

Digitalization of the Accounting Industry

The influence of digitalization on the accountants' role and their self-understanding

- An exploratory study based on 13 Norwegian accounting firms

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Abstract

The purpose of this master thesis is to examine the accountants' perception of their roles and how digitalization influences them. This is an exploratory study of Norwegian accountants, where we have collected primary data from 13 accounting firms using semi-structured interviews.

Our findings indicate there is a limited understanding of digitalization among the respondents, and most of the firms are in the early stage of digitalization meaning that they experience with how to make use of the new technical possibilities coming along with digitalization. There is a need for better technical skills that are essential to enter a new role as a "different accountant," and the educational system must change to prepare the accountant students for work life. Another observation is the distance between the ideal accountants and how they act will be reduced when the accounting industry includes people with more IT-background. Based on our study, we can conclude that the media has exaggerated when it comes to the advanced technology automatize the accountants' tasks and extinction of the profession within the next years. Besides, there is an overestimation of the rapid transition from being a bean counter to a business partner, and our findings indicate the shift is moving slower than prognosis and media present. Since the future role of an accountant has additional characteristics and qualities than earlier, there is a need for a new name that fits the profession better.

With this study, we provide knowledge on a field of research with limited evidence. Also, we provide the thoughts and opinions from the accountants himself regarding how the impact of the digitalization is.

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Throughout this thesis, we have received valuable insight to a field of research with limited evidence by writing this thesis, and whether you are a student, researcher or a business professional, we hope you will find our research interesting.

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Diem Chi Thi Duong



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1 Introduction

1.1 Background and motivation

The accounting industry is under pressure, according to numerous authors, media, and prognoses (Frey and Osborne, 2017; Løvaas et al., 2018; Chukwudi et al., 2018). Media exposes people to predictions of how advanced technology affects organizations and societies. Founder and executive chairman of the World Economic Forum, Professor Klaus Schwab unfolds how the world is going to look and operate drastically different over the next years and spells out:

“We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before.” (Schwab, 2015)

It is a fundamental change that reshapes the relationship between technology capabilities and business opportunities (Schwab, 2015). Further, Frey and Osborne (2017) point out that there is a 95 % chance for the accountant profession to face extinction because of the changing technology. This statement makes us wonder: How will advanced technology impact the accountant? Can they keep the same working routines without being replaced by tech? Or, do they have to change their working behavior to take advantage of the technology?

These are interesting questions and are one of the reasons why we want to investigate more into the topic. Also, we have a personal interest in this field, and we believe it is an important theme to shed light on and gain more information because technological disruption could affect many people. Therefore, the purpose of this thesis is to examine how accountants are affected by digitalization in Norwegian firms.

During the last years, several authors have discussed the impact of digitalization on the accounting industry (Frey and Osborne, 2017; Chukwudi et al., 2018). One of the most significant changes in the industry is the shift from manual to automated accounting systems (Arcega et al., 2015). This change has expanded the accountant's capabilities and removed

many number-crunching assignments (Caglio, 2003). Besides, the role of an accountant is moving from a bean counter to a business partner (Friedman and Lyne, 2001; Heinzlmann, 2018; Goretski et al., 2013; Hopper, 1980; Granlund and Lukka, 1998). The literature recognizes the bean counter as single-mindedly concerned with precision and form, emotional detachment, attention to fine detail and is often associated as boring, unsocial, uninteresting, and conservative (Friedman and Lyne, 2001). While, the business partner is associated as outgoing, creative, forward-looking, modern, and collaborative (Byrne and Pierce, 2007).

According to Bhimani and Willcocks (2014), accountants need to be aware of the consequences digitalization brings and how it affects the data, information, and knowledge. They must determine how to accept and handle the digitalization. If the accountants want to deliver relevant and useful information, they have to develop new characteristics and change their working behavior. According to Rathod (2015), accountants have a past-oriented time focus when recording the financial statements. However, due to the changing role, the accountants must be more future-oriented when delivering services to their customers. The author argues the past-oriented accounts have little value for the clients.

Granlund (2011) claims there are few pieces of research on the relation between the modern IT-development and economic sector, and further, emphasize the importance to pay attention because the rapid IT-development will provide opportunities and changes for the profession. Kaarbøe et al. (2018) ask for more empirical research regarding this topic to see how digitalization affects the accounting sector. Therefore, we believe it is relevant to new research to add clarity on how digitalization affects the accountant's role.

1.2 Research questions and method

Through our research, we want to investigate the impact of digitalization on the accountant's role and their self-understanding. The problem we wish to study is:

How does digitalization influence the accountants' role and their self-understanding?

To answer our research problem, we have divided our research questions concerning the time dimension:

- 1. How has digitalization influenced the role of accountants today?*
- 2. How do accountants believe digitalization will affect his future role and their self-understanding?*

To investigate our research questions, we have used a qualitative study by interviewing 13 accounting firms in Norway. We believe a qualitative approach would be favorable for our thesis because of the more profound understanding of the topic and gaining more knowledge of the underlying factors affecting the accountant (Mack et al., 2005). Further, we used an exploratory research method because there is limited research regarding this topic. We have used semi-structured interviews for collecting our data because these kinds of meetings allowed us to structure the interview in one direction, but at the same time allowing flexibility and let the interviewee express their thoughts freely (Cooper and Schindler, 2014).

The 13 firms included four small, four medium and five large companies, and the respondents differ in age, experience, and gender. By diversifying the companies by size, we got an insight to see whether size mattered when we considered their opinion regarding digitalization and its impact. Moreover, in our opinion, we felt that having a variety of company selection increased the credibility of the results. Since the respondents were diversified, we got an insight from all aspects of employees. For instance, we gained information from an employee with limited experience and one with more experience.

