditors, who are all employed by Big four audit firms, are essentially exclusively using Big data and analytics in their respective departments, the Liberian auditors working at Big Four firms are using both Big data and analytics and Blockchain in their respective departments. Big data and analytics is adopted in similar ways in Liberia and Sweden, i.e to follow audit trails and analyze transactions. According to Earley (2015), the steadily increasing amounts of computerized data in companies has made it increasingly difficult for audit firms to analyze client’s data. Hence, advancements in analysis tools have enhanced the capabilities of auditors to add value (Capriotti, 2014; Whitehouse, 2014). Accordingly, Big Data enables auditors to perform prescriptive analytics (e.g., Holsapple et al., 2014; Delen & Demirkan, 2013; Lee et al., 2014), and implementing practices to computationally verify existing actions and their outcomes (Lee et al., 2014).

Both Swedish and Liberian auditors agree that Big data and analytics allows them to capture and analyze previously unimaginable amounts of client data and hence they can deliver their services in a completely new way. The analysis tools that Swedish auditors use are, perhaps, even more developed than those used by Liberian auditors, since the Swedish respondents
suggest that the analysis tools that they use today allow them to test 100% of the population rather than testing statistically generated samples of transactions. In turn, this has increased the quality of their work since they are now able to detect deviations more efficiently. The Liberian respondents are, however, not able to analyze entire audit trails and analyze all client data as of yet. Perhaps this is not because of geographical differences, but rather because of differences in the technology available by the different Big four firms. According to Alles and Gray (2016) the different Big four audit firms are all investing considerable amounts of money to develop and adopt advanced technologies, like Big data and analytics, AI and Blockchain. However, as indicated by the findings, some firms are more technologically developed than others and can thus provide higher quality audits. Nevertheless, both Swedish and Liberian auditors agree that Big data and analytics is highly useful and key in transforming the audit process, which is in line with prior research by Earley (2015). According to Earley (2015), there are four main benefits of Big data and analytics in audits. First, Big data and analytics allows auditors to test greater numbers of transactions. Second, audit quality can be increased since Big data and analytics can provide greater insights into clients processes. Third, Big data and analytics enhances auditors’ ability to detect fraud and fourth, Big data and analytics allows auditors to provide services and solve problems that go beyond current capabilities by utilizing external data (Earley, 2015).

Even though both Liberian and Swedish auditors, working at Big four firms, receive continuous training on AI, they are not using AI in their audits, at least not as of yet. The Big four audit firms are clearly investing considerable amounts of money to augment their services with advanced technologies, specifically AI, Blockchain and Big data and analytics, but there are evidently some regional differences in which technologies are necessary. In Sweden, the larger clients with more complex IT systems tend to have their operations in larger cities, like Stockholm and Gothenburg and thus more advanced technologies may be needed in the larger Big four offices, to audit those clients in a timely manner. The Swedish participants therefore indicate that AI could potentially be used by auditors in Stockholm for its automation capabilities, but not in smaller offices since it’s not necessary to efficiently audit smaller entities. Similarly, Big four audit firms in Liberia may not be required to implement AI in their audits, since they tend to deal with less technologically advanced clients. Evidently, it’s the auditors who drive the digital transformation in Liberia since they realize the advantages associated with digitalization.
Furthermore, Blockchain technology enables the Liberian auditors to view their colleagues' transactions in a digital ledger, which mitigates errors. This is in line with Vaidyanathan (2017), who argues that Blockchain allows all parties in the distributed ledger to get a common view of the records. No intermediaries are needed to settle a transaction and validation is performed by multiple users and once a transaction is validated, all copies of the ledger are updated. Thus, the auditors within the distributed ledger can automatically view each other's work, which gives the senior auditors a greater overview of the assistants work and in turn errors can be detected. Evidently, blockchain technology has the potential to increase the quality of audits and from a stakeholder perspective, it’s very beneficial since auditors can underline their conclusions with more certainty.

Moreover, the findings indicate that there is a significant difference in technology between Big four audit firms and non-Big four audit firms. The two respondents working at smaller audit firms, both indicated that they are using far less advanced systems to perform their audits. Accordingly, they can’t provide as high-quality services as the Big four firms, which unfortunately means that they are losing clients. This goes in the same direction as prior studies, which argues that small and mid-sized audit firms may be displaced, since they will struggle to afford the investments in technological infrastructure and new competencies needed to remain competitive (e.g., Tiberius & Hirth, 2019; Chaney et al., 2004; Manita et al., 2020). Hence, all respondents agree that technology is a prerequisite for auditing to remain a valuable service and therefore the findings suggested that audit firms, in both Liberia and Sweden must realize the benefits associated with digitalization and digital applications or risk being technologically left behind.

6.2 The audit process

The findings indicate that advanced technologies are used in essentially all parts of the audit process in both Sweden and Liberia, from planning the audit to the completion of the final report. No empirical evidence was found, suggesting that advanced technologies are used in the pre-engagement and hence it’s not discussed in this analysis.

