Innovation In a Highly Regulated Industry

"Do Regulations Inhibit the Digital Transformation of the Audit Process?"

A View on the Regulation of Digital Auditing

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Executive Summary

The large audit firms have publicly announced massive investments in developing and implementing data analytics in the audit. Their investments are part of a transformation towards a digital audit. Concerns have been raised whether audit regulations such as auditing standards and the supervisory authorities may inhibit this transformation. The supervisory agencies have been quiet on these matters and have only recently started to reveal some thoughts about inspections in a highly digitalized audit environment. This uncertainty may have affected audit firms' policies and auditors' willingness to use and obtain audit evidence from data analytics. Against this background, this master thesis explores whether the regulatory environment is inhibiting innovation and a digital transformation of the audit.

The thesis addresses three layers of potential barriers in the regulatory environment for auditors. First, we examine the International Standards on Auditing and the standard-setters. Second, we examine the firms' internal policies and controls. Third, we investigate how the public supervisors, primarily the Financial Supervisory Agency of Norway (FSA), may affect the digital transformation in the firms. We collected data for our analysis through semi-structured interviews with five auditors highly involved in their firms' digital transformation, a member of the IAASB DAWG and two inspectors in the FSA. The analysis presents the perspectives of our interviewees and our discussion relates to the relevant professional literature.

Our findings indicate that the main challenge to more extensive use of audit data analytics is related to restrictive auditing standards and the need for a timely revision process of the standards. The auditing standards do not keep up with the high paced technological developments. A slow revising process of standards means that outdated requirements and procedures prevail. As a result, audit firms are innovating and investing heavily in audit technology without the full ability to apply it in their audits. However, our research indicates that the degree of investment in innovation is not affected by this barrier, but it has a negative impact on the digital transformation process of the audit. Further, we find that the audit firm's internal methodology is inhibiting innovation to the extent of the barriers created by the auditing standards which are embedded in the methodology. When looking at the last layer, FSA has up to now chosen to be passive towards a digital audit. This reflects that the use of data analytics is still considered too premature for supervisory inspections. FSA's strategy causes audit firms to become uncertain in the application of data analytics, but not to a degree where they are inhibiting the use of analytics.

Preface

This thesis is written as a final part of our master's degree in Accounting and Auditing at the Norwegian School of Economics. Our time at NHH, including inspiring exchange semesters, has been an exciting and highly rewarding journey.

The process of researching a new and emerging topic has been challenging, demanding and time-consuming. There have been times of frustration, excitement, and skepticism along the way. However, upon finalization, we have been given a unique insight in the firm's digital processes, regulatory thoughts on a digital audit and gained a deeper understanding of the challenges auditors and audit firms are facing in the years to come. Hopefully, the reader will gain the same insights upon reading it.

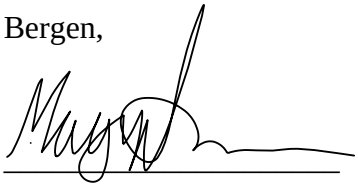
We want to take this opportunity to acknowledge the persons who deserve to be highlighted as essential pieces in this puzzle. The process from start to finish would have been much harder without the help and support from these individuals.

First, we would like to express our greatest gratitude to our supervisor Professor Aasmund Eilifsen for being supportive, available and for challenging us throughout the writing processes. Further, we would like to thank Associate Professor Finn Kinserdal for gaining us access to unpublished data and for helping us with questions before going into the interview processes.

Further, we are thankful to Professor Bill Messier and Ph.D. scholar Kyrre Kjellevold. Professor Messier for giving us valuable guidance before starting our thesis, and to Ph.D. Scholar Kjellevold for helping us to shape our methodology, planning the interview strategy and for his willingness to give us advice along the way.

Finally, we would like to thank fellow students, family, and friends for always supporting us in our choices and for showing an interest in our work. We are also grateful towards each other and have enjoyed the process of writing this thesis. In general, the NHH community deserves a massive thanks for making our time at NHH worthwhile.

Bergen, 17.12.2018



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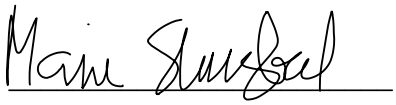

Marie Dahl Slaastad

Introduction

Innovation has been defined as *"the degree to which specific new changes are implemented in an organization"* (Mohr, 1969). There are several other definitions of innovation (Popa, Preda, & Boldea, 2010), and the overall message is that innovation introduces something new and unknown that brings value to a field of business. One of the major innovations from the audit perspective, in 2018, is seen as the implementation of digital tools[1] in the audit profession as part of the digital transformation (Deloitte, 2018).

Innovation, in general, has been a crucial driver for economic growth and development across all industries (Rosenberg, 2004). However, during the last decades, the audit profession has been in a steady technological state. Although technology has driven significant changes in the financial service industry, the audit profession has not until the last decade been focusing on the implementation of digital tools and the use of new technology (Meuldijk, 2017). Indeed, the Big 4 audit firms have expressed digital audit technology as their focus area and most significant investment for the future (ICAEW, 2018).

Even though the investments in technology and the focus on renewing the audit process through innovative techniques is on the rise, there is still significant uncertainty about how the profession will look like in the future. One challenge is to understand how the audit profession can drive innovation forward within the laws and audit standards, but also how the regulatory and oversight environment affects innovation.

The regulatory environment supervising the audit firms in Norway is the Financial Supervisory Authority (FSA) (FSA, 2018). Their primary aspiration is to promote financial stability and well-functioning markets (FSA, 2018). In addition to the FSA, the audit firms have internal quality control, aimed at aligning methodology across the organization in line with the International Standards on Auditing (ISA). These internal supervisions are considered strict and important for each auditor's reputation.

[1] Digital tools can be all digital tools implemented the last decades. However, from a 2018 perspective, digital tools are considered new ways of digitalization which does not include regular computers and easily available software, but advanced computation techniques (e.g. machine learning, AI and robotics), and advanced software (e.g. data capturing, data mining and similar techniques).

Therefore, the regulations surrounding Norwegian auditors are mainly the ISAs, which is a general framework for auditors to consider when auditing their clients. Even though this is not a law, it is used as supportive evidence both in trials and when the FSA is performing their inspection on audit processes. These standards limit and provide guidance to the auditors, and aims to reduce the risk of misstatements, either because of error or fraud (IAASB, 2009). In addition, there are laws that regulate the role and function of the auditors. There is a great deal of consistency between the laws that directly regulate the auditors and the ISAs (Brunsvig & Mestad, 2006). Therefore, our study, focus mostly on how the standards can inhibit digital transformation, and how the supervision from a regulator (in our thesis, the FSA) can affect this transformation process.

Regulations are put in place to ensure high audit quality throughout all audit firms. Audit quality has been defined in numerous ways throughout the years. However, the most widely accepted definition is that audit quality is the auditor's ability to detect and report deviations in the client's financial statements (DeAngelo, 1981). This ensures that the audit gives reasonable assurance that the financial statement is free of misstatement either as a result of error or fraud (Eilifsen, Messier, Glover, & Prawitt, 2014).

In this study, we investigate whether regulations inhibit innovations that drive the digital transformation in the audit profession. To address the role of the FSA in Norway, we perform interviews with auditors in three large audit firms, one of the members in IAASB Data Analytics Working Group (DAWG) and inspectors at the FSA. We focus on the use of Audit Data Analytics (ADA) as innovation in the audit profession. Even though advanced data analytics have existed for several years, it is recently adopted to the audit field. ADA is discussed in paragraph 2.2. Questions arise in the debate regarding the need for audit trail, documentation, and in the discussion of sufficient and appropriate audit evidence (Brown-Liburd & Vaserhelyi, 2015). We aim to explore how today's regulations limit the use of potentially new and improved technology, and how the supervisory should act on these matters. We believe this could contribute to the debate on the role of the current regulations in a digitalized audit.

Our findings indicate that there are barriers in the regulatory environment, slowing down the digital transformation. The main challenge is the timely processes before making revisions in audit standards. The process inhibits the audit standards to keep up with the high paced technological developments. Also, our data have indicated potential future barriers in the relationship between

supervisors and auditors. There is an expected future involvement from auditors, while the supervisors have chosen to stay passive to enable them to perform their work as independent inspectors. Further, our study shows that the regulatory environment has little or no effect on the willingness to invest and innovate. The results are highly interesting and provide a basis for future research.

In section two we discuss the background on innovation, digitalization of the audit firm and the transformation process in auditing. Section three present our methodology, participants in our interviews and how we align our research design with established practices. Further, section four reports the results and analyze how our findings can be tied back to our problem statement. Section five and six indicates the limitations of this study followed by further research. Finally, in section seven, we conclude on our findings in this study. Our problem statement is as followed;

“Do regulations inhibit the digital transformation of the audit process?”

A view on the regulation of digital auditing

2.0 Background and Current State of Digital Auditing

2.1 Technology Innovation

Technological innovation can be described as a process that connects knowledge and technology with the possibilities that exist in our environment to develop new or improve existing products, services, or production methods, and implies a certain risk (Trade and Service Industry's Main Organization, 2007). The implications, according to among others, a survey performed by business executives in US firms, is that technological innovation will be the major source of corporation growth and profitability in the coming decades (Ram & Sheth, 1990). Further, research (Kerr, 2015) point to innovation and the pursuit for new business opportunities as important for firms' development. In auditing, Deloitte's CEO Cathy Engelbert recently stated; "*In the next five or six years I think that the accounting and auditing profession will change more than it has in the last 30 years".* The change is driven by technological innovation which alerts to the importance of facilitating the technological transformation process.

2.1.1 Innovation and History

The introduction of the Automatic Teller Machine (ATM), online banking and bill payments on mobile phones are examples of significant technological innovations in financial services enhancing the customer experience while alleviating costs (Bean, 2018). An early innovation in the auditing environment was the International Business Machine (IBM) release in 1963 which represented a paradigm shift away from the traditional manual audit. Along with the introduction of computers which increased the computing power and security risk, were micro-based Computer-Assisted Audit Tools (CAATs) developed to facilitate automation in the audit process (Byrnes, et al., 2012).

Both the audit quality and speed in the audit process was improved due to the flexibility and the power of CAATS. The IT audit emerged in the 1970s and excel became a well-known audit tool. Although IT was introduced early in the audit environment, Curtis et al. (2008) have emphasized how technological innovation in the audit profession has lagged behind others. Protiviti's (2015) research found that only 15 percent of the auditors are IT-enabled, referring to auditors' ability to take advantage of emerging technologies in their audit. Moreover, professional organizations such as the AICPA (2012) have started discussions on how some traditional auditing approaches and techniques appear outdated in the current technological environment. Nevertheless, it is argued that

current firms experience a much faster technological shift than previous generations, causing a fundamental change in the use of new and innovative auditing procedures (American Accounting Association, 2016). Real-time audit of financial statements due to the technological ability to collect these types of data is one outcome of such innovation. According to Austin et al. (2018), the innovation represents a shift away from the traditional sample-based audit approach to 100 percent testing of populations, due to the technological innovation in processing large volumes of data. The fundamental challenge in using the large datasets, however, is often the quality of data and the process of verifying its reliability, as discussed in section 2.2.3.

2.1.2 Drivers and Barriers of Innovation

Innovation is a complex process affected by various elements. Firms must innovate to develop and stay competitive in the ever-changing environment, and the process from the idea phase to a successful implementation may be long. Hence, to understand the underlying factors of an innovation process, this section discusses different drivers and barriers of technological innovation relevant in the audit profession.

Central within the theory of technological innovation is access to capital to drive successful research and development (Thota & Munir, 2011). Accordingly, insufficient funding is a barrier to innovation. In accounting, the Big 4 audit firms have allocated significant funds in recent years to acquire and develop digital tools (Salijeni, Samsonova-Taddei, & Turley, 2018). An example is EY's reported commitment of US$400 million to develop audit technology (EY, 2014). Similarly, KPMG disclosed a commitment involving several technology companies, to allocate US$100 million to their investment for new audit technology development (KPMG, 2014).

In addition, being at the forefront of technology makes a highly skilled workforce an important factor. Talented employees are also able to develop new ideas themselves and unlock possibilities if the environment facilitates it. To stimulate talent, Deloitte's holds an annual competition challenging their audit professionals to submit their best ideas on how to innovate the audit (IIA, 2017). On the other hand, low skilled workforce or employees resistant to change may be a barrier to innovation. The focus on an IT-skilled workforce is shaping the auditing industry. For example, according to Salijeni et al. (2018), the large audit firm's build shared service centers in countries where the level of IT-expertise of the workforce is high, while the labor cost is low. Such structuring may benefit both profitability and efficiency.

Several researchers have looked at how ownership structure could be both a driver and a barrier of innovation. Ownership structure is important because it affects how a firm can assemble and direct the resource necessary for innovation. Chen et al. (2013) find supportive empirical evidence that ownership type diversity improves innovation performance. Supporting arguments are that *"it builds channels for sourcing and assembling the key resource required for innovation"* (Chen, Li, Shapiro, & Zhang, 2014). The partnership model in auditing is likely to affect the willingness to invest in and apply digital tools in the audit as future engagement partners may gain more of the benefits than the current engagement partners. For example, each partner's compensation is affected by the firm's bottom line and investing in future technology not expected to be fully implemented during their partner and engagement period, reduce their incentive to invest (Asklund, 2016). Even though the research on the implication of the ownership structure in the audit firms is limited, it may be a barrier.

The resistance from corporate management in addition to the employees also arise from numerous structural barriers, which may paralyze the desire to innovate (Ram & Sheth, 1990). In reports, (McKinsey, 2015) professionals have looked at the legislation and regulation environment and how it could be both a driver and barrier of innovation. Further, researchers present how regulation cause lower innovation efficiency. For example, Ram & Sheth (1990) argue that more regulation in an industry or company, the greater is the barrier of innovation. As the auditing profession is a highly regulated industry, this could clearly create a barrier to innovation which we will analyze further in our thesis.

As can be discussed, the audit profession is structured with variables pulling innovation in opposite directions. Access to capital and a highly skilled workforce could drive innovation, while the partnership structure, strict regulations, and lack of IT-enabled auditors could limit innovation. In the following, we discuss innovation in the audit profession and the aspired effects from emerging technologies, while moving our thesis towards the regulatory environment as a potential barrier for a technology-enabled audit.

2.1.3 Innovation in a Highly Regulated Industry

The auditing industry is a highly regulated industry, and regulations could be a challenge for innovation, as argued above. Innovation is necessary to develop, thrive, meet increased expectations from customers, and stay relevant in an ever-changing environment. As a PCAOB

board member (PCAOB, 2018) stated in her speech, a third of all financial tasks at large global companies are today performed by robots and algorithms, while the figure is expected to grow further and be 45 percent within three years. In addition, the speech emphasizes a study showing that 70 percent of all surveyed companies report the use of advanced data analytics. As the clients of the audit firms evolve in the technological field; the audit profession has to develop in the same direction to understand and audit clients' digitalized environment and meet clients' increased expectations of an analytical audit.

The audit should be within the frames of the ISAs and external legislation and regulation, further explained in the regulation section. As a result, the partners are controlled by the governmental regulatory bodies making sure that their audits are compliant with the ISAs. Steward (2010) has identified that it might impose a cost burden as they have to reallocate the investments to stay compliant. Arguments behind regulation as a barrier for innovation is that it holds back developments that do not fit with the regulatory framework within the specific field (McKinsey, 2015), instead of allowing for creativity and new ideas. Besides, the process of reviewing and renewing it takes time (Blind, 2012). Even though regulations may be a barrier, other researchers in the audit field argue how regulation contributes to creating trust in the financial statements, as the clients know how regulators supervise the audit industry (Hurtt, Brown-Liburd, Earley, & Krishnamoorthy, 2013). By providing integrity to the financial markets, it illustrates the importance of regulations even though it might bring negative challenges to the digital transformation.