1.3 Structure

The thesis is structured to illuminate our research questions in a clear and precise manner. This thesis contains five main chapters, and we begin presenting relevant theory regarding the accountant's task, role, self-understanding, and the impact of digitalization on the accountant role. Further, we provide our method, where we explain and argue for the chosen method to collect our data, and after we discuss the ethical aspects of the investigation. In the following chapter, we present our empirical findings from our interviews. This section forms the basis of the next chapter, where we discuss our main findings against existing literature. Lastly, we present the conclusion, and subsequently, we discuss the limitations of this thesis and our recommendations for further research.

2 Theory

In this chapter, we will present a literature review of the theoretical foundation in two main sections, the accountant's role, and digitalization. In the first section, we will review the existing accounting literature related to the accountant's identity, role, and practice. We begin to explain what an accountant is, and then provide their tasks and skills in the way they allocate meaning to their work. Further, we look at the accountants' self-understanding as a professional and what it means to be a good accountant. At last, we present role theory and how previous research has described the role of the accountant.

In the second section, we examine how new development has paved the way for a digital society in the accounting field. Finally, we bring necessary empirical evidence of the digitalization impact on the accounting role.

2.1 The Accountant

There has always been a need for accounting, and it records back to the ancient civilizations of China, Babylonia, Greece, and Egypt in around 3600 BC (Marsden, 2010). At that time, the accounting was about keeping track of the cost of labor and materials used to build structures such as pyramids. Today, accounting is something a company is obligated to have, decided by the authorities (Scott, 2015).

2.1.1 What is an accountant?

According to The Journal of Accountancy drafted by Richardson (1918), there is a broad interpretation of the term "accountant," and some correspondents claim that an accountant is one that keeps accounts and must differentiate from bookkeepers. In his study, he asks for a final definition of the profession.

Accounting and bookkeeping play a significant role in society, and everyone is affected by financial information (Marsden, 2010). In a research made by Kinley, he asked as many practicing accountants if they could define public accounting. The responses showed that the

accountant is expected to do more than one thing and has knowledge of different branches, such as accounting, auditing, and commercial law (Duncan, 1909). However, there are disagreements in the literature regarding whether accounting and bookkeeping should be recognized as a united profession or be distinguished.

On the one hand, Duncan (1909) claims that bookkeeping should be set apart from accounting. Further, the researcher explains bookkeeping as *"the art of recording business transactions according to a logical plan that can readily be interpreted. It begins with the statement of the transaction, and ends when the transition has been properly journalized and posted to the ledger and tested by a trial balance"* (Duncan, 1909, p. 77). Interestingly, the researcher claims that accounting should not burden itself with these tasks, even though he recognizes that accountants need to be familiar with bookkeeping before they can do accounting. Lastly, he argues that accounting is not an art but a science.

On the other hand, Marsden (2010) explains that the distinction between an accountant and a bookkeeper is not essential. Sometimes accountants will perform bookkeeping, and bookkeepers will perform accounting. They share information relating to the financial events of the business and work closely together. Therefore, bookkeepers have a solid understanding of accounting beliefs and principles. Moreover, Marsden (2010, p.2) identifies accounting as the process of *"identifying, measuring, recording, and communicating economic information to permit informed judgments and decisions by users of the information."* He points out that the only difference separating them is that bookkeepers are not part of the communication process.

Other researchers such as Kirkham and Loft (1993) agree that there is a distinction between an accountant and a bookkeeper. They compared the difference as big as the distinction between a doctor and a nurse. Nevertheless, Kirkham and Loft (1993), explain both in society and in academic writings there is little need to distinguish the differences between the bookkeeper and the accountant, and the two groups do not work with different aspects of the accounting function. Consequently, the term accountant is found to be *"a person who keeps the financial history of the transactions of an economic unit in written form"* Scott (2015, p. 4) and is performing both bookkeeper tasks and have the accountant skills. Further, in this thesis, we follow Kirkham and Loft (1993) opinion regarding there is little need to distinguish the bookkeeper and the accountant.

2.1.2 Tasks and skills

An accounting firm mainly delivers services as ongoing bookkeeping, reports of salary, tax and fee reports, preparation, and distributing of the annual financial report for the customers (Løvaas et al., 2018). The primary purpose of having a bookkeeper is to record, classify, and keep a record of business transactions (Marsden, 2010). The task of a bookkeeper is to start with a statement of a transaction and make it adequately journalized (Duncan, 1909). According to Marsden (2010), this process can be completed manually, but the use of a computerized accounting system is more usual. Further, he explains the typical tasks for a bookkeeper are performed on a weekly, fortnightly, monthly or quarterly basis depending on the size of the transactions and of the business and their complexity.

According to Duncan (1909), the task of an accountant is to start where the bookkeeper ends. The accountant must know the bookkeeper's tasks before he/she can do accounting. The primary purpose of accounting is to provide useful information for decision-making in the business enterprise (Scott, 2015). Decisions can vary from if there is enough cash to purchase new equipment or if the business is making a profit.

According to Gooderham et al. (2004), most companies must keep a record of their financial documents. Further, Rathod (2015) explains that the government plays an essential part in accounting developments. The author points out that the accounting profession cannot reach its objectives in the absence of any rules set by the authorities. It is crucial to have good routines and timely accounts from the very beginning because the mandatory tasks can be changed over time by the authorities, and new duties will arise (Rathod, 2015). This consideration makes it even more important to have an account that is à jour and precise. Also, the accounts form the basis for most mandatory tasks delivered to the authorities, and during the last decades, Alexander and Schwencke (2003) explain that Norway has experienced many fundamental changes in financial principle. Moreover, mandatory tasks differ from country to country, and in this paper, we are interviewing Norwegian accounting offices.