6.2.1 Planning

In the planning phase, the auditor needs to plan what evidence to collect in order to be able to express an opinion, amongst other things, on whether or not the financial statements give a true and fair view of the state of affairs and profit and loss of the reporting entity, and how and
when to collect such evidence (Porter et al., 2014). According to Carrington (2014) and Eilifsen et al. (2013), proper planning is important to ensure that the audit is conducted in an effective and efficient manner. This step involves making a preliminary assessment of the client’s business risks and determining materiality, based on the auditor’s understanding of the entity. The audit team relies on these judgements to then assess the risk relating to the likelihood of material misstatements in the financial statements (Eilifsen et al., 2013). According to Porter et al. (2014), planning the materiality refers to the amount of error the auditor is prepared to accept in the financial statements while still maintaining that they provide a true and fair picture of the state of affairs of the reporting entity. This provides a basis for planning the nature, timing, and extent of procedures to be performed during the audit (Porter et al., 2014).

The empirical findings suggest that digitalization has streamlined the planning phase, and Big data and analytics can be very useful at this stage of the audit process. According to R2, Big data and analytics can be used in the planning phase, as part of the auditor’s inquiry work. Analysis tools are also useful in assessing the various business risks. Big data and analytics allow the auditor to collect and analyze all client data, which means that the auditor can efficiently investigate entire audit trails. In turn, the auditor can more accurately assess the various risks since he will have a greater understanding of the client. “If you look at planning, execution, and conclusion. In the planning phase it’s part of our inquiry work to investigate how the trails look like. And that’s also what we see when we do these tests. For us to be able to perform the tests we have to, already in the planning phase, have an expectation on how we think it’s going to be” (R2). This is in line with Meuldijk (2017), who argues that Big Data is a significant tool for auditors that can facilitate the audit in areas such as scoping, risk assessment, trend analysis, and judgments. Additionally, this finding is consistent with Earley (2015), who states that Big Data can provide greater insights into client’s processes.

6.2.2 Evidence
The next step of the audit process is to collect audit evidence, which involves performing a series of tests to gather evidence to support the audit opinion. At this stage, the auditor can choose to follow two audit strategies: a substantive strategy or a reliance strategy (Carrington, 2014; Eilifsen et al., 2013). A reliance strategy means that the auditor intends to rely on the entity’s internal controls, and a substantive strategy means that the auditor has chosen to use substantive procedures as the main source of evidence. The overall objective of substantive testing is to verify the validity and accuracy of the entity’s financial statements (Porter et al.,
According to Porter et al. (2014), the auditor's assessment of the entity's internal control has a significant impact on the nature and extent of the substantive tests that will be performed. If the auditor believes that the entity's internal control systems are effective, and the control risk related to the audit is low, the need for more extensive and less timely substantive audit procedures will be reduced (Bailey et al., 2018).

The Liberian interviewees argue that digitalization and advanced technologies has made streamlining possible since they are now able to test the entity’s internal controls, rather than having to test individual transactions. Although the reliance strategy has been around for quite some time, advanced technologies have clearly made the collection of audit evidence infinitely more efficient. The implementation of analytics tools has allowed the respondents to spend significantly less time collecting audit evidence, enabling them to focus on more complex judgment areas, which is consistent with Lombardi et al. (2015). The auditors are now also able to collect more audit evidence to support their opinion. Hence, the digitization of auditing will ultimately improve the transparency of financial statements, which in turn will enable stakeholders to make more informed decisions (Manita et al. 2020). Thus, from a stakeholder perspective, advanced digital technologies are highly beneficial in the context of auditing.

Moreover, Shen et al. (2017) states that sampling methods allow auditors to focus on the critical control accounts or areas where weaknesses are common. Auditors are not required to be concerned about the statements' absolute accuracy. Hence, sampling techniques are used to draw conclusions about the population. However, the findings indicate that sampling techniques may soon become a thing of the past. The advancements in analytics technology have made it possible for the Swedish participants to test 100% of the population rather than testing statistically generated samples of transactions, which has almost completely cancelled out the need for sampling techniques. Analytics tools allow the auditor to collect all data from the auditee and automatically identify deviations, rather than using sampling techniques to find deviations. “We have left the classic audit behind, which perhaps the other firms still do, where you take a bunch of samples. We gather all the data from the client and it can be several systems that interact with each other so we get connections between the systems which allows us to analyze deviations rather than looking at individual samples” (R1). Thus, the Swedish auditors are now more focused on analyzing the deviations, which is far more valuable for the clients. As suggested by the respondents, the clients are more willing to pay for digitally augmented audit services, which helps them strengthen their internal controls and grow their businesses,
than paying for an auditor whose only focus is finding errors in the statements of accounts. The theory of inspired confidence supports this notion, which suggests that auditors should make use of all resources at their disposal to guarantee that stakeholders’ expectations are satisfied (Mathias & Kwasira, 2019), or the audit profession will gradually lose its value.