The regulation challenge is discussed by Austin et al. (2018), and according to their sample of audit partner participants (n=12), 20 percent expressed that it is a challenge for innovative development. In the same study, other respondents have expressed that increased regulation would stifle innovation. However, there may be differences between the country examined in their study (U.S) and other countries with a less regulated auditing environment. Further, even though Austin et al. (2018) conclude regulations could stifle innovation, the innovative tools and techniques are diverse and may have numerous applications within the audit process.

2.2 Digital Transformation and the Audit Process

The largest accounting firms have announced big investments in data analytics in the coming years as they understand how the digitalization could affect their current firm methodology and practices. The digital transformation is happening for several reasons. First, the current business environment

has adopted technologies which generate large amounts of data. Second, the data analytics techniques are enabling data capturing, handling, and analysis, making the data more accessible than before. Third, companies are changing their business models to take advantage of the digital transformation.

The primary objective of an audit is to generate trust and confidence in the financial reporting. To meet its objective, an audit must be performed in an efficient and effective way. To secure the relevance of an audit, the audit firms should be able to respond to the rapidly changing business environment and new technologies. As a result, the audit profession is transforming into a digital audit. This audit aims to integrate data analytics, big data, and move beyond traditional auditing. The digital transformation is illustrated below.

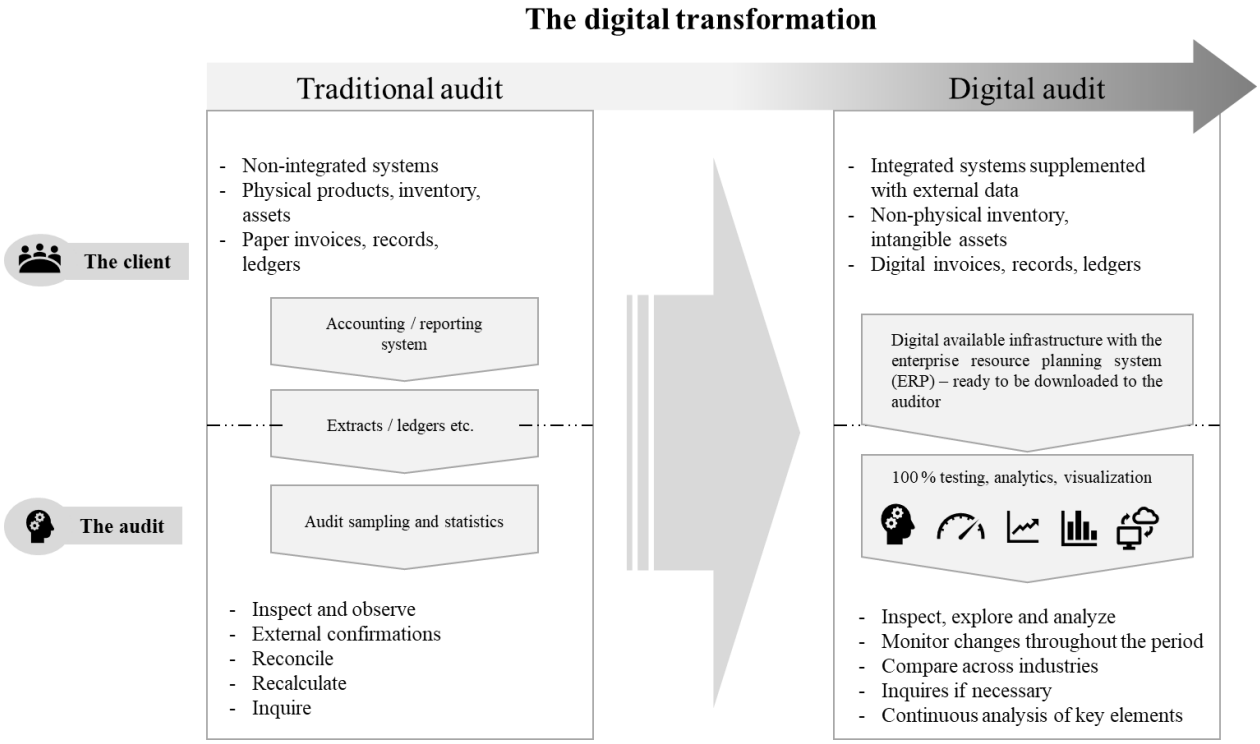

Figure 1- The digital transformation process – illustrated based on figures from the digital audit project at the Department of Accounting, Auditing and Law, NHH

The digital transformation means that the audit firms acknowledge the digital demand to ensure high-quality audits and implement data analytics in their audits. The digitalization of the audit is, according to published white papers from the largest audit firms (PwC, 2015) (KPMG, 2015) (EY, 2015) (Deloitte, 2016), enabling the auditors to keep up with the technological advancements and the rapidly changing business environment, and at the same time increase the audit quality.

Kinserdal (2017) has pointed at two main categories in the digitalization of the audit profession;

- Automation, *the way machines take over the manual work currently performed by auditors.*

- Big Data, *"high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation."* (Gartner, 2012)

In recent years, veracity is linked to the definition of Big Data because of the high uncertainty whether the data processed through Big Data analytics is accurate and trustworthy in decision-making processes (IBM, 2011).

Extending Kinserdal's presentation, we have added the ADA because it provides the connection between Big Data and auditing by providing analyses, visualization, and implementation.

- Audit Data Analytics, *"the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit."* (AICPA, 2015)

Even though the audit firms are positive about their future and expect to move beyond traditional auditing (EY, 2015), survey results conducted by Statistics Norway (2013), presents a probability for accountants to be replaced by emerging technology such as robots, artificial intelligence, and machine learning at almost 95.7 percent. Technologies are expected to replace both the cognitive and manual intensive tasks (Pajarinen et al., 2013). Hence, to stay relevant in the future, audit firms are forced to digitalize and innovate to expand their business opportunities (KPMG, 2017).

As of today, the audit firms apply a traditional audit approach, based on professional judgment and the use of simple techniques such as univariate[2] analysis for analytical procedures. Moreover, the audit is sample driven, time intensive and based on companies past performance (McKee, 2018). However, researchers and auditors expect a digital shift as more advanced audit technology comes available and developments in the global firms are more and more focused on digital auditing. For example, McKee (2018) presents the future audit as a real-time, risk-based audit with multivariate

[2] Statistical methods to describe a population, population sizes and frequency distributions

analysis, driven by machine learning, 100 percent population testing and a critical thinking approach. To date, some digital tools are introduced in the audits, primarily visualization tools. Examples are Halo in PwC, Klara in KPMG and Spotlight in Deloitte (PwC, 2018; KPMG, 2018; Deloitte, 2018).

The transformation ahead is expected to be met with several challenges. Some are among others the difficulties of documenting ADA, how audits are affected by using ADA, and whether ADA is allowed in the current regulatory environment. The regulatory challenge includes many aspects, such as the audit standards, the standard-setters, the supervisory agencies, and the audit firms' internal methodologies and policies.

2.2.1 Digital Transformation and Aspired Effects

There are several reasons for the growth of investments in digitalization of the audit process in firms. Firstly, there is a client expectation regarding digitalization. As clients apply digital tools, they expect their auditor to have the appropriate software expertise and skills to convert to a digital audit. Secondly, digital transformation is an opportunity for firms to decrease costs as digital tools may make the audit more efficient (Kinserdal, 2017). Examples are how digital tools may make the manual observation, documentation, ledger entries, etc. redundant, saving multiple labor hours. Further, larger samples are tested, which may provide a more effective audit with higher assurance that the financial statements are free of material misstatements. Moreover, the implementation of digital audit tools may make the audit planning more automated, decreasing the interim costs (ICAEW, 2018). Thirdly, Deloitte (2018) emphasize the possibility to gain deeper client insight with ADA, and how this may create added value to the client.

Next, the competence required is changing as the digitalization moves forward. Having access to IT-skilled employees is increasingly important. Mainly to understand and document the processes happening in the ADA, but also to understand and analyze the business model of highly digitalized clients (Austin et al. 2018).

It is still unclear what potential effects the digital transformation will have on the audit profession as the process is still in an early phase. Regardless, a report by the professional organization of certified public accountants in Sweden (FAR) emphasize that digitalization and automation of the accounting field are likely to bring structural changes to the whole audit profession (FAR, 2016).

FARs view is supported in the white papers issued by the largest audit firms. The publications from the largest audit firms refer to the future audit as a digitalized process incorporating much more information in their processes than today, through utilizing Big Data and analytics (Deloitte, 2016; EY, 2015; KPMG, 2015, 2017; PWC, 2018). For instance, EY (2015) refers to the transformation from a traditional to a digital audit as a "massive leap." In the potential future audit, all the white papers identify a significant value to clients, auditors and the audit quality. Mainly through increased access to data, but also through enhanced capabilities to understand the entities, their operating environment, and to detect any deviations.

2.2.2 Advanced Data Analytics for the Audit Process

Data analytics in auditing is referred to as ADA and is defined in section 2.2. The definition gives a wide scope of potential ADA and possibilities for ADA applications. Examples of ADA, given by the AICPA (2015), is trend analysis, regression analysis, and journal entry analysis. However, their examples and discussion do not cover the aspects of machine learning and artificial intelligence. These are technologies developing their own set of "minds" based on their training[3]. Sophisticated techniques, like artificial intelligence and machine learning, can replace an auditor's professional judgment. To illustrate; an algorithm could introduce massive amounts of data from different kinds of sources when performing a risk assessment, much more than the capacity of an auditor.

Since the ADA opens for a wide variety of tools, it can be applied in any phase of the audit process. AICPA (2015) identifies areas for implementation in planning, risk assessment, responding to risk assessment and when doing the last analytical procedures to form an overall conclusion.

A research project, led by Professors Finn Kinserdal, Aasmund Eilifsen and Bill Messier, on the topic "Digital Auditing" has through a questionnaire with 221 partners and managers, identified which tools and techniques currently being applied by the five largest international public accounting firms in Norway. Their unpublished data shows that a high percentage of all respondents have used ADA quite often in their audit engagements. However, this might indicate that there is a very wide understanding of what is ADA.

[3] Training is referred to as the process of testing and applying algorithms to large amount of data for the algorithms to be able to draw conclusions without assistance.

When asked to specify which type of ADA is used in audit procedures, the managers and partners respond "basic excel functionalities" (Kinserdal et al., 2018). Basic Excel functionalities is a common tool in today's technological era, rarely identified as an analytical tool. Limiting the results to ADA (general programming, Power-BI, VBA, macros, statistical packages, and different visualization tools), there are few applications of ADA such as advanced business intelligence and visualization. Hence, digital tools used in the audit are mainly advanced excel and statistical analysis.

The ADA procedures are most commonly being applied to journal entry testing, but this is not something new and innovative. All phases of the audit show the application of ADA on a smaller scale. Further, there is an especially low application of ADA in gathering evidence (Kinserdal et al., 2018). Overall, the fraction of results received from Kinserdal and his research team show that there is a consistency between the AICPA perception of possible applications of ADA in all phases of an audit, and what is being performed at the five largest international public accounting firms in Norway. ADA applied to gather audit evidence, however, is still an area of discussion (Brown-Liburd & Vaserhelyi, 2015).

2.2.3 Audit Evidence from a New Digital Space

Audit evidence is "*information used by the auditor in arriving at the conclusions on which the auditor's opinion is based. Audit evidence includes both information contained in the accounting records underlying the financial statements and other information"* (IAASB, 2009).

Audit evidence is all information used by the auditor and includes both financial and non-financial information. However, to be able to use information as audit evidence it needs to be sufficient and appropriate (IAASB, 2009). The requirements are interrelated. Sufficiency is used to measure the amount of audit evidence obtained, and appropriateness is used to measure the relevance and reliability of the audit evidence obtained by the auditor. The auditor cannot compensate with more low-quality audit evidence if the reliability and relevance of the audit evidence are absent.

Audit evidence in traditional auditing is to a large extent built on the subjective opinion of an auditor, often done through randomized selection or from potential high-risk areas. In a digital environment, it is a wider scope of information known as Big Data, defined in section 2.2. ADA enables an auditor to utilize the Big Data in an audit as input to generate audit evidence.

New sources of audit evidence are made available through technological enhancement in the digital transformation of our society (Internet of Things, data collection and data access). For example, according to estimates, it is expected that the amount of global business data doubles every 1.2 years. The production of data is expected to be 44 times greater in 2020 compared to 2009 (A.T. Kearney, 2013). Big Data could substantially increase the scope of what is used by an auditor to form an opinion on whether a company's financial statement is free of material error. Many of the possibilities in Big Data is made available through the extensive use and production of data in business processes globally, and the data generated in the world as a whole (The McKinsey Global Institute, 2011). Even though both businesses and individuals have grasped the opportunities in a Big Data-driven environment, the accounting and auditing industry have yet to take advantage of the new and enormous amounts of data, and have not incorporated the possibilities and threats created by this digital transformation in their rules and regulations (Brown-Liburd & Vasarhelyi, 2015).

If auditors were to use Big Data as audit evidence, there are some issues and risks identified by various researchers, including Brown-Liburd and Vasarhelyi (2015). One of the problems identified in their paper is the lack of transparent audit trail, which means that it will be much harder to obtain traceable documents and a way to verify the information gathered by the auditor. If possible, an auditor could pull the data and store the data s/he gathered from a Big Data source, but because of the rapid speed Big Data is evolving, changing and cumulating (The McKinsey Global Institute, 2011), it would undoubtedly cause difficulties for any other auditor to control if the data was accurate and appropriate at the time it was collected as audit evidence.

Secondly, Yoon et al. (2015) discuss Big Data's ability to be reliable and relevant as audit evidence. They argue that Big Data is reliable in many situations, such as GPS data as a tamper-resistant verification procedure, in addition to text analysis and clustering to sort out any documents with certain deviating attributes. On the other hand, they also raise questions related to the lack of data quality. They refer to social media data as potentially biased data, and that noise in data could cause an overload of false positives. Regarding the relevance consideration, the authors argue that the possibility to obtain more timely data due to the rapid data generating in Big Data environments has improved. Compared to traditional audit evidence, the risk is that even though it gives more and larger amounts of timely evidence, it gives evidence on association rather than causation.

2.3 The Regulatory Environment in Norway

Norway in general is a country with well-established regulations, a respected legal system and a low-litigation risk (Langli & Hope, 2010), also seen in the audit profession. The Norwegian Institute of Public Accountants is the professional organization for the certified auditors in Norway. As a member of the International Federation of Accountants (IFAC), members of the Norwegian Institute of Public Accountants are required to follow the ISAs and the International Code of Ethics for Professional Accountants.

The Financial Supervisory Authority of Norway (FSA) is the regulatory supervisor for all financial services, including auditing. The FSA performs inspections to ensure the correct applications of the audit standards and that all audits are conducted in accordance with The Norwegian Act on Auditing and Auditors (Auditor Act) of 1999. The big auditing firms supplement public regulations and supervision with internal quality control divisions (ISQC 1, 2009). The structure of supervisory divisions can deviate between firms. The main aspiration of internal supervision of audit engagements is to ensure that all audits are performed according to their internal methodology.

Norwegian auditors operate in a regulatory environment consisting of three main layers. The first layer is the ISAs. The ISAs is the minimum requirements for an auditor to perform in their audit engagements (Eilifsen, Messier, Glover, & Prawitt, 2014). The second layer is firm-specific self-regulations. The internal supervision divisions implement the ISAs in their firm-specific audit guidelines and often contribute with discussion notes and helpful comments (The Financial Reporting Council (FRC), 2017). These internal regulations are often a division composed of supervisors, with expertise on auditing regulations and legal frameworks. The third layer is the FSA in Norway. Their role as a governmental body oversees the audit profession and perform inspections to make sure that all audits are in accordance with the Auditing Act.