2.1.3 Good Accountant

In the literature, we find some evidence on what a good accountant could be from the perspective of accountants (Heinzelmann, 2018). For example, Løvaas et al. (2018) investigate Norwegian job ads, which seeks accountants, to examine what qualities and tasks are expected of accountants. The research concludes that the accountant's responsibilities are changing. The expectation of an accountant is increasing, and the researchers point out new qualities is expected, such as communication skills, solution orientated, and outgoing. Besides, Smith and Briggs (1999) point out the attributes of being creative, critical thinking and clarity of articulation are equally important as having technical accounting skills.

Moreover, in another research regarding profession identities of management accountants, Heinzelmann (2018) raised the question *"What does it mean to be a "good" accountant?"* Further, he emphasizes the understanding of their skills, self-understanding, education, and how they allocate meaning to their work to answer this question. Substantial research has been devoted to explaining and theorize management accountant role from a bean counter to a business partner (Friedman and Lyne, 2001; Heinzelmann, 2018; Goretzki et al., 2013; Hopper, 1980; Granlund and Lukka, 1998). However, in this thesis, we distinguish between management accountants as a controller type, and we focus on the role of an accountant and bookkeeper – more a financial accounting-oriented role. The financial accountant is responsible for preparing the financial statements primarily for external parties and has a past-oriented time focus (Rathod, 2015). We identify a scarcity of recent studies looking on the role of the financial accountant, and consequently, we are interested in looking at this specific role.

The criteria to be an accountant in Norway, especially the authorized ones, involves having minimum three years from higher education, two years with practical work and a specific number of relevant courses (Løvaas et al., 2008). Most of the tasks of an accountant, such as continuous bookkeeping and reports to the authorities, are or can be standardized. The customer portfolio often consists of companies from different industries, which has various issues, focus areas, and services customers desire from their accountant. Therefore, the demand for different kinds of related accounting services is more attracted (Everaert et al., 2010).

In Norway, the accounting regulation involves an interaction of formal legislation and good accounting practice. Formal accounting legislation is recognized as constituting a legal framework, including fundamental principle. While the “good accounting practice” can be perceived as the role to fill in what is required because of changing economic conditions (Lundesgaard, 2016). The author raises an essential question of how good accounting practice is formed and codified. The framework of “good accounting practice” provides several regulations for the accountant. Also, the author explains the legal authorization of the good practice expresses: “*the prepetition of the annual accounts shall be in accordance with good accounting practice*” (Lundesgaard 2016, p. 326). The quotation shows the framework consists of regulations on how to perform good bookkeeping practices and has a guideline on providing high standards on accounting services and right accounting products to the customers. For instance, the framework involves instructions on having internal routines, expertise, and confidentiality (God Regnskapsføringskikk, 2014).

2.1.4 Role theory

Sveningsson and Alvesson (2003, p. 1168) define roles as “*explicit and systematically enforced prescriptions for how organizational members should think and feel about themselves and their work*”. Further, Hopper (1980), explains roles are valuable tools because it links three central concepts; expectations- what the accountant and others think he should act; behavior- what he indeed does; structure- how his position is linked to others, and in this manner shaping his role set.

Previous studies recognize the diversity of tasks and practices undertaken by accountants, generally relating the profession as two alternative roles; the bookkeeper role and the business-oriented role (Goretzki et al., 2013; Hopper, 1980; Morales and Lambert, 2013). The role of the bean counter is characterized by single-mindedly concerned with precision and form, emotional detachment, objectivity, soberness and attention to fine detail (Baldvinsdottir et al., 2009; Friedman and Lyne, 2001). The stereotypical character of an accountant is often dull, unsocial, uninteresting, conservative, and mostly alone in the corner with his/her work. According to numerous authors (Beard, 1994; Smith and Briggs, 1999; Dimnik and Felton, 2006; DeCoster and Rhode, 1971), the typical accountant is found to be a boring character in movies. The accountant was associated as introverted, cautious, methodical, shy, showing a

lack of confidence, cold, distant, and impersonal. Further, Dimnik and Felton (2006) describe accountants as being short-term oriented, single-mindedly concentrating on costs, and misleading the purpose of business, which can lead to a disaster for the company.

Nowadays, the role of the accountant is shifted to be more business oriented (Morales and Lambert, 2013), as an outgoing, fun, creative, forward-looking, modern and collaborative role (Baldvinsdottir et al., 2009; Byrne and Pierce, 2007). Accountants are believed to assist and advise managers (Hopper, 1980), participate in daily operational decision-making processes, and manage strategic interventions (Morales and Lambert, 2013; Ahrens, 1997). Baldvinsdottir et al. (2009), explain that the image of the accountant is transformed into a more adventurous and thrill-seeking explorer. Accountant firms and institutes are deliberately building an image of a colorful character using images of happy, laughing young trendsetters instead of the boring grey suited bookkeeper (Jeacle, 2008).

Furthermore, Blom (2013) claims that the role of the accountant is changing. The expectations of the negative outcome of the accountant business give a motivation to change the role from the traditional audit function to become more counseling based (Jeacle, 2008). The expected negative outcome consists of downsizing the number of accountants, fear of the changing role, which can lead to anxiety (Jacobsen and Thorsvik, 2019) or loss of identity (Jacobsen, 1998). Besides, Gooderham et al. (2004) believe the accounting role will change into more business advisory because these services are vital for firms to survive and achieve competitive advantages. Thus, it seems the negative outcome of pressure gives the accountants motivation to change their role.