6.2.3 Reporting
The final step of the audit process is reporting, where the auditor is expected to assess the sufficiency of the evidence and if necessary, obtain additional evidence (Żytniewski, 2017; Eilifsen et al., 2013). The auditor will evaluate the results of the audit tests and identify contingencies. For the audit to be properly completed, it’s important that the process has been documented and that the evidence is appropriately organized (Sikka, 2018). According to Ghasemi et al. (2011), digitalization has allowed companies to progress towards paperless offices which in turn has been beneficial for auditors since audit trails and details are automatically maintained. The empirical findings support this notion, indicating that digital technologies have enabled Swedish audit firms to progress towards a fully digital audit approach, which according to the respondents is very beneficial. The Liberian auditors are, however, still doing some audits manually, but have implemented quite sophisticated IT systems which allows them to automatically maintain audit trails and client data, similarly to Swedish audit firms. Both Swedish and Liberian audit firms have implemented IT systems, in which their clients can digitally upload documents for review. Hence, far less paper is needed throughout the audit process, which is beneficial since it enables a more efficient handling of client’s documents. There is, however, a potential drawback associated with a fully digital audit approach. According to Ali et al. (2015) there is a security risk involved with companies sharing sensitive information online. This opinion is, to an extent, shared by the respondents but they maintain that the risks associated with a fully digital audit approach are vastly outweighed by the potential benefits.

6.3 Perceived usefulness and ease of use
According to the technology acceptance model (TAM), perceived usefulness and perceived ease of use, are fundamental constructs that influence the decision to use computing technologies. According to Davis et al. (1989) perceived usefulness is defined by the subjective probability that the specific application will increase the users job performance, and perceived ease of use is determined by how free of effort the application is to use. Thus, there is a positive relationship between the two constructs and technology acceptance (Kim et al., 2016).
Accordingly, the more users who find that the application will make their job easier to perform; the higher the probability that the technology will be accepted.

The technology acceptance model is used in several auditing studies exploring the acceptance of emerging technologies among auditing professionals (e.g., Kim et al., 2016; Kim et al., 2009; Rosli et al., 2012). Kim et al. (2016), Albawwat and Al Frija (2021), Afroze and Aulad (2020) and Ismail and Abidin (2009), all study the acceptance of different auditing software’s in developing countries. The studies provide similar results, indicating that the complexity of advanced technologies is a significant obstacle to overcome in the adoption of more sophisticated audit technology, although the perceived usefulness may be high (e.g Rapoport, 2016; Kokina & Davenport, 2017; Earley, 2015). The study at hand contradicts prior research, rather we contend that advanced technologies, especially Big data and analytics and Blockchain are useful and also easy to use, as stated by both Liberian and Swedish respondents. Hence, the acceptance of advanced technology in the field of auditing is high, both in Liberia and Sweden. According to the respondents, basic computer knowledge is sufficient to understand the tools that they use, and the internal training that they receive at their respective firms is adequate to learn how to efficiently navigate in the systems. The tools that the participating auditors use are developed, and continuously updated, in a way that ensures that auditors who are not IT experts can easily navigate in the systems, as indicated by the following: "They are designed in a way which makes them easy to use. There is always some form of guide or formula that you can go by. So, they are easy to use" (R4).

In the following sections, the other construct influencing the decision to use computing technologies i.e., usefulness, will be discussed. The findings indicate that emerging technologies have had significant effects on audit efficiency and audit quality, and therefore they are considered as useful by the respondents.

6.3.1 Increased audit efficiency

The overarching purpose of this study is to explore the perceived effects of digitalization on the auditing profession in one developed country and one less developed country. In the auditing literature it’s clear that advances in technology allows auditors to automate parts of the audit process, thereby eliminating some standardized and repetitive tasks, which in turn increases auditors’ efficiency (e.g., Kokina & Davenport, 2017; Raphael, 2017; Banker et al., 2002; Agnew, 2016; Lombardi et al., 2015; Tiberius & Hirth, 2019). Although there are some
differences in technology between Sweden and Liberia, both Swedish and Liberian auditors agree that digitalization and emerging technologies enables auditors to automate audit tasks that were formerly done manually. Accordingly, all respondents have experienced a reduction in repetitive and time-consuming tasks. According to Lombardi et al. (2015), new technology provides auditors with means to complete mundane tasks in a timely manner, allowing them to focus more time on complex judgmental areas. Hence, as indicated by R1, new technologies in the field of auditing will not result in significant time savings on each audit, rather they enable auditors to reallocate their time. According to Raphael (2017), digitization does not only increase the efficiency and quality of an audit, but it also creates value for clients because they can access more relevant and valuable information. Again, this is supported by the empirical findings which suggests that the automation of repetitive and time-consuming tasks has significantly impacted how the service is delivered and the value they can create for their clients.

According to Rapoport (2016), AI in auditing is heavily focused on the automation of mundane and labour-intensive tasks, eliminating structured and repetitive audit procedures (Kokina & Davenport, 2017). According to Kokina and Davenport (2017) AI-enabled technology can locate relevant information, process it and make it usable for the human auditor, who can focus more on complex judgmental areas. The empirical findings, however, indicate that the adoption of AI is not particularly widespread in Sweden, nor in Liberia. Even though both groups agree that AI has the potential to automate repetitive and labour-intensive audit tasks, not one respondent uses AI in their audits. Prior studies suggest that AI in auditing is not perceived as useful by auditing professionals in less developed countries (e.g., Albawwat & Al Frija, 2021; Afroze & Aulad, 2020; Ismail & Abidin, 2009), since they are considered to be complicated to use. Thus, this study contradicts prior studies, showing that Liberian auditors, working at both Big four firms and non-Big four firms perceive AI as useful, since it has the potential to enhance their services.