In the following, our problem statement will be divided into three research question representing each regulatory layer in the audit environment. The background of these questions is presented below.

2.3.1 Auditing Standard Frameworks

The auditing standards highly drive the conduct of the audit and function as the first layer in an auditor's regulatory environment. Different standards control how an audit engagement should be

structured and performed through dictating and coordinating the auditing activities (Knechel, 2013).

There are several aspirations for audit standards. In the ISAs, the primary ambition is to provide a general framework to apply while performing an audit. The ISAs provide minimum requirements for an auditor to comply with in their audit engagements. However, the ISAs also provide guidance in situations where an auditor must apply professional judgment or professional skepticism (Eilifsen, Messier, Glover, & Prawitt, 2014). From an audit perspective, the ISAs and other standards, in general, aim to enhance the degree of confidence of intended users in the financial statements. An audit conducted in accordance with ISAs and relevant ethical requirements enables the auditor to form an opinion on whether the financial statements are presented "*fairly, in all material respects, or give a true and fair view in accordance with the [financial] framework*" (ISA 200, 2009).

Considering the global developments in the world of business, the audit standards also function as a stabilizer for the world markets (Knechel, 2013). By allowing auditors worldwide to follow the same general requirements, the auditing standards provide a level of confidence in financial statements independent of country and local legal frameworks. At a minimum, auditing standards can assist auditors while they are planning their audits and pull them towards safe routes which maximize the likelihood of a correct conclusion (Knechel, 2013).

Research suggests that the auditing standards are essential variables to increase audit quality, but it is dependent on the level of ambiguity in the standards and how an auditor's wealth is on a stake. Ronald A. Dye (1993) found that as long as there is litigation risk that could affect the auditor's wealth, and that potential litigators are aware of this risk, auditors who tend to comply with auditing standards prefer stricter standards. Continuing these findings, Willeknes and Simunic (2007) take into consideration the vagueness or ambiguity[4] of standards. Their research shows that vague standards can increase an auditor's effort up to a point, but that too ambiguous standards will move towards a decreased level of auditor effort. The research shows interesting results because today's standard is more and more shaped towards a specific method and requirement. For example, when testing a hypothesis on small samples and performing mandatory steps in audit procedures.

[4] I.e. the "flexibility" of auditing standards and how much room a standard have for interpretation.

Stringent standards could have been a factor for auditors to determine whether digital audit tools are "allowed" in the audit, and this brings us to our first research question;

RQ1: Do the ISAs inhibit the digital transformation in the audit profession?

2.3.2 Internal Quality Controls in Audit Firms

All the five large international public accounting firms in Norway have their own firm-specific audit methodology, which is identified as the second layer in the regulatory environment. This is a framework where the objective is to deliver audits of high quality through the consistent use of thinking processes, assessments and procedures in all audits regardless of size. The internal methodology is formed to help the employees and the partners to perform their audits with a high level of consistency and quality. The Big 4's internal methodology in Norway is global and based on the ISAs with additional policies and guidelines supplemented with special Norwegian requirements, for example, the attestation of tax statements (PWC, 2018).

All audit firms have an internal quality control system aiming to make sure that the internal methodology is followed by auditors. An audit firm is obligated to establish and keep updated a quality system that enable them to have reasonable assurance that "*The firm and its personnel comply with professional standards and applicable legal and regulatory requirements, and reports issued by the firm or engagement partners are appropriate in the circumstances*" (International Auditing and Assurance Standards Board, 2009).

Audit firms are highly dependent on a good quality control system. Their position in the market is driven by firms' stakeholders and the general perception of quality in their audits (Eilifsen, Messier, Glover, & Prawitt, 2014). Further, the litigation risk is a significant factor driving audit quality. Through quality control systems, they minimize their own risk and align the audit methodology between partners and audit engagements. This reduces the risk of weak audit strategies based on each partner's subjective interpretations of the auditing standards.

How an internal quality control system is put in place, vary among the audit firms. Often it is a separate division in the firm, which oversees the quality work of each office or sometimes country. Their quality control work consists typically of both audit guidelines, interpretation of vague standards and additional procedures required to be performed in all audits. On the other hand, some

firms have a peer system, which includes having the offices perform quality control on each other and cross borders.

Considering the steps taken by audit firms to ensure a specific methodology and compliance with the audit standards, we investigate whether this inhibits the transformation towards a digital audit. As a result, our next research question is:

RQ2: Do audit firms' policy and methodology inhibit the digital transformation?

2.3.3 The Financial Supervisory Authority

The FSA function as the third layer in an auditor's regulatory environment in Norway. The main goal of the FSA is to maintain financial stability and well-functioning markets through their four main activities (1) supervision, monitoring, and control, (2) licensing, (3) regulatory development and (4) information and communication (FSA, 2014). As the audit profession provides public trust to the financial statements and function as a public watchdog for the integrity of the financial reporting, it has an essential role for investors when they make decisions as to how to allocate their capital (PCAOB, 2014).

The FSA's role as a supervisor consists of controls aimed at making sure that auditors are independent and perform their audits in accordance with laws, regulations and "good auditing practice." The latter phrase implies adherence to the ISAs and is interpreted in accordance with the development of the audit profession in general (Cordt-Hansen, Alme, & Knudsen, 2010).

All certified public auditors and can be subject to inspection by the FSA. During the inspection process, all auditors and audit firms are legally obligated to provide the FSA with all information seen as necessary for the FSA to perform their mandate.

Auditors with Public Interest Entities (PIE) are subject to a periodically quality control performed by the FSA every third year, while auditors without undertakings of general interest are subject to a quality control of their audit practice at least once every sixth year, an inspection outsourced to the Norwegian Institute of Public Accountants (DnR) (FSA, 2018).

These quality controls are independent of any other inspections or controls done by or on behalf of the FSA. In the FSA's quality controls, the primary aspiration is to make sure that the auditors meet the requirements in the EU regulatory measures, which apply to Norway as a member of the European Economic Area (EEA). The DnR makes the overall guidance on how to perform quality

controls for non-PIEs. Guidelines are communicated to the FSA, which make sure that the desired level of quality is achieved throughout the profession (FSA, 2018).

In the work of early identifying risks and challenges at audit firms supervised by the FSA, they collaborate globally through different forums on both a professional and governmental level. International Forum of Independent Audit Regulators (IFIAR) is one of them, where the FSA participates in discussions with independent audit supervisory from 52 jurisdictions in their work of improving the audit quality globally. In IFIAR, the FSA has a member in the board (FSA, 2017). IFIAR has a discovery database where all findings from the 52 different countries are gathered to provide an overview of the different problems existing, the scope, and to find a joint solution (FSA, 2017).

Regarding audit inspection and as a member of EEA, the FSA also participates as an observer and in different subgroups of the Committee of Audit Oversight Bodies (CEAOB). As a representative in CEAOB Inspection Subgroup, a working group under CEAOB, the FSA work with registering inspection findings in the audit profession in a joint European database. This database is useful as a basis for communication with standard-setters and in the supervision of the international auditing firms. Under the CEAOB Inspection Subgroup, there is "Colleges," one for each of the big auditing firms in Europe, which is an arena where the auditing firms can present their new initiatives, such as ADA (FSA, 2017). See figure 1 for an overview of the CEAOB Structure.

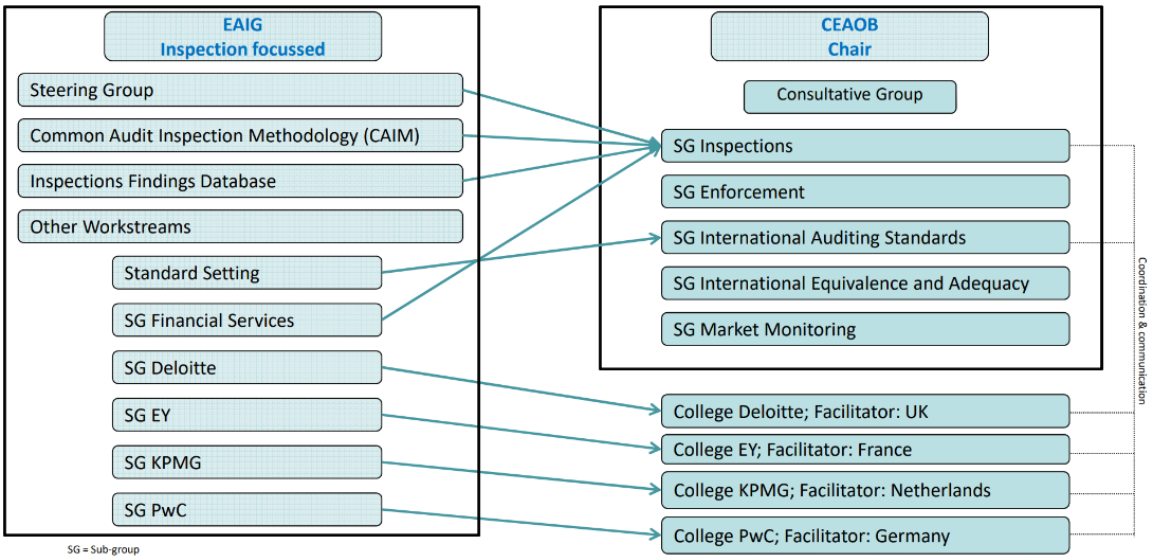

Figure 2 - CEAOB Structure (Bose, 2017)

International collaboration as CEAOB is important because it allows for sharing knowledge and upcoming developments across jurisdictions and organizations. As a result, it may provide consistent opinions between audit oversight bodies on the use of international ADA and could allow for easier implementation throughout the global audit firms. Further, international collaborations are an arena to discuss detected challenges in the audit profession.

Assessing the FSAs role and activities in the regulatory environment, it may show that they have a large influence on the audit profession. Their choices and strategies could have an impact on digital developments and transformation processes. This brings us to the final research question;

RQ3: Do the FSA inhibit the digital transformation in the audit profession?

3.0 Methodology

When choosing how to approach our thesis, we divided our problem statement into three research questions representing each regulatory layer in the audit environment. The research questions are included in the following overview of our analysis structure.

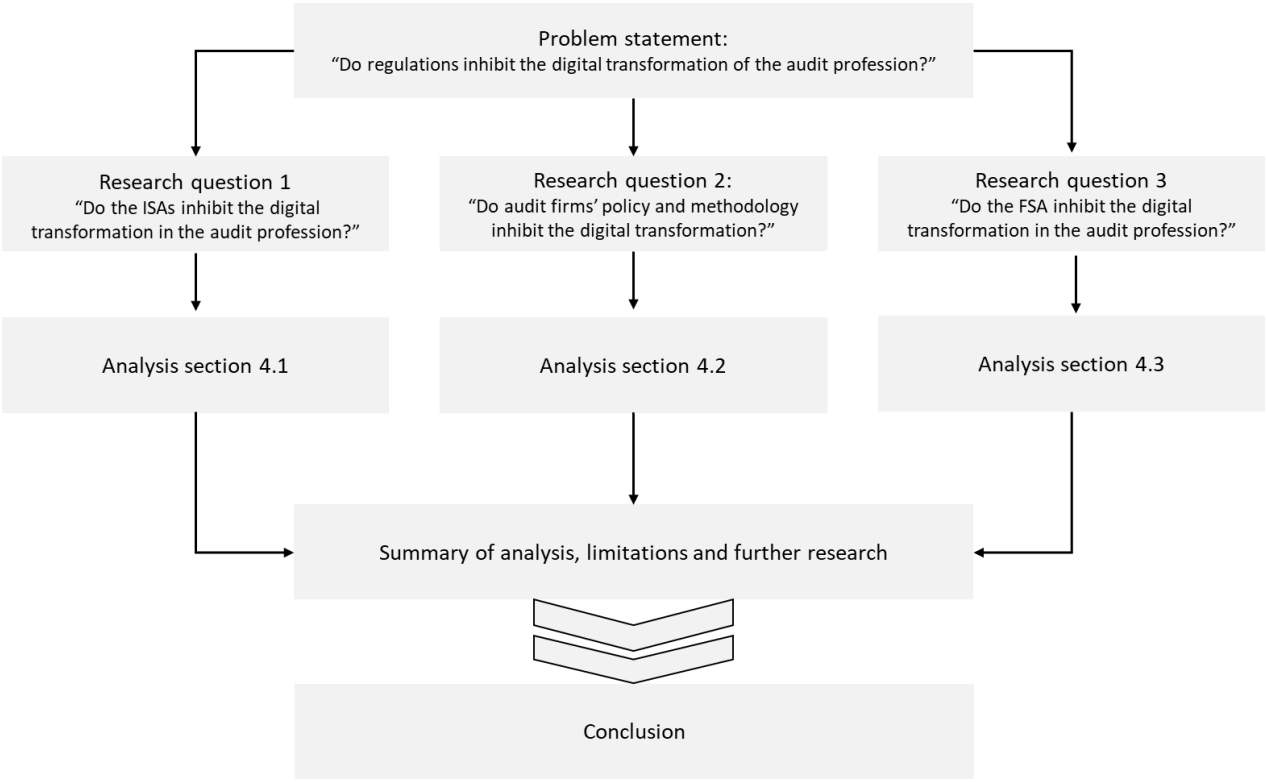

Figure 3 - Analysis structure

We assessed numerous methods for exploring our research questions but decided to use qualitative research and a field study with semi-structured interviews. The acceptance of field studies in the accounting and auditing field has evolved and become common for exploring new research questions (Power & Gendron, 2015). Thus, for our purpose, a field study is helpful for exploring a new and interesting topic in digital transformation.

When designing our methodology, we have had a significant emphasis on sound research design and the feasibility of our thesis supervisor and readers to have confidence in our findings. This has motivated us in our research design choices. As discussed in the following, we had to generate insight from a small sample of participants and relate to the lack of prior research in and the effects of regulation of digital innovation.

3.1 Qualitative Approach and Best Practice

According to the Malch and Salterio (2016), the philosophy of research describes the main ways of conducting research; deductive and inductive. The deductive research method focusses top down, while an inductive approach focusses bottom up. In our study, we have chosen an inductive path as explained in the following.

Within an inductive approach, there are two primary categories of methodology (Malsch & Salterio, 2016). First, there are what research label as a positivist approach. A positivistic approach mainly believes that there is a theory explaining a given phenomenon and that this theory still has not been challenged by a better and more correct explanation. The main aspiration for a positivistic approach is a "*discovery of the best causal explanation for phenomena*" (Malsch & Salterio, 2016). Second, there is an interpretive research approach. When following an interpretive research approach, a researcher will devote their time to analyze patterns and trends and try to interpret their result to develop an opinion about their research question. Put in other words "*the goal of the researcher, therefore, is not to capture some preexisting or ready-made world presumed to be available out there, but to understand this process of symbolic "worldmaking" ... through which the social world is ongoingly accomplished*" (Prasad & Prasad, 2002).

For our problem statement, we are looking at the regulatory environment for auditors and how this affects their digital transformation. Thus, we are conducting in-depth, semi-structured interviews to gather data on the views and experiences of the profession of how their regulatory environment has affected their digital profile. As a result, we are aiming for an interpretive approach to form an opinion of the effects arising from having a social construction involving internal and external regulations and implemented auditing standards.

3.2 Interviews

3.2.1 Sample of Participants and Total Population in the Private Sector

Our sample is large audit firms, one international regulator and the FSA. Large audit firms are often categorized as the Big 4, and they are in the forefront of the development of the audit profession through their extensive research and well-established methodology. However, in Norway, we talk about the five largest international public accounting firms, which includes BDO. As BDO has a significant role in the Norwegian auditing environment, it is included in our sample as a large audit

firm. The five firms position put them in front of the profession as "path setters" for the audit industry.