Moreover, the accountants are more interested in a business advisory task instead of an obligated job set by the authorities. Hence, Rumelt (2003) argue they need to develop their competencies to comprehend consulting work. Gooderham et al. (2004) believe it may result in competence development within the company. Nevertheless, the fulfillment of being a business orientated partner and a consulter cease to happen because of tedious-, repeatedly and time-consuming tasks, such as bookkeeping. These tasks create tension in their self-identity narratives and self-understanding (Morales and Lambert, 2013). As Heinzelmann (2018, p. 467) points out, the accountants are facing a dilemma in respect to their occupational identity:

"How to deal with the dissonance emerging from the difference between the professional ideal of the business partner role and the organizational reality faced in day-to-day work?"

In the study of Morales and Lambert (2013), they examine the relationship between the accountant's work, their self-understanding and the dissonance between professional ideal type role and the organizational reality they face (Heinzelmann, 2018). Morales and Lambert (2013), find that professionals create a symbolic distinction between the types of the task they undertake, based not only on technical characteristics, but also on a moral characteristic related to the prestige, pride, or otherwise, the shame or disgust they feel for undertaking them. These symbolic tasks connect the distance between the role indeed performed and an idealization of the role as identified by profession. Further, the researchers explain "dirty work" as tasks that are incompatible with their desirable identity. Typical dirty work is bookkeeping and can be a demeaning and shameful task because the accountant denies what the occupation normatively defines as its pride and high moral standards. The dirty tasks threaten to crush the fragile image the profession puts forward for itself and its members. Also, Heinzelmann (2018) recognize clean/good accounting of being a business partner, and therefore, the dirty work does not correspond with this particular role. Moreover, the researcher finds that the impact of more usage of IT systems will decrease the freedom for accountants, which leads to less clean business partnering and more dirty work.

In summary, we find the traditional bean counter role as shy, cautious, and attention to fine details. The literature explains the traditional role is changing into a business partner role, which involves being outgoing, forward-looking, and modern (Baldvinsdottir et al., 2009; Friedman and Lyne, 2001). Many authors believe the role will change into a business advisor because of the expected negative outcome of the accountant business (Jeacle, 2008; Jacobsen and Thorsvik, 2007). However, the fulfillment of being a business orientated partner and a consulter cease to happen because accountants perform dirty work, which does not correspond to this particular role. Also, dirty work creates tension in the accountant's self-understanding because of the distance between the tasks performed and the idealization of the role identified by profession (Morales and Lambert, 2013). Lastly, research finds that more usage of IT will lead to more dirty work, such as bookkeeping and less clean work, such as business partnering and consulting (Heinzelmann, 2018). Subsequent, in the next section, we will explain the usage of digitalization and how previous research has described the accountant's role in digitalization.

2.2 Digitalization

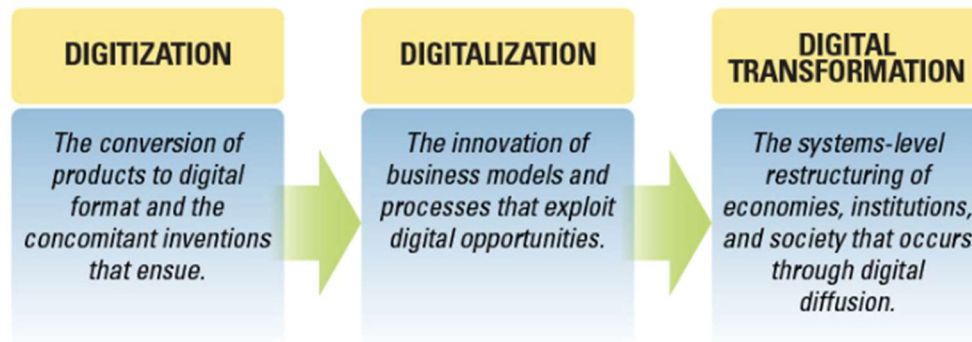
Many researchers ask themselves what the role of the accountant is in the ongoing digital revolution in the academic literature (Jeacle and Carter, 2014; Frey and Osborne, 2017; Taipaleenmäki and Ikäheimo, 2013). Further, some authors indicate limited coverage of the digitalization term (Parviainen et al., 2017; Henriette et al., 2015). Kaarbøe et al. (2018) examined approximately 30 literature reviews and found that the current research only includes limited aspects of the theme digitalization. They argue that the literature reviews conducted primarily focuses on Big Data and social media as digitalization tools, and they ask for greater diversity in how digitalization is related to data analysis, Robotics, and Artificial Intelligence.

Gbadegeshin (2019) argues that despite the significant impact of digitalization, there are not as many scholarly studies on the topic. Besides, he points out that practitioners write a lot of existing reports in the form of reports, whitepapers, consulting companies, service guides, and blogs. These pieces of writings are concentrating on digital transformation and are both opinion-based and speculations. Therefore, Parviainen et al. (2017) argue that it will be challenging for firms to know how suitable and reliable the information is for their situation. Consequently, we want to investigate further into the impact of digitalization on the accountant's role as technology continues to evolve and change their profession.

2.2.1 What is digitalization?

In line with the common knowledge shared among professional bodies, academics and practitioners (Schumacher et al., 2016; Brennen and Kreiss, 2016) the term *digitalization* is many times interchanging used with the term *digitization*. Gbadegeshin (2019) explains that they express different things, even though both concepts are connected. To understand how digitalization proceeds we provide a theoretical framework developed by Unruh and Kiron (2017). According to Unruh and Kiron (2017), there is no consensus of the meaning of the terms: digitization, digitalization, and digital transformation. The definition of these terms often depends on who is using them, such as consultants and technologist. The terms are often misunderstood and bring confusion (Parviainen et al., 2017). Therefore, we seek to explain the difference using the framework below provided by Unruh and Kiron (2017).