Moreover, the benefits of Big data analytics clearly also include automation capabilities (e.g. Appelbaum & Smith, 2018; Liu et al., 2019; Earley, 2015). Both Swedish and Liberian auditors, especially those working at Big four audit firms, have implemented analysis tools which automate parts of the audit process. For instance, both Swedish and Liberian audit firms have implemented IT systems, in which their clients can digitally upload documents for review. The respondents describe it as a portal in which the client can transfer documents, and the
documents will “automatically fall under the right review step” (R1). This allows auditors to collect more audit evidence and since the documents automatically fall under the right review step, the acquisition of client data will be far more efficient. Hence, the respondents suggest that Big data and analytics allow for a detailed audit track along with the ability to detect irregularities from an entire population rather than a sample, which is in line with Kokina et al. (2017) and Liu et al. (2019).

To summarize, the automation of audit tasks has not resulted in significant time savings on each audit. However, advanced technologies allow auditors to complete mundane tasks in a timely manner, allowing them to focus more time on complex judgmental areas and on tasks and analyses that will create more value for the clients. In the end, a more extensive and, in essence, better report will be produced, and the client will clearly benefit from the auditor utilizing advanced technologies. Moreover, agency theory suggests that auditing plays a significant role in resolving agency problems, since it functions to assure the investors that their interests are being upheld (Commerford et al., 2019). The findings suggest that advanced technologies have the potential to enhance the auditor’s role in resolving agency problems, because of the provision of more timely and useful reports. Further, two Liberian respondents maintain that advanced technologies in audits may reduce agency costs that could arise from conflicts of interests between the agent and the principal. In line with Moffitt et al. (2018), the respondents suggest that advanced technologies in auditing can effectively detect fraudulent behavior. This is also supported by Manita et al. (2020), who argue that new digital technology enables a more relevant analysis of the clients’ processes and data and makes it possible to identify errors and anomalies more effectively, allowing the auditor to fully play its role as a governance mechanism.

6.3.2 Improved audit quality

Financial statements are intended to meet the information needs of investors and creditors and should also be useful in decision making. Stakeholder theory explains the interaction between organizations and the people affected by the activities of the business, i.e., the stakeholders. Stakeholder theory suggests that various social contracts have to be negotiated with different groups of stakeholders due to the fact that different stakeholders have different views on how the business should be conducted (Harrison & van der Laan, 2015; Hörish et al, 2020). The role of the independent auditor is to provide confidence in the financial reports produced by businesses, assuring the stakeholders that the financial statements give a true and fair view of
the state of affairs and profit and loss of the reporting entity, and that they are free of material misstatements. However, due to the rapid growth of companies it has become increasingly difficult for auditors to manually analyze the growing volumes of data (Kokina & Davenport, 2017). Thus, both Swedish and Liberian participants agree that audit firms must implement digital technology to ensure that they can continue providing timely and reliable information to investors, consistent with Handoko and Lindawati (2021).

The empirical findings indicate that digitalization and advanced technologies have increased audit quality, since they enable a more relevant analysis of the clients’ processes and data, making it possible for auditors to identify errors and anomalies more efficiently. In line with Raphael (2017), the respondents suggests that advanced technologies allow them to provide higher quality services, as indicated by the following quote: “Yeah I think that we can deliver our audits better and we can also provide more value for the customers (...) we can provide the client with more information that is of value to them” (R2). The findings also support prior research by Manita et al. (2020), which shows that digital technology will allow auditors to get a better control of the client’s data, and thus improve the relevance and quality of the audit.

Furthermore, both Swedish and Liberian auditors agree that digitalization and advanced technologies, like AI, Big data and analytics and Blockchain, have the capability to improve the reliability of audited reports and the information contained in them. According to two Swedish respondents, the risk for material misstatements in audited financial statements will be significantly lower if the auditor uses digital analytics tools. From a stakeholder perspective, this is very beneficial since the audited reports will be more useful in decision-making. This notion is supported by Jachi and Yona (2019), who argue that digital tools can enhance the effectiveness and quality of the audit process, in turn increasing the reliability of audited financial statements. Moreover, the findings suggest that the risk for human errors in the audit process is significantly lowered with advanced technologies, as indicated by the following: “The computer is usually not wrong compared to humans. Most of the time it’s humans who make mistakes and not the computer. So I absolutely believe that it’s improved the quality. The human factor decreases” (R2). This is consistent with (Moffitt et al., 2018), which shows that advanced technologies can transform the audit through automated analysis of accounting entries, which in turn reduces the risk for human errors.
Moreover, professional judgment is critical for auditors, since it’s required that the auditor makes sound and informed decisions about the courses of action throughout the audit engagement. Thus, professional judgment is a prerequisite for the usefulness and timeliness of audited reports. Professional judgment is highly subjective and for auditors it means making decisions, analyses, or evaluations on the basis of knowledge, skills, training and experience. The respondents all agree that advanced technology improves the auditor’s professional judgment, since they allow them to focus more time and resources on complex judgment areas. This goes in the same line as Brown-Liburd et al. (2015), which suggests that Big data and analytics could potentially enhance the auditors professional judgment and decision making. According to Salijeni et al. (2019), Big data and analytics provides auditors with the means to automate some repetitive and routine tasks, giving the auditor more time to focus on the complex areas such as risk assessment. Thus, this study does not support the notion that advanced technologies may have an adverse effect on professional judgment because of information overload etc. (eg. Brown-Liburd et al., 2015).