Our sample of audit firms (n=3 of N=5 organizations) consists of a mix of technical and operative partners and a senior manager. All interview objects have key roles in the development and implementation of digital tools in their firm and have a role in their firm's digital transformation. One of our participants holds a position in the IAASB Data Analytics Working Group (DAWG). Further, our sample includes the head of section for external accountants and auditors at the FSA and a chief inspector at this department. See table 1 for a complete overview of our interview participants.

TABLE 1: Interview participants

Identifier	*Role*	*Organization*	*Specialization*
P1	Partner	Company 1	Technical Audit Leader
M1	Manager	Company 1	Manager with a key role in digital development
P2	Partner	Company 2	Assc. Partner with several roles in digital developement
P3	Partner	Company 2	Key role in innovation and data analytics
L1	Partner	Company 2 / IAASB	Global Methodology Leader, member of IAASB DAWG
P4	Partner	Company 3	Key role in digital developement
R1	Director	FSA	Leader of Audit Supervision
R2	Inspector	FSA	Chief Inspector
Total:	**8**		

In total, we have interviewed eight people through seven interview sessions. All interviews were recorded, except two, and a transcript is produced by both authors and our versions were compared. Any deviations have been discussed and changed until there has been reached a consensus. For quality control, the transcript was sent to the interview participants who were given a chance to verify the transcripts and an option to elaborate more on their answers. No changes in the transcripts were requested from participants, but the FSA elaborated on their answers through a separate e-mail. For the one interview not recorded, there was also a follow-up interview and an open dialogue to secure the correct understanding of the participant's perspectives.

Access to the interview candidates was made by courtesy of Professor Aasmund Eilifsen and Professor Finn Kinserdal and their professional network.

3.2.2 Design

Our methodology is based on a qualitative method. A natural consequence of adopting a qualitative method towards our research questions is interview bias both during the interview and when analyzing the transcripts (Lillis, 1999). To limit biases, we use a semi-structured design, requiring us to develop an interview guide in advance. This minimizes the risk of bias as predetermined questions reduced the tendency of asking unplanned, non-neutral probes from the interviewer (Lillis, 1999). In addition, with the interview-guide we ensure that the questions asked are consistent across participants, making a non-biased basis of comparison in the analysis. Nevertheless, the semi-structured design allows both interviewer and respondent to engage and deviate from the questions where it feels appropriate during the interview (Austin, Carpenter, Christ, & Nielson, 2018). The guide is designed to be used flexibly and ensures the natural flow of the conversation (Lillis, 1999).

The interview guide for the audit partners consists of three sections, each covering different themes. There was a total of 19 questions. For the FSA and the IAASB DAWG, we focused the interview guide on the regulatory aspects of auditing. Both general questions and more open-ended questions were included in all our interviews. Refer to Appendix B for the complete interview guides.

3.2.3 Limitations

Interviews are an effective way to put a deeper meaning to general data and can yield data built on years of experiences from the interview objects. On the other side, there are some limitations to our research design and the interview method in general.

First, the interviewers could be affected by their firms' politics and shape their answers according to their firms' values and beliefs instead of their own. One could argue that this is avoided by giving the option of being anonymous. On the other side, the population and sample used is small and anonymity is not a guarantee for "honest" answers.

Second, the design of the interview could affect the interview results. This is often labeled as the existence of "biased questions." Therefore, we have been aware of the potential research design biases and built or questioner and interview guide as a neutral, non-leading overview of the questions. This helps to avoid pulling the interview candidate in certain directions. Further, we tried to allow for a free answer as possible but directed the interviewee back on track in the

instances where the response went outside of the scope of this study. To practice, we consulted auditors in our professional network and used that to test out interview guide up front.

Third, there is always a risk of biases when preparing and interpreting interview data, and this is labeled “moderator bias.” When interpreting the results, we have already been studying the field of interest for some time and this may have colored our views. To adjust for our potential self-bias, we both worked with the transcription and coding of data. In addition, we had a week away from the collected interview data before interpreting our result. This is important and should improve the confidence that our analysis is sufficiently independent of our previous experiences and within what is considered acceptable in an academic investigation.

Awareness of the methodology limitations is key to be able to be conscious and adjust the best possible way for any biases. Therefore, our interview questions and design follow the guidance of best practice by Lillis (1999).

3.3 Preparing and Structuring Data

Five out of seven interviews were tape-recorded and lasted from 28 to 58 minutes with an average of 46 minutes. All interviews except two were transferred to text format through manually transcribing the data. For the two not recorded, notes were written down during the interviews by both authors and then compiled to a document. Thereafter, the interviews were anonymized and identification codes for the interviews were created and stored separately in a cloud server. The interview candidate could review their interviews, and any comments would have been taken into consideration. The other interviews moved forward in their original form.

We utilized the software Nvivo, a qualitative data analysis tool, to identify trends, arguments, and expressions that gave information on our RQs; auditing standards, firm-specific methodology and the role of regulators. The coding and structuring of data were performed to summarize views, arguments, and information across the three themes and the categories assigned to those themes. This creates a basis for performing analysis, through analytical tools built into the Nvivo Software.

Some researchers have pointed at limitations in computerizing interview data (Salijeni, Samsonova-Taddei, & Turley, 2018). For example, they refer to pattern language as a bias in interview data, where the interviewees try to construct their desired reality, rather than expressing the state of their digital transformation. Salijeni et al. (2018) argue that to avoid bias, they cross-

checked interview content with professional literature. We have tried to adapt their approach, but there is a time constraint giving that our timeframe for the thesis is limited to about four months. However, referring to professional literature has been done throughout the analysis if available.

3.3.1 Matrix for Performing the Analysis

The data structuring performed in Nvivo allowed us to structure the in-data as a matrix-model. A matrix gave us the opportunity to illustrate the questions horizontally and each group (firm and their respondents) vertically. Visualization of each group and their perspective for each relevant topic/question made the analysis effective and reduce the potential of undetected information, as could be the case if we only read transcripts.

We exported the data as a matrix to excel, where we had allocated all the answers to the relevant node (subjects identified in the interviews). After exporting the data to excel, it gave us the possibility to compare all answers across the different firms and respondents. Our matrix was built as illustrated below.

MATRIX	ISAs and standard-setters			Internal regulations and firm methodology			Regulators and the FSA		
	Subject 1	Subject 2	…	Subject 1	Subject 2	….	Subject 1	Subject 2	…
Company 1 P1 M1									
Company 2 P2 P3									
Company 3 P4									
IAASB L1									
FSA R1 R2									

Figure 3 - Matrix used as a base for the analysis

4.0 Analysis

4.1 RQ1: Do the ISAs Inhibit the Digital Transformation in the Audit Profession?

To address our research questions, we asked our respondents a wide range of questions on how their innovation of the audit and use of ADA (as discussed in our theory section) are affected by today's audit standard, particularly their ability to apply new audit tools in the audit process. In addition, we asked the participants what should be improved and what could happen if their concerns were not addressed. To take in consideration that much of the dialogue between standard-setters and audit firms happen on a global level, we also asked the same questions to our respondent who is a member of IAASB DAWG and holds a leading global position in one of the Big 4 audit firms. The perspective from our respondents in the audit firms gave valuable insight and evidence on how regulations affect the digital transformation in the firms and raised concerns whether the regulatory environment manages to take into consideration the digital shift.

4.1.1 The Current State of the ISAs

Some of the professional literature (IAASB DAWG, 2016) claims that the auditing standards were created in a different technological era, and as a result, there is an ongoing debate on whether they support an audit in a highly digitalized environment. An example is how the reference to CAATs in different ISAs is technologically outdated. The IAASB DAWG, researchers (McKee, 2018) and auditors emphasize that CAATs has evolved significantly since the ISAs was published and must be interpreted according to the technology available at the time it was written.

Throughout our interview, all of the auditors shared similar thoughts on the ISAs. In general, there is a consensus that the ISAs has fallen behind the digital developments and will struggle to keep up with further advancements. For example, two partners stated:

> *"The standards have fallen behind. They are not fitted* [to enable the use of ADA]. *I have seen developments* [from the innovation and enablement department*] which is really good, but then it does not fit* [within the ISAs]*" (P1)*

> *"I believe that* [in the future] *if the use of artificial intelligence replaces our thoughts and assessments we will be outside the framework* [the ISAs]*" (P3)*

They view them as stuck in a pre-digital era. Our data indicate that the standards create uncertainty. As a result, auditors struggle to decide which audit procedures that could be renewed through new ways of implementing them in ADA procedures. P3 explains:

> *"One of our challenges is that the use of data analytics provides good insight in different problem statements and increase the efficiency on audit engagements. But even though our impression is that these analytical procedures are safe, there are certain traditional audit procedures that we feel cannot be replaced* [according to the interpretation of the ISAs]. *And then the main question is which of the procedures performed earlier in the audit that can be abstained without the audit plan moving outside the* [audit] *standards. This is a challenge."*

When discussing the standard-setting in general, the common view is that the revision process for auditing standards is too slow. Some revisions take several years. Similar, the pace of the digital developments expected to be implemented in those standards increase exponentially. The standard-setters are, however, asked to be cautionary when considering revisions in the audit standards. In the professional literature, especially consultation responses, stakeholders emphasized the importance of not rushing to conclusions. The IAASB DAWG (2016) expresses concerns on the potential stagnation of the digital audit if revisions are made prior to understanding the full implications of a digital audit. Given the pace of the technological innovations, there is uncertainty on how the future digital audit will be developed. The challenge of balancing advancements in technology and incorporating the ADA possibilities in the audit standards today is identified as a primary challenge in a digital audit environment.

In our interviews, there are three ISAs mentioned as problematic for implementing todays ADA possibilities. Many of our respondents (n=4 out of 5 auditors) elaborates on ISA 501[5] and ISA 530[6], and point to some critical changes needed in ISA 315[7]. Our respondents argue that these ISAs objectives are more efficiently performed with ADA, than with traditional audit procedures. Specific examples are discussed in section 4.1.3.

[5] ISA 501 – Audit Evidence: Specific Considerations for Selected Items
[6] ISA 530 – Audit Sampling
[7] ISA 315 – Identifying and Assessing the Risks of Material Misstatement Through Understanding the Entity and Its Environment

Beside those, one of the most senior partners in our sample present compelling arguments on the general auditing principles in the ISAs. P1 states:

> *"It is a challenge with them* [audit standards]. *They say* [the ISAs] *they are principle-based, but there are few other standards which have many detailed requirements. They require that an auditor have to do 'this' and in any case 'that,' but except from those requirements it is the principle that counts."*

The partner argues that the objectives of the ISAs are to be principle-based, but the way the ISAs are constructed, interpreted and applied in the audits, they are in fact rule-based. Rule-based audit standards are the case when audit standards, in general, are a list of detailed rules that must be followed when performing an audit. Examples are mandatory procedures such as specific methods for audit sampling.

4.1.2 The Potential to Implement ADA in the ISAs

In the current technological environment, the auditor could include non-financial variables, financial information across industries and use data from sources not available in the past. Possibilities form emerging sources such as social media, and the Internet of Things are not explicitly included in audit standards today.

According to Austin et al. (2018), 20 percent of all participants (N=32), and 46 percent of the audit partner participants (n=12) indicates that the current state of regulations might inhibit the use of data analytics necessary for a digital transformation. Their participants responded that it is the lack of standards preventing them from integrating analytics in the audit, as the auditors are used to have standards for benchmarking their work and strategies. As a result, there may be insecurity whether chosen ADA are accepted as audit evidence when not explicitly regulated through or in an audit standard.

As presented in our background section, the IAASB has come forward through its DAWG, stating that the willingness to apply digital audit tools in the audit is present and is supported by standard-setters and regulators. The PCAOB indirectly back this claim. They are publicly expressing their optimism towards more data-driven decisions in auditing and is prioritizing to investigate the potential benefits technologies might have on audits (Harris, 2016). The optimism is, however, not supported in interviews with partners and managers, coherent with Austin et al. (2018).

Austin et al. (2018) quote one of their respondents stating that there may be a fear of being punished for applying data analytics when it does not tie back to the standards. This is somewhat confirmed by L1. S/he argues that the insecurity on whether you can apply ADA is causing auditors to "double" audit. This evolves when a partner instructs the audit team to use ADA as a supportive procedure, rather than replacing existing audit procedures which makes the audit less efficient. Further, the FSA stated in our interview that an auditor is not supposed to take any risk in violating the standards. Their statement provides evidence for the expressed fear of being punished given that there are no standards to tie ADA back to. In addition, it indicates the need for more guidance to reduce the auditor's perceived risk when applying ADA. Little guidance and the lack of digitally enabled audit standards are identified as a reason for the low usage of ADA.

Since the feedback given to standard-setters advised revisions in ISA 240, ISA 315, ISA 320, ISA 330, ISA 500, ISA 501, ISA 520, ISA 530, there have been started a process to discuss potential revisions in the standards (IAASB DAWG, 2016). The objective is to make the ISAs better fit in with the emerging technologies. L1 argues that even though a process has been initiated, the technology moves too fast, making it impossible for the standard-setters to keep up:

> *"When the technology is evolving so quickly at the moment, a three-year process of changing the audit standard is not helpful."* (Notes are written down during the interview)

The potential situation is that standard-setters conclude on a specific topic, but before the revisions of audit standards are fully implemented, the technology is advanced further because of the long and timely process. Alternatively, participants in the study by Austin et al. (2018) argue that it should be a new standard focusing on the correct implementation of ADA, rather than revising existing standards. Either way, IAASB DAWG emphasize the importance of being careful when considering changes in audit standards because the conclusion might unintentionally constrain further developments in a digital audit.

A solution to this, presented by L1 as his/her personal view, could be that IAASB starts to issue practice notes or guidance notes on emerging topics without necessarily go through the whole process of revising or creating a new audit standard. This reduces the risk of commencing a process and concluding when the technology is still evolving. Further, they could ask for feedback on these notes, and eventually, it will come to a point where 'everyone' is comfortable with it. These notes could be the basis for changes in the audit standards, resulting in a more efficient revision process.

P4 argues that without any digital audit standard or guidance, it is hard to know what they should do and where to focus their development. As of today, they have a pipeline of new tools that can be applied throughout the audit process and is currently being tested. On the other hand, the partner also points out that they manage to use their audit technology within the audit standards today:

> "*We manage to maneuver* [within the auditing standards] *today*. *The principles* [in the audit standards] *are fair enough*. *The challenge is the requirement that the auditor, the one who signs the paper, must have complete control of everything, and how should that be interpreted? It is a possibility that there is a system that takes care of that control on your behalf"*.

The partner goes on, arguing that there are too many redundant requirements in the audit standards. The insight is interesting. On one side the ISAs have general principles coherent with the aspiration for new and improved ADA. On another side, the ISAs also include mandatory procedures and specific steps. This forces an auditor to perform traditional audit procedures rather than performing procedures assisted by digital tools with the potential of improving audit quality. This is confirmed by P3:

> *"We want all of our partners to use the tools [ADA] as we believe it would improve the audit quality."*

P4 further present this view with examples. The ADA they have available can verify that internal control has worked on all transactions with no deviations. The primary source of frustration is that their ADA are in compliance with the objective of an audit, but there is no standard to tie our procedures back to. This inhibits them from using it further in the audit, even though it may provide higher audit quality. The partner argues:

> "*…if there are no deviations; then the control has worked every time. And then I think that the discussion is meaningless because you can not say that it is a test of controls, even though you have verified that the internal control worked on every single transaction. And you can, based on that, state that no one has tampered with that configuration in the system, therefore, the control have worked every time(…), but you do not manage to tie it back to the standard."*

The statements indicate that the requirements in the standards demand steps that can be done in bundles, and at the same time provide the auditor with much more extensive validation than ordinary audit procedures. This is supported by the fact that the ISAs does not directly forbid the use of ADA, nor stimulate it (IAASB DAWG, 2016), and therefore the auditors interpretation of the ISAs makes it a supportive audit tool in addition to the mandatory audit procedures. When ADA is not recognized as an audit procedure, it holds back the digital transformation.