A Framework for Understanding Digitalization



Framework by Unruh and Kiron (2017)

Digitization is referred to as the framework for digitalization and is defined as communicating analog data into digital sets. (Rachinger et al., 2018; Gbadegeshin, 2019; Unruh and Kiron, 2017). Digitalization gives exploitation of digital opportunities (Rachinger et al., 2018), meaning that innovators unfold new business models and business process that can take benefits of the recently digitized products (Unruh and Kiron, 2017). At last, several researchers have identified digital transformation as *"the changes associated with the application of digital technology in all aspects of human society."* (Stolterman and Fors, 2004, p. 689; Henriette et al., 2015, p. 432; Parviainen et al., 2017, p. 64). According to recent research, Parviainen et al. (2017) identify digital transformation as the changes in how we work, in roles and business offerings caused by implementing digital technologies in the organization or the operating environment of the organization.

2.2.2 The stages of technological development in accounting

Researchers have described the accountants' history of using information technology in the finance function as a three-stage period (Källroos and Havelka, 2017; Kaarbøe et al., 2018). The first-period concern the transition from manual systems to recording the financial statement in the functional IT-system. Meanwhile, the second period involves introducing an Enterprise Resource Planning (ERP) system. We are currently participating in the final stage; using advanced digital solutions. In the following section, we will explain the different periods of digitalization and its impact on the accountant's role.

First period: From manual to computerized accounting

The literature perceives Luca Pacioli as the father of accounting education because of his invention of double-entry bookkeeping, which is still being used today (Sangster and Scataglinibelghitar, 2010). Indeed, modern accounting is founded by this scientific system (Amanamah et al., 2016). Also, there has been a significant shift from manual to automated accounting systems over the past few decades (Arcega et al., 2015). Since the 1950s, it became easier and quicker to handle massive data and produce more accurate and timely reports because of the implementation of using computers for processing and storage information (Murungi and Kayigamba, 2015).

Before the 1980s traditionally, accounting was performed manually by recording all the transactions in columnar papers and kept in voluminous binders (Kaur, 2017). Further, Shiraj (2015) explains the tasks of traditional accountants involved recording financial information mainly by manual work, papers, and journals. Since accountants need to pay attention when entering data while they are doing accounting works, the researcher points out that traditional accounting can be understood as quite informative. Computerized accounting uses software packages, which can do all traditional accounting works within the computer. Sam et al. (2012) mention in their study that a computerized accounting system seems to reduce the challenges in book record keeping practice. Besides, Warren et al. (2014) argue that computer-based systems usually are more accurate than manual methods. Nevertheless, still, today, companies can choose to use a manual accounting system, computerized accounting system, or a combination of both (Scott, 2015).

As soon as computers became popular with inexpensive software, the work of the accountants stepped into this medium: where the concept remained unchanged while the methods shifted from papers to program (Kaur, 2017). Further, Ghasemi et al. (2011) argue that the companies' ability to establish and use computerized systems to track and record financial transaction is recognized as the most significant influence IT has made on accounting. Advancement in IT has transformed many firms in the public accounting industry. Moreover, at the turn of the millennium, Ghasemi et al. (2011) point out that the slow-paced and conservative accounting field experienced an overwhelming change because of the rapid changes in the environment.

Even though employees may never have to make a pencil entry into a sales journal again, researchers emphasize the importance of understanding how the flow of data through a manual system and double entry systems work (Arcega et al., 2015). Moreover, Scott (2015) points out the importance of the operator's ability and knowledge of accounting. The operator needs to be skillful to comprehend the correct information into the computer program.

Second Period: Introduction of ERP system

The computer industry has created ways of connecting PCs into larger systems using client-server technology and thus paved the way for integrated information systems, and particularly Enterprise resource planning (ERP) systems (Scapens and Jazayeri, 2003). McGaughey and Gunasekaran (2009, p. 360) define ERP as an *"information system that integrates business processes, with the aim of creating value and reducing costs by making the right information available to the right people at the right time to help them make good decisions in managing resources productively and proactively."*

Initially, ERP was a back-office system because the information system included processes and activities, which the clients and the general public were not directly involved (McGaughey and Gunasekaran, 2009). Functions typically supported by ERP consisted of extensive software systems that integrate several business-process such as accounting, manufacturing, human resources, supply chain, sales, finance, budgeting, and customer service activities (Rajan and Baral, 2015). In general, the goal of a traditional ERP system was greater efficiency, and to a lesser extent, effectiveness (McGaughey and Gunasekaran, 2009).

As technology evolves, ERP systems rapidly moved into front office functions (CSCMP and Sanders, 2014). According to McGaughey and Gunasekaran (2009), the goal of most companies adopting ERP was to replace various functional systems with a single integrated system for delivering faster, better, and cheaper services. However, the implementation of ERP is a challenging process as it includes various types of end users (Rajan and Baral, 2015). Since an ERP system cuts across different functional units of an organization, the scientists point out it needs to be managed appropriately during its implementation because otherwise, it might lead to resistance from users.

Since accounting literacy, through ERPs has become easily transferable to non-accountants, such as information system people and line managers, Caglio (2003) argues that the accountant's traditional role within organizations is declining and accountants no longer have a monopoly of accounting knowledge because of these information systems. In this context, the author questions the boundaries and the traditional view of accounting as the core of an organization information system. On the one hand, Caglio (2003) claims that there is evidence that the accountant's information provision role diminishes because of the downsizing of the accounting department of many companies that have implemented an ERP-system.

On the other hand, Caglio (2003) explains that accounting professionals are creating a more comprehensive role because they work with more data interpretation and consulting work and is less in charge of data gathering. ERP system is believed to decrease the time for accounting procedures such as financial reports because these are a task that could easily be automated (Goumas et al., 2018). Further, Caglio (2003) says that the system has expanded the accountant's capabilities, while at the same time removed many number-crunching assignments. As a result, Goumas et al. (2018) and Caglio (2003) point out that firm to a greater extent looks for accountants who can use their time and competence in areas as strategic decision-making, business management, and information technology initiatives.