6.4 New competencies

6.4.1 Skill sets required to perform audits with advanced technology
Competence plays a significant role in the field of auditing, directly impacting the effectiveness and the value of audits (Nearon, 2005). Many scholars agree that the digital development of the auditing industry will lead to a changing organizational structure and hence a notable effect of digitalization is the changing skills needed within audit firms (e.g., Ghasemi et al., 2011; Appelbaum et al., 2017; Lombardi et al., 2015). The participants of this study tend to agree with this notion, suggesting that auditors today are expected to have more IT and computer knowledge than before because of the extensive use of excel applications throughout the audit process. Karlsen and Wallberg (2017) and Manita et al. (2020) agree that it’s important that auditors possess the technical skills necessary to perform audits with the use of these new technologies. In line with Karlsen and Wallberg (2017) and Manita et al. (2020), the respondents also argue that auditors must keep up with current developments for auditing to remain a valuable and relevant service and therefore auditors have an individual responsibility to familiarize themselves with the currently trending technologies.

Moreover, the Swedish participants also suggest that analysis tools in auditing, place more emphasis on auditors’ analytical skills. As indicated by the participant’s, auditing today is not about performing the same standardized tasks over and over, rather auditors collect and analyze
client data using advanced analysis tools and hence they need to have a deep understanding of how the client’s data is designed and generated. This is consistent with prior research by Appelbaum et al. (2017), who argues that the increased digitization and the constantly changing nature of clients’ business models, may result in more complex auditing and auditor requirements. However, most respondents seem to agree that, while there may be a higher demand for IT competencies in the auditing field today, a basic understanding of computers is sufficient in most audit engagements. Furthermore, Manita et al. (2020) suggests that audit professionals should be properly trained to gain specific technical skills to understand how the client’s data is designed and generated. The findings support this notion, indicating that the internal training that audit firms provide is paramount for the proper application of advanced technologies in audits. Both the Swedish and the Liberian respondents, working at Big four firms, receive continuous training to ensure that they can efficiently use the advanced technologies to perform audits. Hence, this study argues that internal training is the most effective way to ensure that today's auditors are kept up to date with the current developments in technology, and that they can continue to provide timely and useful reports.

6.4.2 The need for IT specialists

According to Appelbaum et al. (2017), the increased digitization and the constantly changing nature of clients’ business models, may result in more complex auditing and auditor requirements. For instance, while blockchain offers a completely new way to record financial transactions and information, and brings new business to auditors, such as verifying the existence of digital assets and reviewing certain transactions, it’s believed that these new tasks can be challenging for auditors who are not IT experts (Earley, 2015). Especially when there are no centralized authorities on the blockchain. Hence, more IT specialists and data scientists might be employed in auditing firms due to the changing requirements. This raises the question of whether business administration, accounting, or auditing graduates will continue to staff auditing firms, or if they will be replaced with more IT-oriented employees (Tiberius & Hirth, 2019).

The Swedish participants suggest that more IT specialists may be necessary for some audit engagements. According to the respondents, bigger clients with more advanced IT systems sometimes require more specific IT knowledge. The Liberian respondents do not seem to agree that more IT specialists are necessary, rather they argue that they receive sufficient training at their respective firms. Perhaps the clients in Liberia do not have as advanced IT systems as the
biggest clients in Sweden and therefore the Liberian auditors have no issues navigating in the clients’ systems. Nevertheless, the findings suggest that it’s important for audit firms to have the in-house experience to utilize the available technologies, for auditing to evolve and remain a valuable and relevant service (Lombardi et al., 2014). This is supported by the theory of inspired confidence, which suggests that auditors should make use of all resources at their disposal to guarantee that stakeholders’ expectations are satisfied by providing an expected degree of assurance (Mathias & Kwasira, 2019). Most modern companies with large operations have a huge amount of data to be audited and since human auditors won’t be able to cover the vast amount of information in each time frame without the use of digital applications, the audit profession will gradually lose value (Mathias & Kwasira, 2019).