The analysis above is supported by P3, who argues that the main problem they face today is identifying which audit procedures that can be dropped and replaced by their ADA, without having to change the ISAs.

Our respondents are all managing to maneuver their ADA within the audit standards for now, but many of them point to challenges on a global level, given that this is the level for discussions regarding innovation and development. One of our partners follows up with a concrete example.

P4 refers to a global project that has been stopped due to the restrictions in using pre-determined criteria in risk assessment procedures. S/he argues that this is an example where standards inhibit innovation and reduce the availability to apply ADA. As explained, the digital audit has an objective to automate a substantial part of an audit. Automation expresses a need for determining a given pattern to be performed automatically in a given order, decided by a set of criteria or variables. An action is selected by the results of those variables, but the activities chosen to a given output is predetermined or based on previous action / patterns that a model has been trained on. Restricting the use of technology in this setting also limit further developments where machine learning and artificial intelligence is expected to have a much more active role in any given industry in the upcoming years. Again, it is the mandatory requirement where the auditor must evaluate the risk and risk factors of the client before planning the audit, which is inhibiting potential automation of ISA 315.

A more general view on the ISAs and the reason why they might inhibit the use of ADA in an audit is provided by P1. S/he argues that the ISAs are supposed to be based on general audit principles. However, over the years, the principles have been more and more controlled by rules and requirements. The partner agrees on this observation, arguing that we have rule-based principles, which could inhibit the development of the digital audit.

Considering the argument proposed by P4 that the principles themselves are okay, but that some mandatory steps might become redundant, align well with the general view on a rule-based principle in the ISAs, presented above. If it is the requirements within the standards that are the problem, less requirement and more principles could allow the auditors to apply their professional judgment on when ADA is beneficial to audit quality.

The combined views made throughout the interviews indicate that there are similar frustrations across firms and auditors. In the professional literature, there is further evidence supporting these indications. For example, KPMG went publicly, stating that their technology could perform 80 percent of an audit, but argues that the challenge is whether the processes are within the audit standards available today (Asklund, 2017).

Summarizing our findings in existing research, professional literature and our data from the interviews, there is evidence that the audit standard principles do not inhibit the use of data analytics today. However, the structure of an ISA, with specific requirements and mandatory steps are making the implementation of ADA in an audit less efficient. As a result, the digital audit is merely used as supportive evidence, rather than replacing the traditional audit procedures. The effect is auditors doing "double" audits.

In the future, on the other hand, these restrictions could potentially neglect the incorporation of emerging technologies such as artificial intelligence and machine learning. Given the indication in our data, any technology with the ability to predetermine audit actions based on an analysis of the company would be inhibited by the audit standards. Further, there is a consensus on the need for revising the audit standards, but as discussed below, there are contradictory arguments on how these changes should be done. A timely revision process cause outdated parts of the ISAs to prevail.

4.1.3 Different Views on the Potential for Revisions in the ISAs

As mentioned above, the perspective of the IAASB DAWG (2016) is that there are several risks when changing the audit standards. The risk of a prematurely commencement on standard-setting activities is argued to cause a possible stagnation of further developments. What they mean by "commencement" is uncertain, but it is expected to refer to the context of a clearly defining a standpoint in audit standards, driven by the standards setters. We interpret their statements as a desired flexibility in the audit standards until the digital audit technology is more mature. Flexible standards would allow for more professional judgment and be interpreted in accordance with the

technological advancements. As a result, an auditor is expected to apply his/her professional judgments when introducing new ADA.

Increased flexibility in a standard allocates more responsibility towards the FSA. They **s**tate that this provides them with more room for interpreting which will set the bar for what inspectors see as an acceptable audit practice**.** Therefore, our impression is that the FSA prefer clearer guidelines through a rule-based approach, to increase the auditors understanding of what is allowed in an audit. Overall, this will increase the transparency in the audit profession because it is easier to understand the results of an inspection.

The rule-based approach is by L1 (personal view, not in association with IAASB) seen as problematic. S/he argues that the problem with a rule-based approach is that if something happens which is not within the rules, it will stop. Therefore, for it to work, there must be rules for everything. Considering the rapidly changing business environment, this is impossible to achieve. S/he continues saying that it all comes down to a difficult tension between the inspectors' and the auditors'; who's job are we trying to make easier? Is it the inspectors' job, or is it the auditors' job? His/her argument is that eventually, it all comes down to the objective of the audit; making sure that the financial statements are correct. Further, s/he says that an auditor needs to focus on achieving the objective of the audit rather than making the inspector's job easier.

Our respondents did not elaborate on how the standards should be changed to make ADA more available in an audit. Instead, they pointed to specific examples where the standard has fallen behind. They all refer to the requirement for an auditor to be physically present to validate the existence of an inventory in ISA 501. There are many technologies causing this requirement to be redundant. One example is Radio Frequency Identification technology allows timely tracking of inventory. Another is robots taking control of the warehouse where the inventory is in locked enclosures, only accessible to the robots. This is done at the Komplett Group in Norway and Amazon in the US, whom both use fully automated warehouses for inventory and logistics. A third example is the use of drones to observe the inventory and confirm its existence or check if certain assets are located at the right place and within the auditee.

Another ISA being mentioned by our respondents, and currently in the progress of being revised, is ISA 315. One of the objectives with changing the standard is to deal with the "*rapidly changing business and audit environment (technology)"* (IFA, 2018). Several of the hearing responses to the

exposure draft for the revised ISA 315 gives supportive arguments for the view of IAASB. Supportive arguments are a need to further focus on "*whether the standard will remain fit for purpose, given the pace of technological change*" (PwC, 2018). The support for including a view on technology is heavily visible throughout several of the hearing responses from the largest audit firms. For instance, BDO states in their reply that the explicit reference to the use of ADA is "*moving the ISAs away from the current position of not expressly prohibiting the use of technologies while also not promoting them either"* (BDO International Limited, 2018), which has been a source of frustration throughout our interviews. Further, BDO (2018) indirectly support the IAASB DAWGs arguments on not rushing to a conclusion by stating:

> *"The way in which these examples* [ISA 315; A33, A48, A175] *have been presented also does not appear to restrict future innovation as technologies continue to develop and auditors identify additional steps that can be undertaken using other (automated) tools and techniques, including tools for the assessment of soft controls for example."*

Coherent with our interviews, it is a request for more guidance and support when the ADA reach its future potential. The revisions proposed in the exposure draft for ISA 315 is vague statements regarding data analytics and is opposite from the desired design presented by the FSA. Even though the FSA is not clearly expressing their opinion through the interviews, their views represent something different than what seems to be the consensus in the audit profession in general. If this results in the FSA being stuck in their current track, it could potentially cause difficulties for international implementation processes in the international firms. As a result, the Norwegian audit environment could fall behind in the digital space.

ISA 530 was mentioned by all our respondents. P1 commented:

> *"I believe that ISA 530 will be less relevant* [in the future] *because you would not do audit sampling anymore, you test everything* [100 percent], *and you will receive it electronically. The reasons to test the nature and timing of misstatements is due to the assessment of the consequences of the omitted part of the population. But if everything is tested, then you will have* [without the need for further calculations] *the total rate of deviation and the monetary misstatement."*

ADA will allow auditors to evaluate the entire population at the same cost. Today, ISA 530 requires an auditor to form a hypothesis and test them with the use of statistics. The need to form a hypothesis is not necessary when testing full populations because the auditor can evaluate the results ex-post and have the complete overview of any deviations.

However, an overview of all deviations in a population could result in an impractical number of outliers, that an auditor must document and evaluate. Therefore, the question arises whether the audit standard needs a different outlier approach if introducing these possibilities with ADA or create a new audit standard with a new set of requirements. A proposed solution (Vasarhelyi, 2018) is to apply a Multidimensional Audit Data Selection (MADS) model with a set of prioritized criteria's for modeling an approach to testing samples from the outliers. By using this framework, the intention is to guide auditors to select the sample associated with the biggest risk and use this for a substantive test of details. A more risk-based audit with ADA providing an auditor with more information is coherent with the predictions made by Tom McKee, as pointed out in our background section. A more detailed discussion is out of scope for our thesis but shows important developments and should be evaluated further.

4.1.4 ISAs Effects on Investment in Innovation

As elaborated on in our background section, innovation is a complex process affected by many elements. One of the drivers of innovation is capital access. Access to capital enabled investments in technology, providing an audit firm with the possibility to develop and implement ADA in their audit engagements. To the contrary, regulation is assumed in the literature to inhibit innovation. Both variables are highly present in the audit environment. Capital secure investments and the Big 4 have committed themselves to be at the forefront of development. While the professional literature might suggest that the ISAs inhibit transformation, DAWG (2016) comment it in a more neutral form, they state that the ISAs do not prohibit the use of data analytics, but neither do they stimulate the use of it. While professional bodies such as IAASB and Charted Professional Accountants Canada (CPA) are engaged in public discussions with auditors on the topic of revising the audit standards, the outcome is yet to be determined. Some changes have been proposed such as implementing ADA in the risk assessment process and to enable auditors to understand complex estimates.

The fact that all audits are regulated through compliance with audit standards implies that innovation in the audit field must be done in accordance with the standards if the aspiration is to implement the innovation in an audit engagement. Hence, it can be argued that a slow technological adaption by standard-setters can be a constraint on the willingness to invest. As a result, it reduces the ability to develop digital tools as part of a digital transformation. However, our respondents report otherwise. P3 states:

> *"I do not believe that the* [audit] *standards have that much to say regarding our willingness to innovate and how we will invest in the future. Factors that are more important is market expectations and rapid technological development. In addition, when our clients become more digital; it makes us more IT-focused as it is important to understand the* [new] *systems and gain the advantage of* [clients processes] *things being automated."*

Thus, it can be argued that the aforementioned hypothesis about standards causing reduced investment in innovation is incorrect. When asking about the motivation behind innovation, P4 provides compelling arguments. As an example, s/he elaborates on the importance of being up to date with the investments in innovation to make sure that the Big 4 firms are competitive. With that, the partner argues that they need to be up to date to inhibit audit tech start-ups establishing a (hypothetical) "AI Audit" and gain substantial market shares. The response is interesting for several reasons. It provides a basis for us to argue that there is evidence suggesting that the main driver for investing in innovation is to stay relevant in a rapidly changing audit environment, meet client expectations, and to create barriers for entry in the market. Client and market expectations could be key aspects to why audit firms might over-communicate their commitment to the digital advancements.

Our data indicate that the external drivers for investing in innovation are stronger than the internal regulatory barrier. The investments in innovation are mainly driven by the need to stay relevant and to increase their legitimacy to clients and the public in general. The fact that they are not sure whether the different regulations accept the use of new technology does not inhibit their willingness to invest in innovation. This assumption is supported in FRC's comment to DAWGs report (2016). The report presents the level of investments in digital tools and technology as an argument for the standard-setters to envisage the possibility to implement data analytics in the ISAs. FRC's comment indicates the investment level among audit firms as important for creating pressure to

adopt new technology in the audit standards. An approach that according to our data, might be compliant with the view presented by the FSA, arguing that a regulatory involvement always will come in retrospect.

In sum, there are no indications in our interviews that the regulatory environment inhibits the audit firms' willingness to invest and innovate. Our findings suggest that the audit firms are staying relevant in the business environment by investing in innovation.

4.2 RQ2: Do Audit Firms' Policy and Methodology Inhibit the Digital Transformation?

We have investigated whether the internal methodology in the largest audit firms might inhibit the digital transformation. This was done by exploring innovation and implementation of digital audit tools. The implementation in audit engagement and the use of ADA is a large part of the digital transformation process, parallel with finding where in the audit it can be implemented most efficiently.

Our findings suggest that digital auditing tools are not implemented in today's methodology in any of the firms in this study. Instead, we discover that the use of ADA and new technology is encouraged through communication within the organization both globally and regionally. Globally, the tactic has been to use "the carrot and the stick," to create incentives for auditors to allow the use of ADA in an audit engagement. Our findings suggest that it is still up to the auditors (the partners) whether they want to implement technological advancement in their audits. Further, the methodology is closely related to the ISA and will be changed parallel to the developments in the audit standards.

4.2.1 The Availability and Willingness to Apply Digital Tools in Audit Engagements

All of the five large international public accounting firms in Norway report a list of their developed technology in the transparency reports. Their reason behind the investment is to continuously increase the audit quality and improve the opportunity to give valuable insight to their clients.

As audit firms are organized through the partnership model, as mentioned in section 2.1.2, much of the digital use is voluntary. The willingness to use digital tools in an audit is depended on each individual partners' knowledge and willingness, a view supported in our interview with the IAASB

DAWG member, L1. To implement more ADA in the audit, s/he explains the use of "the carrot and the stick".

Behind 'the carrot' it is the enticement of ADA improving audit quality, that it increases the efficiency which makes the job more rewarding, and the fact that use of technology makes the work more interesting. On 'the stick' side, s/he explains that they monitor each partner use and require a certain number of engagements where data analytics is applied. However, L1 state that it is the partner who is responsible for the audit strategy in their audit engagements. Hence, it is important to allow each partner to make their own strategic decisions. Otherwise, it is against the requirements in the standards and thereby the internal methodology.

Further, s/he explain how the audit firms work to embed ADA into the internal methodology. This can be seen as a way to increase the availability and further the use of technological techniques in the audit. This might increase the willingness to apply ADA, as the implementation in the methodology is an acceptance of the practice. The reason is that a change in the methodology is expected to be within the area of approved audit procedures and are supposed to guide the auditor to a low-risk and effective audit strategy.

From another perspective, P1 explains that their auditors are encouraged to apply ADA and focus on clear communication within the firm in combination with requirements. Indeed, each partner is required to use ADA on 10 percent of his/her audit engagements.

P3 support this view:

> *"Our ambition is that most audit partners use the new tools developed, as our understanding is that it creates a better audit quality. Many points at the efficiency gains, what our clients find important and so on, but we will never compromise on audit quality as this is most important for us. But when our impression is that we have a tool which gives you a better understanding of the risk and enables you to handle it more quickly, of course, we want them to use it. But every partner decides themselves and have the ability to say that they would not use digital tools on the engagement. This is clear as our internal methodology does not force the use.*
>
> *However, if the partners make use of digital tools, we emphasize the importance of understanding the risk associated with it. Such risk often requires additional audit*

procedures to ensure that we are within the internal methodology. When that it said, we want to increase the use as we believe it improves the overall audit quality."

P4 also comments on the desire to apply ADA through an example:

"I have people in my department now building models themselves. So, the opportunity is present, but you must know what the algorithm does and explain it to the responsible partner. Then, the partner has to understand it and be able to document the attributes."

From our understanding, the availability to implement digital tools is present if it is within regulations, rules, and standards, even though the methodology does not mention it explicitly. Compiling the responses above, it shows that the user is supported within the audit firm, and in many cases, measured and monitored to ensure the application of ADA. The openness and willingness to develop digital tools is consistent throughout the responses from the audit partners.

The data suggest that the internal methodology is not stricter on the use of ADA than the audit standards. Continuing, it indicates that the willingness to bypass the audit standards is a risk that no firm would allow, and if it happened, the audit partner is responsible.