The demand for ERP software increases because of its importance, and Appandairajan et al. (2012) believe that combining the cloud-based solution with ERP will lead to a more efficient business process. Moreover, the authors encourage more firms to replace their conventional ERP system with cloud-based ERP. A cloud-based solution consists of a third-company providing the storage of the data in their servers and maintenance of the systems (Fernández-Cardenosa et al., 2012). The technology enables people to log in and access their data from any computer or site (Christauskas and Miseviciene, 2012). Mulholland, Pyke, and Fingar describe the cloud-based solution are in use in several accounting functions, such as bookkeeping, control reports, and analytics (cited in Heinzelmann, forthcoming).

On the one hand, this solution provides benefits such as lowering the costs, increasing productivity, and security (Dimitriu and Matei, 2015). The cost decreases by having access to the same IT systems used by the competitors without substantial capital investment in systems and improvements. At the same time, having a system available 24/7 allows the user to work when they want to. This method increases flexibility and business productivity because they

are not confining to only work during office hours. Also, the security increases because the data is saved "in the cloud" and not in a potentially vulnerable device.

On the other hand, challenges with cloud application services are that there is a lack of industry standards in providing these services (Appandairajan et al., 2012). The switching cost to the alternative provider will be high, and therefore, the user may find themselves reluctantly tied to the existing provider. Another challenge is cloud security, where professionals are concerned about data privacy, and thus, they have fears about data loss and leakage and breaches of confidentiality. Further, Takabi et al. (2010) emphasize the challenge of securing private and sensitive information. They argue that the data is easily accessed when it can be available to various services across the Internet. Also, Appandairajan et al. (2012) recognize compliance among one of the top cloud computing challenge. The problem relates to moving critical business information to the cloud do not comply with the regulations of the authorities.

According to Christensen (2018), the future ERP system will be a meeting place for transactions. Because of the vast quantities of operations, he argues that an ERP system should be built on in-memory technology to provide the required performance: fast and responsive. He emphasized that a well-established ERP system should invite innovation, and this can only take place when the core process works, and data quality is excellent. Only then one can begin to discuss digital ambitions that include Robotic technology, machine learning, and the Internet of Things (IoT).

Current period: Implementing Digitalization

Chua (2013) emphasizes that the previous change from adding machines of the 19th century to the calculators and computers of the 20th century are only simple propositions of technology development compared with the infinite amount of technologies that are now quickly changing the worlds of business and accountancy. Digitalization is today recognized as one of the essential trends changing civilization and industry in the near- and long-term future (Parviainen et al., 2017). Further, Gbadegeshin (2019) says digitalization is affecting nearly every aspect of human activity. Indeed, several researchers argue that digitalization keeps evolving and impacting our lives in countless ways and has come to stay as the Fourth Industrial Revolution (Gbadegeshin, 2019; Parviainen et al., 2017; Tihinen et al., 2016). It has

an impact on how we communicate, our working behavior, influence transportation systems, and even manufacturing processes (Gbadegeshin, 2019).

According to Kolbjørnsrud (2017), the media draws colorful images of the advancement of intelligent robots. The author argues that the media brings a lot of fear and expectations of what impact Artificial Intelligence can do with seemingly automated careers. Scientists expect Artificial Intelligence and Robotics will bring out the most significant upheavals in the workplace since the first industrial revolution (Brynjolfsson and McAfee, 2014), and estimates that from one third to over half of the jobs we have today are likely to be automated by 2030 (Chui et al., 2017; Frey and Osborne, 2017; Manyika et al., 2017).

Digitalization is an umbrella concept that includes several technological developments that include Artificial Intelligence, Robotics, machine learning, Internet of Things, Big Data, and more (Mezghani and Aloulou, 2019). In the following sections, we will narrow down the concept and emphasis on Big Data, Robotic Process Automation, and Artificial Intelligence.

Big Data

Big Data is one of the most important developments in management practice (Alles, 2015). Current usage of the term Big Data tends to refer to *"the use of predictive analytics, user behavior analytics, or certain other advanced data analysis methods that extract value from data, and seldom to a particular size of data set."* (Farhaoui, 2018, p. 408). Further, Suri et al. (2019) explain that Big Data include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy and data source.

When a new type of data become accessible, Warren et al. (2015) express that Big Data will have increasingly important implications for accounting. Big Data are data sets that are so vast and complex that traditional data-processing application software is insufficient to comprehend (Suri et al., 2019). At the same time, the data set becomes more advanced and more extensive than ever. Janvrin and Weidenmier Watson (2017) argue that the main object of accounting remains the same: to produce and provide information to internal and external decision makers. In a study by Warren et al. (2015), they conclude that Big Data can improve the accounting field. For instance, in managerial accounting, Big Data can assist the development of productive budgeting processes and management control systems. While in financial accounting, Big Data will contribute to enhancing the relevance and quality of

accounting information. Lastly, in reporting, Big Data can enable the development and enhancement of accounting standards, helping assuring accountants to persist beneficial information as the dynamic economy expand.

In a study conducted by Frey and Osborne (2017), they examined 702 occupations and predicted that the accounting profession is among the top business faces extinction with a probability of 94 %. On the contrary, Richins et al. (2017) argue that in a world of Big Data analytics, accountants can still create value. They insist that accountants are already skillful at a problem-driven analysis of structured data and are capable of entering a central role in the problem-driven report on Big Data. Further, their reasoning rests on two arguments. First, accountants already understand structured datasets, easing the transition to handle unstructured data. Also, secondly, they have to obtain the expertise of business fundamentals. Richins et al. (2017) have an optimistic view where Big Data analytics complements accountants' skills and knowledge rather than replacing accountants as Frey and Osborne (2017) conclude automation will do with their profession. At the same time, Richins et al. (2017) claim the educators, standards setters, and professional bodies must regulate their standards, curricula, and framework for comprehending the challenges of Big Data.