6.4.3 The need to redesign the academic curriculum for Auditors

Academic institutions play a major role in preparing future auditors. According to Lombardi et al. (2015), the rapid advancements of technology has resulted in a gap between the profession and education that should be shortened in order to properly educate and prepare students for the audit profession. Additionally, Issa et al. (2016) suggests that the audit industry is changing in conjunction with digitalization and the universities will therefore have to change parts of their curriculum to cater for the new competencies that auditors are expected to have. This is especially true in Liberia, as indicated in the interviews. According to the Liberian auditors, the academic curriculum in Liberia should be revised to reflect the current state of the audit profession more accurately. Findings from the empirical results indicate that the academic curriculum in Liberia is not keeping pace with the technological advancements in the field of auditing and the requirements of the current job market. This is in line with prior research by Cao (2015) and Earley (2015), which suggests that academic curriculums should make room for the recent developments in technology to prepare future auditors. According to Earley (2015), the auditing curriculum should be changed to combat the shortage of skills required to perform audits using analytics tools. Early (2015) do, however, maintain that there is no need to completely restructure the curriculum, rather it should be redesigned to accommodate the changes in technology. The Liberian respondents seem to disagree with this notion, suggesting that more significant changes should be made to the curriculum. According to R7, the entire curriculum needs to be revised. R7 suggests that the accounting curriculum should, at the very least, provide basic knowledge about data analytics and data science. “Auditors, nowadays, are not about just reading the accounting books, it is about going beyond the books and adding other technologies, and schools in Liberia should incorporate other specialized programs with
the accounting programs. During my ACCA studies, I struggled a lot because of our educational setting. So, I will say more hands-on technologies programs should be included” (R7).

Furthermore, the findings suggest that there is no need to significantly change the academic curriculum for Swedish auditors following the advancements of technology. According to the participants, different audit firms have different procedures and hence it’s far more important that auditors receive continuous internal training at their respective firms. This allows audit firms to shape their employees, which will make them more effective in their work. If the academic curriculum was too focused on specific technologies and how they are used, there would be a risk that audit firms would have to re-educate auditing graduates, if the training provided at the universities weren’t properly aligned with the audit firm’s procedures. This would clearly take more time than internally training auditors with no prior experience. Although the findings indicate that there is no need to significantly change the academic curriculum for Swedish auditors following the advancements of technology, two Swedish respondents suggested that the universities failed to provide them with a good understanding of what auditors actually do. The expectation gap that exists between what the public believes that auditors do and what they actually do has been discussed by many scholars, in many different contexts (e.g., Koh & Woo, 1998; Nazri Fadzly & Ahmad, 2004; Woodhead & Sohliman, 2006). This study confirms that there is an expectation gap, which should be closed. In line with prior studies, we argue that universities have a role in closing the existing gap, and they should provide more information regarding the role of the auditor.

6.4.4 Potential barriers for future auditors

Furthermore, audit firms have generally relied on recent graduates to perform the more repetitive and administrative tasks in the audit process. However, since disruptive technologies allow auditors to automate parts of the audit process, thereby eliminating some standardized and repetitive tasks, it’s argued that audit firms will hire significantly less new audit and accounting graduates in the future (Kokina & Davenport, 2017). Although senior auditors in large audit firms agree that the need for human auditors won’t go away anytime soon (Agnew, 2016), and that it’s likely that the auditing field, like many other business fields, will be augmented by technology rather than fully automated (Davenport & Kirby, 2016), there is evidence indicating that some audit professionals are worried about the technological developments (e.g., Afroze & Aulad, 2020). While studying the perception of audit
professionals on AI in the context of auditing in Bangladesh, Afroze and Aulad (2020) found that auditors in Bangladeshi audit firms agree that AI pose a direct threat to the jobs of grass-root employees. According to the authors, AI has made manual and repetitive auditing tasks a lot simpler and quicker which is seemingly intimidating for some auditors.

On the one hand, the Swedish participants argue that advanced technologies are no threat to the continuous availability of jobs for auditors, stating that technology is more likely to change the existing role of the auditor rather than eliminating it, which is in line with prior research by Agnew (2016) and Davenport and Kirby (2016), who suggests that the need for human auditors won't go away anytime soon and that it’s likely that the auditing field, like many other business fields, will be augmented by technology rather than fully automated. On the other hand, the Liberian auditors argue that audit firms needing less staff is a negative effect of digitalization and advanced technology in the auditing field. Hence, the findings support existing studies on the perceptions of auditing professionals in developing countries on the effects of digitalization on auditing (Afroze & Aulad, 2020), who found that auditors in Bangladeshi audit firms view AI as a direct threat to the jobs of grass-root employees. According to the authors, AI has made manual and repetitive auditing tasks a lot simpler and quicker which is seemingly intimidating for some auditors.
7. Conclusion

The following sections conclude this study, summarizing the key takeaways from the empirical findings and analysis. This chapter also includes theoretical, practical, and societal contributions of the study. Limitations of the study and avenues for future research are also discussed.

7.1 General conclusion

The purpose of this study was to explore the effects of digitalization on the auditing profession in one developed and one developing country, answering three research questions. First, we sought to explore how Swedish and Liberian auditors perceive the effects of digitalization on the audit process. We found that, although there are some differences in which tools are used, both Swedish and Liberian auditors had experienced significant changes in how they perform their audits, following the advances in digital technology. Both Swedish and Liberian audit firms have implemented digital tools which increase their capabilities to add value for their clients. Among other things, both Swedish and Liberian Big four audit firms have implemented IT systems which allows their clients to digitally transfer documents for review, which will enable them to progress towards paperless offices. In line with prior research (e.g., Banker et al., 2002), we also found that advanced technologies, especially Big data and analytics, have streamlined the audit process, by automating formerly repetitive and routine tasks. In turn, modern auditors can collect more relevant audit evidence, with significant time-savings, allowing them to spend more time on complex judgment areas. Hence, we argue that digitalization, and the implementation of increasingly advanced technologies have had a significant and positive impact on audit quality in both Liberia and Sweden.