4.2.2 The Implementation Process of ADA in Internal Methodology

We asked our respondents questions about the implementation process and how changes occur and affect their audits. The first factor is whether the changes in methodology is done on a national or global level. According to P2 and P3, the changes happen on a global level. For instance, they say:

"If the [audit] standards would change, then our "implementation and enablement" in the USA rapidly turn around and investigate what this would mean for our methodology (…) we have a continued focus on what we can do different and better, but it is always supposed to be within the [audit] standards, but I think that is something that follows uptight"(P2).

From the response, we can extract the demand for an efficient audit, but also that the audit standards work as a constraint on what their "implementation and enablement" team can change in the internal methodology. It also shows that it happens on a global level. The main challenge in a global implementation process is the differences between the audit environment across countries. P3 explains:

> *"It takes, in such a system, time to get approval for the solutions we propose. The biggest difference is that the Nordic have many smaller clients than what is the case on a global level.* [For example] *We have persons* [auditors] *that work in London that might only work with two clients. While in Norway, Sweden, and other Nordic countries, we have more clients, and we are interested in how we can apply data analytics to audit those small companies, etc."*

The response indicates that the objectives of the implementation process are to some extent different between countries. The size concern is also mentioned by P4. Even though the main objective is to provide a more efficient audit with higher audit quality, our data indicate that the desired changes in the methodology may deviate from one country to another. To address this, P3 explains how they propose changes dependent on their client portfolio:

> *"It is our job to build a business case so that we can get approval from the top. And that approval is to avoid that we develop tools locally that makes us take the* [seriousness] *of the engagement to easy* [because] *we shall still audit coherent with the audit standards, laws and regulations."*

Compiling the views of our respondents shows that the time it takes to develop new tools or make changes in the internal methodology is lengthened by the time it takes for the local branches of a global entity to implement those changes. This is because they need to test, create and document the results of their business cases. P3 estimate the time between 1.5 and 2 years to develop new tools, while M1 argues that it is dependent on the changes, but that larger implementation process and use of new tools can take "several years" and use an example of a process that has to date has spent 2-3 years in developing and testing on local clients. However, it is reasonable to assume that the largest firms manage to perform testing parallel to the development and changes in audit standards. The fact that P3 state that they have continually processes of improving and testing, back this claim. At the same time, internal processes for testing and adjusting to changes in audit standards might cause a lengthening in the time of a digital transformation.

Summarizing all sections, professional literature and our interview data indicate that the firm's digital transformation is in retrospect of the changes in the audit standards. The methodology is closely related to the ISAs, and do not represent an inhabitation further than the extent of their adoption of the ISAs.

4.3 RQ3: Do the FSA Inhibit the Digital Transformation in the Audit Profession?

The regulatory agencies have for a long time been silent on the matters of digital auditing. Even though no research has been done in the audit literature to back this claim, we have performed literature research on the public letters, journals and meeting notes at PCAOB, IAASB and the FSA. Through our analysis, we have identified general comments on the developments in digital auditing and the value of data. Any specific recommendations or publicly announced opinions is not raised by either of the mentioned organizations.

We have connected our interview data with the professional literature, the background of a digital audit, and the regulatory environment. The first section discusses the role of the FSA. However, we had many high-level discussions with the participants concerning the regulatory bodies. As a result, we discussed to some extent the FRC, PCAOB, and IAASB. The second section discusses the potential challenges identified on a national and global level.

4.3.1 The FSA's Role in a Digital Transformation

According to the FSA, their mandate is to perform inspections and controls of the auditors and their audit. The FSA's objective is to make sure the auditors are independent in all their audit engagement and perform their audits according to laws and "good auditing practice" (FSA, 2018).

Hansen et al., (2010) argue that the latter phrase represents an auditor's independence and a responsibility to align their work with the ISAs. However, the introduction and mandate description in inspection reports sent from the FSA do not communicate their responsibility to evaluate whether an audit firm is performing their audit according to the ISAs. The reasoning behind this is clearly stated by R1:

> "*I think that we can, to a large extent, say that the* [legal standard] *good auditing practice is the international standards on auditing… but we manage the* [legal standard] *good auditing practice… and could say that good auditing practice is achieved even though the standards say something else."*

The statement aligns the view of the FSA with the view of Hansen et al. (2010) and shows the FSAs ability to safeguard and control the interpretation of the legal standard. However, this also indicated that the FSA easily could have made interpretations of the ISAs, shaping good auditing practice in the view of today's technological era. This could either be done through thematic

reviews, as general comments on the developments in auditing, or as guidance notes. Their involvement would not be a process of regulating the use of ADA but taking a role in securing the progress toward a digital audit. However, the FSA see it differently. R1 argues:

> "*We cannot say that this* [an implementation of ADA] *is ok, and then we notice through an inspection that the audit is of poor quality, and they would say "but you said that…", that does not work. That responsibility must the auditors take themselves.*"

Continuing, s/he states that the audit firms have the possibility to demonstrate suggestions and developments, but that there would never be any approval of ADA prior to inspection. On the other hand, s/he argues that the FSA would raise an opinion if there is something clearly wrong with the solution presented to them, but it would be limited to issues to consider and clarifications in an informal setting.

The FSA performs their mandate through an ex-post approach. An ex-post approach refers to evaluating the results of an audit after it has been executed. Their approach has been questioned by our respondents, and there are strong indications in our interviews that the FSA should reconsider their role in the digital shift, and how they participate in the ongoing debate on digital auditing.

P1 describes the role of the FSA in the digital transformation for the audit profession as shaped by their fear of being:

> "…*captured by their own statements* [in case of an inspection]."

P1 further elaborates on the FSA's difficulties if they try to function as both a rule-setter and a controller, putting them in a position where they might measure themselves. On the other hand, s/he argues that there are other governmental agencies worldwide that have managed to balance those roles. P1 explains:

> "*They* [the FSA] *are clear on the fact that they cannot create rules and be the controller. However, there are others* [governmental agencies] *that manage to do both (*…) *I think that the supervision agency in the UK* [The Financial Reporting Council, UK] *is much more proactive than our agency* [The FSA] (…) *They are engaged in standard-setting, and Marek Grabowski [*Director of Audit Policy at the FRC*] is a member of the IAASB. The FSA never give any hearings before a translation* [of the audit standards] *is available, and they will not take any responsibility for the ISAs in Norway, even though the EU expect that*

> *they* [The FSA], *according to the EU-directive* [2006/43/EF and 2014/56/EU], *take that responsibility…There is probably an attitude* [at the FSA] *that they are responsible and if it is a responsible process another place* [i.e., a professional private agency], *then that is enough."*

P1's insights are particularly detailed given his/her extensive experience in both operative and technical positions in several large audit firms. When building on his/her insight, we investigate the communication between the FSA and the largest audit firms on the topic of "digital auditing." We find little or no communication between the audit firms and the FSA involving digital auditing. However, one audit firm refers to a report by the FRC (2017) covering the use of data analytics in the audit of financial statements and ask the FSA directly if they plan to perform a similar review in a Norwegian context. The answer shows, to some extent, the passivity of the FSA, as it confirms that the FSA has no plans to explore the effects of the topic. The FSA specifically communicate in their response that:

> *"The FSA is familiar with the mentioned report…The FSA follows up the use of data analytics in financial auditing through its oversight activities, but have today no plan to perform a similar investigation* [create a report] *in Norway" (11.04.2018)*

The comments made by P1, argues that the proactivity in other governmental agencies is a result of them being more forward-leaning than the FSA. P1 elaborates this thought by arguing that it is expected in the audit profession in other countries that the governmental agencies take an active approach towards interpreting and implementing standards. This is supported by L1, telling us that it is actually possible to have a conversation with FRC regarding digitalization and technology, even though the FRC will not take a formal stand in the discussion. Combined, this implies that the FSA should take a standpoint in discussions and contribute to the national debate. P1 gives an example illustrating this view:

> *"When I was* [ANONYMIZED] *and met on the last meeting in Brussel, there was a representative from the EU present where he was meeting the standard setter and did not understand why it was the union* [DnR] *that were present since it was the governmental agencies' responsibility."*

When asked if there is a stronger connection between the audit firms, the oversight authority and the international forums abroad, P1 agrees. S/he continues explaining that even though the FSA communicate their responsibility externally, they have landed on the option of outsourcing the responsibility to the DnR, which according to P1, is an example of stretching the interpretation of the EU-directives a bit too far. The FSA, however, emphasize that they utilize their available resources as optimal they can, and argue that they cannot be compared to, for example, the FRC, because of the difference in available resources.

The FSA do not agree that they lack international participation. R2 argues that their role in the International Forum of Independent Audit Regulators (IFIAR) allows them to have a good position in understanding the global developments as presented in the background section 2.3.3. R2 argues that if any digital audit initiatives were presented, they would get feedback and expected improvements from IFIAR, before going back to their firms and improve these digital initiatives. The findings, experiences and potential threats to audit quality would be stored in a database available to all participating regulators, including the FSA.

In the other interviews conducted in our study, there are not as extensive elaborations on the role of the FSA. We notice, however, a consensus throughout all our interviews with auditors (N=5) that the FSA has not taken an active role in the digital transformation.

P4 has a different approach to why the FSA choose a more conservative and passive role in the digital transformation of the audit profession. S/he argues that the FSA lags in the auditing environment because the audit firms change how an audit is conducted. The partner argues that it is vital to understand how a digital audit includes a change of mindset. For instance, how this change the potential differences in risks associated with new types of information, such as Big Data. As stated by P4 in the interview:

> *"If you don't understand how the digitalization affects the way we think of an audit, and how this affects the risk for both the auditor and the auditee, then it often happens that it creates a conservative approach to these changes."*

P4 wraps up his/her comments with concerns regarding the passivity and conservative attitude at the FSA. Their approach to new and innovative ideas in auditing may create a nervous environment for implementing ADA. This is coherent with findings by Austin et al. (2018).

Confronting the FSA with the comments above, they respond with opposing arguments. First, R2 argues that introducing new digital tools should not represent a risk for the auditor since they are not supposed to take on more risk. S/he argues that they are supposed to audit in accordance with the ISAs.

The statement indicates that if the auditing process becomes riskier, the view of the FSA is that it does not provide higher audit quality. Further, the FSA argues that if an auditor avoided taking risk through new ADA, they would be in accordance with the legal standard "good auditing practice" as long as it provides well-documented audit evidence. However, the FSA mentioned that they had not seen any significant changes in the use of ADA during their inspections. This is in accordance with the findings in the unpublished digital auditing survey at NHH (Kinserdal, 2018).

The FSA states that it is not possible to pre-regulate a digital audit before audit firms are performing such an audit that can be inspected and evaluated. Their view is close to the IAASB DAWG (2016) perspective that regulators must be careful not rushing to create audit standard and conclude when it is still significant uncertainty regarding the final outcome of the digital audit.

Building on the insight and responses in our interviews, it clear that the FSA is a source of frustration for not taking a more explicit role in the digital auditing development. However, it is a clear choice made by the FSA to be able to continue their ex-post approach. They are consistent in their perspective on avoiding to pre-regulate a digital audit before the technology is at the level where regulatory intervention is necessary. The FSA has chosen not to give any interpretation of where in the ISAs such deviations would be possible. However, in our interviews, they are not negative to digital initiatives with the potential to enhance audit quality. But they emphasize that this is a choice needed to be done by the auditors, not the regulators. As a result, they choose a passive role until they get an impression that regulation is needed to cope with the expected digital shift.

4.3.2 Audit Firms Identify Potential Challenges Caused by the FSA

When discussing digital auditing, there are a few points being repeated by our interview candidates. From the Norwegian perspective, there is some skepticism on whether the FSA has a role in the digital transformation. The aforementioned comments indicated that a more proactive FSA could be helpful in the digital transformation. On the contrary, from the international perspective, it is observed a more proactive regulation environment such as increased involvement in discussions.

Combined, our interviews and professional literature research gave us an overview of the current state and potential challenges of the audit profession.

To date, there are not any significant challenges identified locally. The background for this is described by P3. S/he argues that the digital auditing is not developed to the extent that it is beyond the traditional audit scope. Therefore, the digital tools are not in breach with the current audit standards. Continuing, P3 state that:

> *"As long as our developments are within the interpretation of the audit standards, I do not see any challenges associated with the FSA."*

This is backed by P2:

> *"We have not had any comments* [through inspections] *on any of our audit engagements* [including the use of digital tools]."

Further, P3 elaborates on the lack of guidance from the regulators:

> *"I do not think that we miss any guidance today…* [But] *it might come to a point in the future where guidance is needed. I think that they* [the FSA] *should be more forward leaning (…)* [to provide guidance] *for the use of Big Data, non-financial information in data analysis, artificial intelligence, machine learning, and all that.*
>
> *When we get to that point where those tools* [are available]*, then we should not be inhibited by their* [the FSA] *inspections at our firm where they say we cannot use those tools. They should be in the forefront too. Both the supervisor, DnR, and the auditors should move in the same direction at the same time, but ideally, the supervisors should be ahead* [of us]*. Then they can have an opinion* [on digital auditing]*. If not, it will become more reactive than proactive, and we will not be able to have good discussions."*

As the new digital tools are expected to be further out in the technological feasibility area than what the auditing standards allow, lack of guidance from the FSA may become a challenge. The respondents point out, however, that there are forums where these matters are discussed, both across firms and with the regulatory agencies and the international standard-setters. The question is whether it is accepted as "good auditing practice."

When continuing the interview and discussing the potential in the future audit, several challenges become visible. P3 is arguing that:

> "[when we] *move away from applying our professional judgment and artificial intelligence replace our own evaluations and thoughts… then I think that we have moved outside what is within* [todays] *framework*…[We] *wish to have a tool where you upload an extracted data set, marked the type of market* [note: industry], *the size* [of the company], *type of problems identified, and then it creates a dashboard with many types of analysis, where you can press the one you think is relevant…"*

This is clearly showing the desired fully automated audit and the implications of introducing data-driven decision making to such an extent that it reduces the incentives to apply auditor's professional judgment. Mentioned by Kinserdal (2017) to be one of the main elements in the digital audit. When we cross this point, P3 argues that more involvement from the FSA would be necessary.

P4 elaborate on the need for guidance on some areas. The respondent is focused on the challenge's auditors need to overcome when introducing more advanced techniques. This is understood as ADA with the potential to replace an auditor's professional judgment in different aspects of an audit. (i.e., valuations, audit planning, risk assessment). P4 explains:

> "*I think that the primary challenge is that it happens so fast…To this point, everything has been based on several decades with experience on how things* [the audit] *should be performed, and suddenly there is a digital shift… and the FSA need to understand the implications from this* [the digital shift]. *It is understandable if you look at the CAAT criteria's in the audit standards (…) It is the same principles that apply even though you use more advanced tools. But you need to have a documentation package that facilitates a possibility for the FSA to inspect what has been going on* [in these tools], *but since there are such massive and complex data and calculations, it is impossible to document each audit procedure individually as possible when you pull out the general ledger and compare it to the balance of payments, etc. You must do it more systematically, and possible automatic as well, and if it becomes automatic, then which controls do you need on to automation of documentation."*

As presented in our theoretical background, the digital audit is expected to allow an auditor to become more efficient through the extensive use of ADA, and it would allow standardized audit tasks to be automated. In addition, as discussed above in section 4.3.1, it involves a new way of thinking of an audit. Therefore, the partner addresses some important challenges.

First, the arguments point to the lack of experience in dealing with a digital audit. The FSA has never publicly presented how they look at the digital audit, nor presented any results from inspections they have had on newly developed audit tools. This would deviate from the ex-post approach in the FSA, but it could increase the efficiency per dollar invested in the digital audit developments. The reason is that it would give a new dimension to the implementation; security that the regulators understand and have inspected emerging audit technology.