Robotic Process Automatic

Robotic Process Automation (RPA) is an evolving form of business process automation technology (Madakam et al., 2019) based on business processes of software robots that concern structured data, routine work and determinism effects (Aguirre and Rodriguez, 2017). RPA is now the new language of business, and Madakam et al. (2019) consider this technology to be among the 21st century most significant high-tech development. Aguirre and Rodriguez (2017) point out that RPA brings out the benefit of productivity, costs, speed, and error reduction.

Hindle et al. (2018, p. 4) and Suri et al. (2019, p. 57) define RPA as:

"A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management."

To streamline the repetitive and mundane business process, accounting firms use RPA software to automate the input, processing, and output of data across computer applications, (Cooper et al., 2018). Accounting and finance tasks are by their nature rule-based, and RPA is important in ruled-based duties for using structured data to accomplish a single correct result (Hindle et al., 2017). Further, Hindle et al. (2017) explain that not all RPA tools are identical. Indeed, many are very different from one another, and devices may vary on multiple dimensions. For instance, one aspect may be a deployment approach on desktops, servers, or cloud-based. While another dimension is functionality, meaning what the tool can perform or to what degree it is enterprise-safe or independent.

Rus (2015) believes that Robotics can and will influence our lives in the nearest future. Moreover, the author assumes that robots have the potential to advance the quality of our lives at home, work, and a lot of other places. Customized robots can create new jobs, improve the quality of existing jobs, and give people more time to focus on what they want to do. Consequently, the accountants will have a more productive working day, and therefore, they can also focus on other aspects than accounting.

Artificial Intelligence

Artificial Intelligence (AI) is quickly changing the operation of financial institutions and is anticipated to take over core functions because of operational effectiveness and cost savings (Chukwudi et al., 2018). Smith (2018) explains that for several decades, AI has been a part of media and practitioner conversation. However, the accounting implication of AI is currently emerging as a dominant force in the landscape.

Smith (2018, p. 242) defines Artificial Intelligence as:

"either a suite of programs or individual program that can replicate certain facets of human behavior and engagement in some situations."

Furthermore, Smith (2018) explains the accounting tasks become more automated due to the integration of AI tools. As mentioned earlier, previously accountants spend many working hours in traditional bookkeeping and accounting work. The author points out that one of the most apparent utilization of AI tools is enabling accountants to focus more on forwarding level advisory guidance.

A study completed by the University of Oxford in 2015 concluded that when machines take over the accountant's role of data analytics and number crunching, the profession would have a 95 percent chance of losing their jobs (Chukwudi et al., 2018). At the same time, they reported that some jobs disappeared, while others evolve when technology progresses, and the task becomes automated. According to Burgess (2018), it is a matter of debate whether the net impact on work will be positive or negative. In other words, will automation generate more employment than it demolishes? Burgess (2018) calls himself an optimist, where he believes that people will be able to adapt to this new work eventually, but not before going through a troublesome transition period.

According to Smith (2018), practitioners should be aware of the changing understanding of the accounting profession as the field adapts to and evolves alongside an increasing digitalized perception of the occupation. In his view, the accountants will move forward and have a more strategic and managerial oriented role than their traditional role as record keepers and verification agents of financial information. Still, he mentions that this positive and forward-looking perspective does not come without risks. Chukwudi et al. (2018) also warn about the dangers of AI is that people conclude too early that they understand it.

Chua (2013) points out that accountants will need to become more skilled at observing, evaluating, and utilize AI technology as these expert systems become commonplace. Further, the author explains that it is crucial for the accountants to take actions, stay informed, know what is achievable, evaluate the potential to automate tasks and lastly be up-skilled to benefit from the potential to focus on higher value work.

2.2.3 Accountants' role in digitalization

Throughout the phases of technology, accountants have always taken advantage of the rising advancement of technology in order to help them complete their tasks more accurately, rapidly, and relaxed (Chua, 2013). In this section, we will explain the possibilities of digitalization as well as its impact on the accounting role.

As technology emerges, Amiri and Amiri (2014) explain that accountants are exposed to both potential risks and opportunities. The promising advantages of digitalization are massive. For instance, through the processes of digitalizing information, firms can lower their cost up to 90

percent and turnaround times enhanced by multiple orders of magnitude. Besides, utilizing software instead of paper and manual processes could help firms to automatically collect data that could improve process performance, cost drivers, and causes of risk (Parviainen et al., 2017). Further, the authors explain the possibilities where managers can address problems before they become critical because of the real-time reports and dashboards on digital-process. Besides, there are risks related to the disruptive changes in the profession, meaning digitalization causes business roles to change entirely, and the firms' current business may become obsolete. Although the importance of digitalization is well known, firms are often striving to comprehend the potential impact and advantages of digitalization (Parviainen et al., 2017).

In the study by Granlund (2011), smaller firms are more reserved to adapt to the latest technology because of the expenses included, along with the hidden costs and they are sometimes engaged in ongoing development projects. Thus, the author asks whether it could be a result of insufficient resources and explain a reason might be that the employees are skeptical and fear modern tech developments. Besides Gooderham et al. (2004) mention that the firm's resources depend on the size of the company, and he claims the larger the size of the company, the role of an accountant is more likely shifted to be a business advisor. Also, Granlund (2011) observe as long the old systems and routines are functioning; it seems to be no compelling pressure deriving from authorities, leaders, or customers to change. Moreover, he explains the transition is slow and leads to a situation where nobody exploits the opportunities of digitalization no matter the positive arguments for it.