Furthermore, this study is consistent with prior studies (e.g., Moffitt et al., 2018; Manita et al., 2020), which suggest that advanced digital tools enable auditors to provide more useful and timely reports, containing more reliable information. Moreover, prior studies have argued that a potentially negative effect of digitalization is that the digital development of the auditing industry will lead to changing skills needed within audit firms (e.g., Appelbaum et al., 2017; Tiberius & Hirth, 2019). This is especially true in Liberia. The Liberian respondents argued that the academic curriculum in Liberia is not keeping pace with the technological advancements in the field, and the requirements of the current job market. Thus, the academic curriculum in Liberia should perhaps be revised to reflect the current state of the audit
profession more accurately. Further, a concern was raised by the Liberian respondents that the continuing digitization of the audit profession will result in audit firms hiring less new auditing graduates, since advanced technologies allow them to automate audit tasks that were formerly done by junior staff. The Swedish respondents, however, did not share this opinion, stating that technology is more likely to change the existing role of the auditor rather than eliminating it. Hence, new staff will continue to be employed by Swedish audit firms.

This study also intended to answer what Swedish and Liberian auditors’ perceptions are toward the importance of digital tools in auditing. Prior studies have argued that, due to the rapid growth of companies, it has become increasingly difficult for auditors to manually analyze the growing volumes of data in a timely manner (e.g., Kokina & Davenport, 2017). Hence, audit firms must implement tools which allow them to analyze the growing volumes of data, for their services to remain valuable and relevant. We found that this view is widely shared by both Swedish and Liberian auditors who argue that digital tools are essential in evolving the audit profession. This study suggests that more technologically advanced audit firms are able to provide significantly better audit services than less technologically advanced firms. Auditing today is not just about finding errors in the client’s financial statements. Clients today are seemingly more interested in how they can improve their internal controls and procedures and the auditor can, with the use of analytics tools, provide his clients with valuable analyses, which could help them grow their businesses. The findings indicate that smaller audit firms, using less advanced systems to perform their audits, can’t provide as high-quality services as the Big four firms, which unfortunately means that they are losing clients. This goes in the same direction as prior studies, which argues that small and mid-sized audit firms may be displaced, since they will struggle to afford the investments in technological infrastructure and new competencies needed to remain competitive (e.g., Tiberius & Hirth, 2019; Chaney et al., 2004; Manita et al., 2020). Thus, we argue that audit firms that fail to implement advanced technologies in time, especially analytics tools, will struggle to stay competitive, in developed as well as developing countries.

Lastly, this study strived to explore if, and in what ways, Swedish and Liberian auditors differ in their perception towards the effects and importance of digitalization in auditing. Overall, this study shows that Swedish and Liberian auditors tend to agree that the effects of digitalization are significant and positive for the auditing profession, enabling auditors to provide higher quality services more efficiently. Thus, audit firms in developed as well as developing countries
would benefit from implementing digital tools. In the end, analytics tools enable auditors to detect fraudulent behavior more effectively.

7.2 Contributions and implications of the research

7.2.1 Theoretical contribution

Digitalization and emerging technologies in the context of auditing is a currently trending topic, generating a lot of interest from scholars, auditors, regulators, and users of financial statements. In this era of digitalization, this study adds to the existing literature, complementing some of the previous studies and providing more insights on how digitalization and currently trending technologies are transforming the audit profession. This study also contributes to the available literature by studying the effects of digitalization on auditing in one developed and one developing country. While there are many studies investigating auditors' perceptions regarding the effects of emerging technologies on auditing, few have been directed at less developed countries. Hence, this study fills the existing gap in the literature. In line with prior studies, we found that digitalization has positively impacted audit quality and audit efficiency in both Liberia and Sweden, providing auditors with tools that increase their capability to add value.

7.2.2 Practical contribution

There are several practical implications of this thesis, relevant for various stakeholders. Foremost, audit firms will have to realize the benefits of digitalization and implement emerging technologies, especially analytics tools, to ensure that their services remain valuable and relevant in the future, although there are significant costs associated with the implementation of the mentioned emerging technologies. Further, this research provides valuable insights into how the audit process is transforming, following digitalization, and emerging technologies and what skills and competences are necessary to perform audits today. This will be helpful for future auditors as well as the recruiting audit firms.

7.2.3 Societal contribution

Lastly, this study is relevant for academic institutions and regulatory bodies. The findings indicate that digitalization may result in changing skills and competences needed within audit firms, and hence more IT specialists may be needed within Swedish audit firms. In Liberia, less new audit graduates may be needed, and the academic curriculum should be revised to
reflect the current state of the audit profession more accurately. Therefore, academic institutions and regulatory bodies can use the findings to determine the required adjustments.