Secondly, the partner addresses the CAAT principles. As P4 argues, it is the same principles applied when dealing with more sophisticated technology. But the problem is how an auditor can document his/her actions and the specific audit procedures. It is nearly impossible to extract each step individually from a computerized process that evolves and learn constantly. If viewed from a traditional perspective, that an auditor must document each of his/her audit procedures individually, then such sophisticated methods would be close to impossible to use as a stand-alone procedure. An auditor would have to perform additional procedures. However, this would be a "double" audit and is not aligned with the objective of the digital tools; making the audit more efficient and effective. To be able to change the way we think of an audit, we must gain experience in working with ADA and understand its effects on the audit quality, audit engagements and how it aligns with the objectives of an audit.

The FSA address the challenges presented above. First, the FSA has identified the need for IT – skills when dealing with the planned audit development. To prepare for the digital shift, the FSA have restructured their organization, structuring their IT-skilled personnel in a stand-alone department, helping the inspectors. This indicates a more forward-leaning regulator than what the audit firms communicate through the interviews. The challenge of not having experience might not be an issue. The new digital-focused department at the FSA has experience from the financial technology implementation in banks and would probably be able to understand and review ADA. Further, R1 argues that expecting the FSA to join the effort in the digital transformation is the same as a disclaimer:

> *"Of course, they* [the audit firms] *would wish to have the FSA on their team* [when transforming to a digital audit] *it is a disclaimer. But it will be very difficult for us afterward if we have been involved in developments and cheered for a digital audit tool, and then it turns out that we cannot conclude if the audit is correct…"*

Secondly, the FSA argues that they would answer questions on digital auditing if they are specific enough. They cannot answer high-level questions and prove a general view on a topic. We used ISA 501 as an example and its requirement for an auditor to be present to verify the existence of an inventory. Our suggestion was the use of drones on some clients where it could be applicable. The FSA did not provide any view on the acceptance of the solution, but R1 said:

> "*The more specific the questions are, typical this example with a drone; if we would be given a question of interpretation on that standard* [ISA 501]*, then we would probably have provided an answer. Maybe reached out to the DnR and drafted a response on how they would do it."*

Given the difficulties with documenting sophisticated ADA procedures in accordance with the audit standards, a specific answer would be helpful. Today, it would to some extent be helpful with answers, for example during pilot testing. However, sophisticated ADA (i.e., AI and machine learning) would need the documentation requirements to be revised as the auditor is currently required to document his/her procedures in a way that enable inspectors to follow a detailed audit trail which is impossible in emerging technologies such as AI. This is identified as a key challenge.

The arguments above illustrate that there is a gap between the pace at which the FSA renew their perspective of what an acceptable audit involves when it comes to documentation, than the audit profession. Our analysis shows signs of potential conflicts, but the inspections set the scene for further regulations. For now, they expect the auditors to follow the traditional documentation requirements. Auditors argue that this would create a documentation overwhelm and make emerging technologies less efficient and cause more problems on how to verify the documents gathered from a self-evolving technology (i.e., machine learning). P4 illustrates his/her point through an example:

> "*When you can use an algorithm, as we expect in the near future can be performed on valuations, where you collect data, how do you know that no one has damaged the integrity*

of the algorithm? How do you know that it has not been trained on the wrong data set, if it is based on machine learning that causes it to do something else than what it was intended to do?... and when you document the use of the algorithm, and it is based on machine learning, then it will look completely different next year since it has learned and evolved itself further, what is the point for documentation then? …What is good enough for the frameworks?"

The questions raised illustrate the need for having a clear understanding of these implications. In addition, it raises some concerns correlated to the passive strategy at the FSA. Without any public statements, it is hard for auditors to know what enough documentation is. From our data, there seem to lack some general communication on what is expected from an auditor when applying emerging technologies. As stated by P4:

"*Is it our job to convince them* [the FSA] *what is good enough, or is it their job to tell us what they need to understand? Probably our job to convince them, since we work with this* [the technology] *every day."*

This is correlated with the high-level questions whether the role of the FSA should involve a more proactive approach. The benefit would be the potential to discuss and conclude on future challenges. The statement above is also coherent with the view of the FSA.

Given the litigation risk for each partner, there might be no incentive to take a step towards a digital audit, even though the objective communicated within the audit firms is to provide a better audit. Without anyone pushing the limits, the audit profession and the transformation itself will be in a steady state or move slower than what is expected to happen. The FSA argues that their job is not to develop the audit, but to ensure a safe development within the audit objectives and relevant frameworks. But for now, their perspective is that there is mostly talk and little action when it comes to a digital audit.

P4 support the last argument, that even though this might inhibit the development of the digital audit, it provides a safe development. In addition, P3 argues that their developments are mostly driven on a global level, and when it has been tested, discussed and implemented in some audit engagements, it is rolled out to Europe. According to P3, there are no limitations on their use after that point, because it has been through a dialogue with the PCAOB. In P3's view, they have the

strictest inspections and requirements. This view is also pointed out by P4. In contrast, the firm developing its audit tools locally, indicate a stronger need for a proactive FSA.

4.3.3 Global Considerations in the Audit Environment

Considering the global development in the largest audit firms, we were given a unique chance to interview one of the members in IAASB DAWG. In addition, s/he is the global leader of methodology and the data analytics initiatives at a Big 4 audit firm. L1 recognize the regulatory challenges and that the digitalization is done at a slower pace to makes sure that the regulators are following. However, s/he emphasize that the regulations are not stopping them and indicate a positive development.

L1 describes a former situation where s/he introduced the concepts of a digital audit to multiple regulators worldwide and was met with a lot of skepticism. Today, s/he describes a situation where the regulators are much more interested in the developments than before because they now see the potential benefits of technology. L1 explains:

> *"Now when I talk to the regulators, it is the complete opposite. It is around; are you moving quickly enough, we can see the benefit, and we like what you are doing (…) there is a great support."* (written down during the interview)

L1 points out that the FRC was the first regulator to publicly support the developments in a digital audit in 2017 through their thematic review. The problem for the FSA and other regulators are that they are afraid of making a statement that ties their view prior to inspection. L1 also refer to the FRC going quiet after the Carillion[8] failure in 2017. The collapse of Carillion has placed a lot of attention towards the dominance of the Big 4 firms and the audit profession in general. The FRC also came under a lot of pressure by the parliament in the UK, so they have *"gone a little quiet on pushing the agenda."* L1's example shows how politics and potential scandals can put the oversight agencies under political pressure, which could explain the carefulness and passivity in the FSA

However, even though the FRC have reduced the pressure on moving towards the digital audit, they have publicly stated their optimism and is still aiming to be forward-leaning. L1 argues that there is a first-mover effect. For example, s/he argues that PCAOB, as one of the regulators with

[8] The Carillion failure is one of the most significant scandals in the audit markets where auditors did not manage to discover significant overstated incomes and wrongdoing in the valuation of pension liabilities.

the most significant impact globally, has made some statements on the value of data and have shown an interest in the potential benefits of a data-driven audit. L1 further emphasize that there has been a substantial shift towards the focus on the digital audit in the PCAOB, but that they are careful not setting too high expectations in the market. This indicates that the step taken by the FRC in 2017 have made other agencies step into the public debate. Support in the professional literature are found in the PCAOB's guidance notes and IAASB DAWG data analytics report.

In summary, our analysis in section 4.3 indicates that there is a high demand for clearer guidance from the oversight authorities. Further, we identify an expectation gap between what auditors think the FSA should contribute to in the digital transformation, and what the FSA view as their role. When discussing the regulator's view on emerging technologies, there are strong indications that they are preparing for a digital shift, which is a crucial development to not inhibit the future audit.

5.0 Limitations in this Study

While our thesis gives highly interesting insights into the regulatory environment, there are certain limitations to our study with implications to our findings. These limitations relate to our sample size, the background of our respondents, and the timing of our thesis. The digital audit is still in a preliminary phase, providing some difficulties to our research design.

The first limitation to our study is the sample size. Our thesis is limited to seven interviews, three with different audit firms (two interviews with one of them), one with the FSA, and two with the member of IAASB DAWG. Having a higher number of respondents would be beneficial as it would provide additional insight into the topic. However, our impression after interviewing three audit firms was that the respondents were highly consistent, as the arguments were more supportive than undermining. In addition, the interviews with the FSA and IAASB DAWG provided additional perspectives for our thesis. Therefore, as a result of our time frame being limited to four months, we ended up with seven interviews in total.

The second limitation is regarding our sample of respondents, it should be mentioned that our respondents are mainly Norwegian, except from one. Accordingly, the view of the regulations is seen from a Norwegian perspective. As the research and development are mainly driven globally among the Big 4, an increased number of participants from a global level would enhance our analysis.

The third limitation of our study is also concerned with our sample. We choose to only focus on the five largest international public accounting firms in Norway, not taking into consideration the view from the mid-tier and small audit firms. Including them could have impacted our thesis as the dynamics in the biggest firms are different from the smaller ones.

The fourth limitation addresses potential biased answers. Our respondents are all heavily involved in digital auditing within their respective firm, which implicate that our thesis lacks the perspective of those who are not as advanced as our respondents. As a result, our analysis might provide a biased impression than what could have been the case if we interviewed a broader sample of auditors that have to implement ADA in their audit engagements. However, given the time frame, the thesis was scoped to a Norwegian context covering the viewpoint from respondents with the most experience from the five large international public accounting firms.

The fifth limitation is the empirical basis used in our thesis. Our respondents are mainly auditors, in addition to the FSA, and the literature referenced to, is produced by the same people. Through our research, a finding is that client pressure is one of the main reasons for the motivation behind digital development. In addition, much of the ADA use is depended upon the quality of data collected from the client's system. Hence, the perspective of the clients on these aspects would have benefitted our thesis.

Further, opposite from our early beliefs, we experienced during our research the use of ADA being rather limited. As a result, the regulatory problems discussed was more of a future concern than a current problem. In addition, the actual use of ADA is far from what is communicated in the media. For instance, the FSA had not experienced any innovative tools during their recent inspections. Hence, the discussion focused primarily on audit firms' experiences and views on regulatory intervention. Through the regulatory perspective, concerns with a digital audit were discussed more on a hypothetically level. As of this, we believe that our topic is highly relevant for future research in years to come.

In addition to the limitations identified in this section, there are some methodology limitations outlined in section 3.2.3.

6.0 Future Research

The limitations of the study could offer potential areas for future research. First, potential future research could investigate the effect on audit efficiency in terms of quality and cost to clients. Through our study, we noticed that one of the objectives for introducing a digital audit is enhanced audit quality. As of today, no exploratory research has been done on this topic. This could be an interesting area to perform experiments, preferably with the actual ADA currently in the development pipeline of the largest audit firms. These effects would help regulators to understand the implications such as new types of risks in a digital environment.

Secondly, it would also be interesting to perform an analysis looking further than experienced auditors within the digital audit field. For instance, there are being used both "a carrot and a stick" to incentives ADA in audit engagements. The effects from this would be an interesting area of research, looking at how this pressure affects the audit strategies and the efficiency in audit engagements led by auditors without the digital expertise and interest. A digital audit could potentially interfere with an auditor's professional judgment and exploring how these inferences vary between certain groups could provide valuable insight into how auditors react given their background and experience.

The third area of research could be extending our analysis by also including the aspect of clients. Client pressure has been identified as one of the key elements in the audit firm's motivation to innovate and become more digital. However, there is already an expectation gap between the perceived level of assurance an auditor is expected to provide and the actual level of assurance. Exploring how this expectation gap is affected by auditors introducing a more digital approach could yield insights into how the digital audit is expected to perform compared to the effect auditor themselves might expect.

The fourth area of research could investigate the dynamics of the audit markets and the possible challenges from a digital audit. The research in our study has a primary focus on the largest audit firms because they are the ones who have committed themselves to large investments to develop a digital audit. Moreover, it might also enable them to create a competitive advantage against other audit firms. Given the ongoing debate on the Big 4 becoming too big, this research could be beneficial to this debate.

Finally, our study shows that a digital audit is still a far fetch, but that there are ongoing developments. Once more and more tools are implemented, there could be a sudden shift in the environment. Exploring our research questions once that shift happens, would provide more timely and precise data. Continuing, further research will become important for all stakeholders in the audit environment.

7.0 Conclusion

This study has essentially examined the regulatory environment in the audit environment and the implications for digital auditing. In particular, it has explored whether regulations inhibit the digital transformation of the audit process. The study aimed to understand where in the regulatory environment the barriers for a digital audit are present. It has examined the regulatory environment through interviews with partners in some of the five large international public accounting firms. In addition, the regulatory perspective is investigated through interviews with a member of IAASB DAWG and the FSA in Norway. The results show that the digital transformation towards a digital audit is challenging on multiple levels, but the primary barrier is technological outdated auditing standards. Restrictive auditing standards, combined with a passive supervisory and a firm-specific methodology that embeds auditing standards, cause an uncertain environment for the implementation of ADA and further technological developments.

RQ 1: Do the ISAs inhibit the digital transformation in the audit profession?

The audit standards and standard-setters have been mentioned throughout the interviews as a problematic area. On one side, the positive attitude towards revisions and implementation of "digital-friendly paragraphs" are welcomed by the audit community. On the other side, there are several concerns about whether the conclusion from revisions will come too early and create barriers for further implementing emerging technologies. Further, the revision process and implementation take too long to complete. As a result, the changes may fall behind the advancements in technology, and a digital transformation may be inhibited. A timely auditing standard revision process is viewed as the main barrier for a digital audit. It causes auditing standards to remain outdated as the general requirements and guidance for auditors. Implications from this are "double" auditing, reduced effectiveness and reduced incentives to implement ADA-procedures, thereby might inhibiting a digital transformation of the audit.

RQ2: Do audit firms' policy and methodology inhibit the digital transformation?

Internally, the audit firms are investing heavily in audit technology and see the digital audit as an excellent potential for both improved audit quality and client-value. Their main incentives to innovate and transform is to stay relevant in a digital business environment and meet client expectations. Therefore, they incorporate both incentive programs and requirements locally and

globally to push through the digital transformation. As such, audit firms are not a barrier to the digital transformation. On the other hand, firm methodologies are closely based on the technological outdated audit standards, and often supplemented with additional individual actions to reduce the risk of litigation. Their methodology is the basis for all their audits, and internal supervisors and controls keep auditors within its limits. Changes in methodologies are typically done when audit standards are revised. After changes are expected, there are several indications that their testing and application procedures could be an extension in the process of implementing revised audit standards.

RQ3: Do the FSA inhibit the digital transformation in the audit profession?

The supervisory act differently around the world, with the FRC standing out as the most proactive. Their attitude has helped push other agencies towards a more positive embracement of a digital audit. In contrast, the FSA choose to remain passive. The strategy is based on an impression of the digital audit to still be in a preliminary phase, too early for supervisory intervention. The auditors are split on whether this is a desirable position for the FSA. For now, they all manage to maneuver their way within the audit standards, but all of them point to an increased need for guidance if the audit were to implement emerging technologies more intensively.

The digital audit is developed on a global scale, and the international regulatory agencies are expressing a positive attitude towards a digitalized audit environment. There are no significant signals that international regulators will create any barriers for implementation. In contrast, there are mentioned valid arguments for the FSA being a barrier for transforming the audit industry in Norway. However, there is not enough evidence to conclude whether they are one today, but there are several indications that they might become one in the future. As such if they do not keep up with the fast-paced digital developments, they might over time inhibit the digital transformation in the audit profession.