7.3 Limitations

Although the aim of the study was achieved, there are bound to be some limitations. First, the nature of qualitative research does not allow for generalizations. In this study, a qualitative research approach was adopted to explore the effects of digitalization in one developed and one developing country, which provided a rich, contextual understanding of the topic. Second, the study was conducted during the busy season for auditors and hence it was difficult to obtain participants. Time constraints were also a limiting factor and thus only nine interviews were conducted in the end. This could have possibly resulted in less diverse perspectives in the empirical findings. Third, the mix of participants did not include Swedish auditors from small and mid-sized audit firms. Hence, we were not able to explore how Swedish small and mid-sized audit firms differ from the Swedish Big four firms, with regards to technology. A comparison between Swedish and Liberian small and mid-sized audit firms was not possible either. Fourth, we were only able to interview one Audit Manager/Chartered accountant. More interviews with senior managers or even partners would certainly have provided interesting information, particularly regarding professional judgment. Fifth, the participants were essentially only using Big data and analytics (and Blockchain to some extent) in their respective departments and hence not much insight was provided into how AI, for instance, is changing the audit profession. Sixth, since this study sought to explore the perceptions of Liberian auditors, five interviews had to be conducted over zoom and teams. This meant that we were not able to capture the Liberian interviewees' body language to enrich the analysis. Furthermore, the four interviews with Swedish auditors were conducted in Swedish, at the respondents' request. Thus, the interviews had to be translated to English. Therefore, there is a potential risk of misinterpretations in the empirical data. Given these points the reader may have to consider the findings considering the limitations.

7.4 Avenues for future research

Given the limitations of this study, there are several avenues for future research. Foremost, future research should further explore the effects of digitalization and emerging technologies on small and mid-sized audit firms. Although two Liberian respondents worked at non-Big four audit firms, this study did not include Swedish auditors from smaller firms. The findings may
not be transferable to Swedish non-Big four audit firms and hence further investigation is required. Moreover, it would be interesting to include more senior auditors, including senior managers, authorized public accountants, and partners, since this could result in more nuanced findings regarding how digitalization and emerging technologies impact professional judgment and decision making in auditing. Further, the empirical findings suggest that audit professionals believe that digitalization positively impacts audit quality. Hence, future research could explore the perceptions of perhaps clients, regulators, and other users of financial statements. Further investigation is also needed regarding AI, and its impact on auditing. The empirical findings indicate that the bigger Big four offices in Sweden are using more advanced technologies to deal with the more complex clients, and hence it would be interesting to focus more on the bigger cities. Lastly, more research is required on developing countries, to validate the findings of this study.
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Appendix 1: Interview guide

Warm-up Questions
1. Could you tell us about yourself? Education background, experience?
2. What is your current position and responsibilities within the organization?
3. What do you know about digitalization? How would you define it?
4. Could you give some examples of current technological trends in auditing?
5. Is big data and analytics incorporated in your auditing department? If yes, how? If no, why not?
6. Is blockchain technology incorporated in your auditing department? If yes, how? If no, why not?
7. Is Artificial intelligence (& RPA) incorporated in your auditing department? If yes, how? If no, why not?

Usefulness and implementation levels
8. How familiar and confident do you feel using these technologies?
9. Did you receive any prior training on how to use them from your former education or your workplace? If yes, in what ways?
10. Do you perceive these technologies as useful? In which contexts are they useful? Can you give some examples?
11. Are these technologies easy to use? Please elaborate.
12. Do you think that digitalization will enable auditors to test 100% of the population rather than testing a sample? What are the effects of that?

Automation
13. Do you think that digitalization has reduced the number of repetitive/many tasks in the audit process?
14. In which parts of the audit process are these technologies being implemented?
15. How are these technologies changing the audit process?
16. How could these technologies impact the auditors work, i.e., audit tests, audit procedures, sampling, control, and substantive testing, etc.?
17. Do you believe that the automation of audit tasks has impacted the audit quality? If yes, how?

Effects and quality of audits
18. Do you think that these technologies have improved the effectiveness of audits?
19. Do you believe that these technologies have the capability to improve the reliability of audited reports and the information contained in them? How?
20. Do they increase transparency? Does the implementation of these technologies benefit shareholders?
21. Would you say that it impairs or promotes professional judgment of auditors?
22. Do these technologies have the potential to help auditors to identify risk and material misstatements?

Competencies
23. What skills and level of expertise do you think are required to perform an audit today?
24. Do you think more IT specialists are required in the audit team?
25. What kind of training programs do auditors need to utilize new technology i.e., AI, Big Data, Blockchain
26. What changes do you think the academic and professional curriculum could make to prepare future auditors?
27. Do you believe that less new audit and accounting graduates will be hired by audit firms in the future?

Reflections on the future of auditing
28. Do you believe that audit firms will have a hard time to stay competitive if they don’t implement these technologies in the future?
29. What is the motivation behind the implementation of these technologies? What factors affect the implementation?
30. How do you envision digitalization’s future impact on your field? What changes will it bring?
31. What are the benefits, opportunities and risks that you think digitalization brings on auditing?
32. Do you believe that these technologies are a threat to continuous availability of jobs for auditors? If yes, how?
33. Is there anything we haven't discussed that you think is important to know?