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Appendix

Interview Participants

TABLE 1: Interview participants

Identifier	*Role*	*Organization*	*Specialization*
P1	Partner	Company 1	Technical Audit Leader
M1	Manager	Company 1	Manager with a key role in digital development
P2	Partner	Company 2	Assc. Partner with several roles in digital developement
P3	Partner	Company 2	Key role in innovation and data analytics
L1	Partner	Company 2 / IAASB	Global Methodology Leader, member of IAASB DAWG
P4	Partner	Company 3	Key role in digital developement
R1	Director	FSA	Leader of Audit Supervision
R2	Inspector	FSA	Chief Inspector
Total:	**8**		

Interview Guide

Interview Guide for Audit Partners

Dataene vil registreres i form av notater under intervjuet, men også ved hjelp av opptak om deltaker samtykker til dette muntlig før intervjuet. Om ønskelig tilbys gjennomlesning før oppgaven leveres av de deler hvor deltakers synspunkter formidles eksplisitt.

Manus:

Studiets siktemål er å få en bedre forståelse av hvordan revisjonsstandardene, tilsynsmyndighetene og den firmainterne policyen, inkludert metodikk, krav om bruk, stimuli og restriksjoner, påvirker det digitale transformasjonsarbeidet og bruken av digitale verktøy innenfor Advanced Data Analytics Som Machine Learning i revisjonsprosessen og Big Data i beslutningsprosesser.

Prosjektet er en del av Magnus Johannesen og Marie Dahl Slaastad sin mastergrad i Regnskap og Revisjon ved Norges Handelshøyskole. Veileder for masteroppgaven er professor Aasmund Eilifsen. Oppgaven skrives som en del av «Digital Revisjon»- prosjektet ved Institutt for regnskap, revisjon og rettsvitenskap.

Alle personopplysninger behandles konfidensielt. Det er kun forfatterne av oppgaven og deres veileder som har tilgang på data fra intervjuet. For å sikre dataene, lagres de på en tredjepart skylagringstjeneste og koblingsnøkkel vil lagres adskilt. Som deltaker i studien vil du ikke bli identifisert, men referert til som, for eksempel, «P1».

Oppgaven skrives i perioden august til desember 2018, og ved fullført masteroppgave slettes koblingsnøkkelen, slik at dataen forblir anonymisert.

Behovet for datalagring er for å kunne dokumentere grunnlaget for funn og konklusjoner.

Informer

Samtykkeskjema må underskrives før intervjuet starter

Oppbygging

I dette intervjuet har vi tre deler.

Den første delen tar for seg standardene som setter rammen for revisjonen.

Den andre delen tar for seg de regulatoriske myndighetene (Finanstilsynet eller PCAOB og om dere har klienter som er underlagt disse). I tillegg går vi inn på rolle til regulatoriske myndigheter i den digitale utviklingen.

Den tredje delen tar for seg firma policy, metodikk og hvordan dette påvirker digital transformasjon/bruken av digitale verktøy innenfor Advanced Data Analytics.

Føl dere fri til å gå utenfor spørsmålene og nevne det dere mener er viktig og ikke er omfattet av spørsmålsstillingen.

DEL 1: Inngangsspørsmål om forholdet regulatoriske myndigheter

Manus:

Regulatoriske myndigheter er strenge i tilsynet av revisors rådgivning til revisjonsklient, som er regulert ved lov. Med nye digitale verktøy innenfor Advanced Data Analytics (ADA) vil revisor fremover kunne få økt kunnskap om klienten som klienten kan ha nytte av, men som kan komme i konflikt med revisorrollen. I tillegg er det naturlig å tenke seg at automatisering av manuelle prosesser vil gjøre at revisor har mulighet til å tilby slik analytisk innsikt til samme pris/timebruk. Hvordan ser dere for dere at bruken av digitale verktøy kan anvendes innenfor dagens regulatoriske rammeverk, og hva skal til å for å øke bruken av ADA?

I finansavisen gikk en partner i ett av de fire store revisjonsfirmaene ut og sa at regulatoriske myndigheter er en hindring i utviklingen av digital revisjon. Hva er deres synspunkt på dette?

Stikkord: De regulatoriske myndighetene i Norge har i stor grad tiet om problemstillingen, men diskusjonen mellom revisorer, akademikere og lignende belyser saken som problematisk og utfordrende.

Spørsmål:

- Er dere enig påstanden over?
- Hva er deres opplevelse av de regulatoriske myndighetenes posisjon i den digitale transformasjonen / bruk av digitale verktøy i revisjonsoppdragene?

Stikkord: IAASB working group, hemmer, tilsyn/ettersyn er jobben

Oppfølgingsspørsmål (hvis de opplever det som utfordrende):

- Hva er utfordringen dere kan møte fra regulatoriske myndigheter (Finanstilsynet) ved å implementere teknologien i en større skala enn dere gjør i dag? (*Husk å få frem hva som er problemet/ene).*
- Gitt det dere beskriver nå, hvordan har dere gått fram for å kunne benytte dere av digitale hjelpemidler?
    - Er det enkelt å forstå hva tilsynet vil mene og hvordan opplever dere kommunikasjonen mellom bransjen og tilsynsmyndighetene?

Stikkord: Prosessen ved å implementere digitale verktøy, tidskrevende, kontakten med FT

- Gitt at dere satt på den regulatoriske siden – hvordan ville dere endret tilsynsmyndighetenes tilnærming for å legge mer til rette for digital utvikling i revisjonshusene?

  Stikkord: Gi guiding og eksempler i standardene hvor teknologiske hjelpemidler kan benyttes (IAASB), evnt. gi guiding vedr. praktisk anvendelse ettersom å endre standarder tar langt tid, kommunikasjon. Prøv å finn ut konkret hva bekymringen er.

- Hva slags påvirkning har tilsynsmyndighetenes regulatoriske krav på deres incentiv til å innovere (digitalisere) revisjonsmetodikken?

Oppfølgingsspørsmål (hvis de opplever det som ikke å være noe problem):

- Kan du utdype hva som gjør at finanstilsynets rolle er uproblematisk i implementeringen av digitale verktøy? Er lovverket/reguleringen enkle og forstå? Forutsigbart?

- Hva er prosessen dere går gjennom ved vurdering av et digitalt verktøy i forhold til regulatoriske krav? (ISA; Finanstilsyn; internt) Inkluderer dette under.

DEL 2: Inngangsspørsmål for standardene

Manus:

I litteraturen innenfor revisjon, er det mange som hevder at revisjonsstanderne er tilpasset en annen teknologisk tidsalder og dermed ikke tilstrekkelig støtter oppunder deres tiltenkte funksjon. Noen mener også at dagens revisjonsstandarder setter begrensinger på bruk av digitale verktøy i revisjonen.

Spørsmål:

- Hvordan opplever dere situasjonen?
- Har dere opplevd at standardene har stoppet implementering av digitale verktøy, eller hemmet den overordnede transformasjonsprosessen innad i BDO?
    - Kan du utdype hvorfor dette er tilfelle og hvordan dette har påvirket arbeider deres med digital revisjon.

Oppfølgingsspørsmål:

- Hva slags påvirkning har standardene på deres insentiv til å innovere (digitalisere) revisjonsprosessen ved bruk av nye og bedre digitale verktøy?
    - Kan dette for eksempel redusere investeringene i teknologi, antall henvendelser til fagavdelingen eller lignende?

  Stikkord: Press, trusler, konsekvenser? Interne retningslinjer? Motarbeidelse fra HQ i utlandet?
- ISA 315 omhandler identifiseringen og vurderingen av risikoen for vesentlig feilinformasjon gjennom forståelsen av enheten og dens omgivelser. Bruk av Big Data har blitt mer og mer vanlig i andre bransjer, men hittil lite implementert i eksterne revisjonstjenester. kan dere se for dere en økende bruk av Big Data i risikovurderingen, for eksempel som analytisk prosedyre (for eksempel bruk av Facebook, Twitter og nyhetskilder?) for å øke forståelsen av enheten og dens omgivelser? Legger standarden til rette for dette? Relevant problemstilling for dere? Hva må evnt. endres på? Tidsaspekt før dette er mulig?
- I ISA 530 som omtaler stikkprøver, skal «revisor undersøke typen og årsaken til feil som er identifisert». Et eksempel er ved hjelp av nye analyseverktøy, hvor 90% av eller hele populasjonen kan testes, og dette vil føre til et større antall oppdagede avvik. (IAASB Working Group adresserer problemstillingen). Hvordan påvirker kravet om å undersøke avdekkede avvik anvendelsen av analytiske verktøy?

- Hvordan ser du for deg at «problemet» kan løses?
    - Tror dere at tradisjonell stikkprøve testing kan favoriseres fremfor nye metoder der hele populasjonen inngår fordi avviksanalysen blir for

ommfattende og krevende ved å undersøke populasjonen?

- Når det gjelder nye digitale verktøy, i hvilken grad oppfattes det at standardene krever det at dere kjenner til hvordan verktøyet behandler data og forståelsen av hva output fra verktøyet forteller? Gjør dette det vanskelig og omsette output til «tilstrekkelig og hensiktsmessig bevis»?

DEL 3: Inngangsspørsmål til firma policy for bruk av digitale verktøy regulering

Manus:

Se for dere at dere at ditt firma har utviklet et verktøy innenfor kategorien Machine Learning. Verktøyet er utformet slik at det innhenter tilstrekkelig revisjonsbevis ved bruk av Big Data, og anvender en algoritme for å vurdere om bevisene som er hentet inn er hensiktsmessig. Deretter er verktøyet i stand til å anvende informasjonen den har innhentet fra mange forskjellige kilder på flere områder i revisjonsprosessen. For eksempel kan det benyttes til å vurdere risikoprofilen til selskapet og om verdivurderinger/estimater i regnskapet står i stil med (korrelerer) med bransjens estimater for øvrig. Verktøyet er i tillegg svært dynamisk / tilpasningsdyktig og kan dermed enkelt anvendes på de fleste klienter, uavhengig av hvilken infrastruktur og IT-systemer klienten benytter.

Spørsmål:

- Hvordan vil prosessen ha vært for å implementere dette verktøyet som en del av deres interne metodikk?

  Stikkord: prosessen internt, rollen til standard/reguleringene i intern metodikk,

Oppfølgingsspørsmål:

- Basert på deres erfaringer, hvor lang tid tar prosessen med å implementere et slikt digitalt verktøyet?

  Stikkord: Intern diskusjon, vurdering opp mot standard og reguleringer, uker/måneder/år?

- Tar prosessen for lang til? Ser dere noen muligheter for at denne prosessen kan effektiviseres/endres?

  Stikkord: Avhengig av endringer i reguleringer/standarder?

- Hvor stor frihet innenfor rammene av deres interne policyen og metodologien har den enkelte revisor når det kommer til å benytte digitale hjelpemidler eller anvende ny teknologi som en del av revisjonsoppdragene?

- Hvor ofte endres den interne metodikken, og hvem har det overordnede ansvaret for dette? Har du et eksempel på en konkret endring dere har gjort i metodikken for å tilpasse en digital revisjon? Er det steder i metodikken deres hvor det er krav om å bruke digitale verktøy? Hvis tilfellet, er det da et krav å bruke spesialister på digitale verktøy? Når i tilfelle?
  - Når var sist dere gjorde en signifikant endring som hadde påvirkning på hvordan dere gjennomfører en revisjon?
    - Skjer endringene nasjonalt eller internasjonalt?
- Intern metodologi er ofte strengere enn standardene, og er ofte supplert med momenter fra reguleringer i andre land (USGAAP, USGAAS). Hvis ISA'ene endres for å inkludere digitale verktøy, vil det være uproblematisk å fremdeles følge ISA'ene som en del av den interne metodikken, selv med de sammenblandingene mellom ulike standarder som ofte finner sted i intern metodikk?

Interview Guide to IAASB DAWG member

- What are the main challenges you have identified from your perspective on the transformation from traditional auditing towards digital auditing?

- How do you work with the regulators to address these challenges?
- What are the main factors that you think might challenge the aspired digital audit developments?

- Do you feel that oversight authorities (i.e. FRC), the audit standard or the firm methodology inhibit the digital transformation in any way`?

    - If so, which of the three elements are most visible as constraints in the development
- How far have you and your firm come in the use of advanced data analytics and how does it change the audits?

- When talking to one of the managing partners of innovation and digital auditing in Norway, she pointed out that much of the development and testing of new and innovative auditing tools are initiated at the global level in the largest firms. What is the process from developing to applying a new audit tool and how do you cooperate with the PCAOB/FRC or similar agencies in that process?

- In the process of developing a digital audit tool, or any tools for that matter, are there any form of approval from the regulators before using the newly developed audit tools, and is it any form of dialogue during development?

- To make the digital transformation as effective and transparent as possible, which changes do you think regulators (or the audit firms in general) should change/position them self for the upcoming years?

Interview Guide for the Financial Supervisory Agency in Norway

- Kan du fortelle oss litt om prosessen som skjer hos dere når dere kommer over et nytt digitalt verktøy ved tilsyn hos et av revisjonsselskapene? Innhenter dere eksperter eller har dere kompetansen «in-house»?

- Frem til nå; Har dere hatt et tilsyn hos et revisjonsselskap hvor de har vært nødt til å dokumentere bedre/bruke andre tradisjonelle metoder for å få godkjent revisjonen dvs. ikke fått godkjent det digitale verktøyet?

- Behovet for digital kompetanse øker i alle bransjer og vi vet at den digitale utviklingen vil stille økte krav til digital kompetanse også hos revisor. Hvordan vurderes behov for digital kompetanse for å utføre tilsynsoppgaver i lys av økt digitalisering av revisjonen? Har synet på hvem dere ansetter endret seg? Har nyansatte annen bakgrunn?

- Hvordan oppdaterer dere dere når utvikling skjer? Kursing? Etterutdanning?

- PCAOB/FRC/IAASB kommer jevnlig med oppdateringer, diskusjonsnotat, møtereferat o.l. rundt sine tanker hvor de blant annet har uttalt at det er behov for guiding/endringer i standardene i lys av økt bruk av nye digitale verktøy i revisjonen. Hva tenker dere om det?

- FRC har uttalt at de ønsker å vise at de er interessert i teknologi og digitale verktøy. Ønsker Finanstilsynet i Norge å ha noen mening i denne debatten om digitale verktøy i revisjon slik som FRC?

- Representanter fra FRC i UK og en partner fra EY var i en paneldebatt hvor spenningene mellom innovasjon og reguleringer ble diskutert spesielt når data analytics brukes i revisjonsarbeid. Her ble det diskutert krav om at revisorer burde tilnærme seg DA på en måte som møter forventningene til regulatorene hvor de adresserer at begge partner bør ha en åpen og konstruktiv dialog for at dette skal skje. For at revisjonsselskaper i Norge skal

kunne møte forventningene til FT er det essensielt å vite hva disse er. Hvordan føler dere dere er på dette? Kommuniserer dere med de ulike aktørene?

- Hvordan vurderer dere behovet for dialog og lignende mellom Finanstilsynet og revisjonsbransjen når det gjelder de nye digitale revisjonsverktøyene og bruken av disse i revisjonen? Møter med revisjonsselskapene? Samarbeid på tvers?

- En revisjonspartner fra de fire store (Austin 2018) har sagt at ettersom revisjonstandardene var skrevet i en annen tid er vi nødt til å ha denne dialogen med tilsynsmyndighetene. Videre sier han at Data Analytics ikke er en tradisjonell revisjonshandling, og dialog er nødvendig for å kunne anvende det i en revisjon. Har dere denne dialogen med revisorene?

- Siden de store revisjonsselskapene benytter *globale* digitale verktøy kan det være hensiktsmessig med internasjonalt samarbeid for tilsynsenheter. Hva tenker dere om dette?

- Hvordan jobber dere med å holde dere oppdatert på det som finnes av nye utviklede digitale verktøy og for å være klare for endringene som vil skje fremover?