Amiri and Amiri (2014) argue that accountants can use new IT to improve their intra-organizational roles to avoid potential risk. Further, Zvirtes and Alves (2014) point out that IT can play a fundamental role in accounting work and activities. Till the 1960s, the literature recognizes an accountant as a bookkeeper with the role of ensuring that papers and documents were kept precisely (Amiri and Amiri, 2014). Besides, Aristita et al. (2009) envision accounting from the perspective of the relationship between the user of accounting information, on the one hand, and the one who obtains it, on the other hand. They explain the accountants' role as the producer and user of the information represent the same person because the owner managed his business directly and kept the bookkeeping that he needed.

With the advancement of economic activity, accounting was recognized as a separate profession and began increasing in complexity as double-entry accounting evolved (Aristita et al., 2009). Moreover, Aristita et al. (2009) explain that the producer of information, namely the accountant, is distinct from the user of the data. As mentioned, during the 1960s, computers allowed a more effective way to keep documents and books, enabling faster access of accountants to financial information for reporting purposes (Amiri and Amiri, 2014). The researchers argue this changed the accountants' role, and the accountants were no longer able to respond to management needs for reporting the firm's activities.

As technology continues to evolve, the role of the accountant, that is being the producer of information, is replaced by the technological system of information (Aristita et al., 2009). Further, the accountant is described as the assistant of the informatics expert, who creates, applies, and maintains the system under exploitation. The accountant is also considered to be an advisor of the administrator in the process of decision-making. During the 1970s with the evolving expansion of technology, Amiri and Amiri (2014) reported increased demand for a management information system (MIS). MIS is a computer-based system that makes information available to users with similar needs (McLeod and Schell, 2004). Amiri and Amiri (2014) suggest that MIS was established to support new roles of accountants because now accountants had to interpret all information as new MISs were producing complete information with no regard to its relevance. As a consequence, they faced difficulties with a high volume of extra information.

Vorster (2015) explains that customers and firms now are looking at the profession as a business advisor who can provide a bundle of services that are flexible, tailored, adaptable, and at affordable prices. Interestingly, the author claims the accountant's needs to adapt to ensure that they generate more value for their clients through innovation, creativity, and technology to become more competitive to thrive in the industry. For accountants to maintain their emerging role as the gatekeeper of corporate data, it is necessary for them to reskill (Chua, 2013). Also, the author explains to attract talent, develop and manage existing talent, the accountants must exploit emerging technologies. She points out that the CFO of the future need to be able to comprehend as much about high tech as they do about financial management. Lastly, the author warns that accountants will follow the dinosaur into extinction both individually and as a profession unless they embrace the evolving technology.

3 Method

In this chapter, we explain the method and our thought process behind the thesis. The purpose of this section is to include enough detail so that another researcher could replicate our study (Bui, 2014). Consequently, we begin presenting our research design, where we describe the actual procedures that were used to conduct the study. Subsequently, data collection is provided, followed by data analysis and evaluation of our choice of methods and ethical considerations.

3.1 Research Design

Research design is a general plan about how to answer the research questions (Saunders et al., 2015). The plan relates the conceptual research problem to relevant and practicable empirical research (Ghauri and Grønhaug, 2005).

The nature of the research will either be *exploratory*, *descriptive*, *explanatory*, or a combination of these three (Saunders et al., 2015). Exploratory research involves asking open questions to discover new insights into the topic investigated (Saunders et al., 2015). While the problem studied in descriptive research is well structured and understood (Ghauri and Grønhaug, 2005), and the purpose is to gain an accurate profile of events, persons or situations (Saunders et al., 2015). Finally, explanatory research is about studying a situation or a problem to explain the relationship between variables (Saunders et al., 2015).

The choice of our research design derives from what was most suited to answer our research questions:

1. *How has digitalization influenced the role of accountants today?*
2. *How do accountants believe digitalization will affect his future role and their self-understanding?*

We chose to use exploratory research because it is an appropriate method when researchers wish to get a new insight or clarify the understanding of a problem (Saunders et al., 2015). Also, in our opinion, it will increase our knowledge of the theme where we can determine

why and how things happen. Through exploratory study, the researchers develop concepts more clearly, establish priorities, and develop operational definitions (Cooper and Schindler, 2014). After searching for literature covering the topic, we found this field of research to be quite new, and consequently, few scientists have examined our research questions. There is literature about how digitalization can affect accounting firms. However, there is limited coverage regarding the accountant's self-understanding of how digitalization will impact their profession. By using exploratory research in our paper, we wished to get more insight into how digitalization was dealt with in different companies and the accountant's self-understanding of their role at the firm. A benefit of using this type of research is the opportunity to present and receive new knowledge about the topic and allowed us to have an open approach for the data collection and analyze (Saunders et al., 2015).

Moreover, in terms of the time horizon of the thesis, we have used cross-sectional research. This research involves investigating a particular phenomenon in a specific time (Saunders et al., 2015). We use this kind of study because of our constraints regarding resources and time horizon of this thesis.

3.1.1 Research approach

When we chose our research approach, we evaluated the extent to which our study is concerned with theory testing or theory building (Saunders et al., 2015). This choice raised an essential question regarding two different methods: deductive or inductive reasoning (Ghauri and Grønhaug, 2005). A deductive approach involves the researcher has a logical process of deriving a conclusion from a known premise or something known as accurate. The inductive approach is a systematic process of establishing a general proposition based on observation or particular facts. Nevertheless, Tjora (2017) claims that it is challenging to have a clean deductive approach. There is a third approach to theory development, which is abductive reasoning (Saunders et al. 2015). This approach is a midway between deductive and inductive reasoning. Abductive reasoning generally refers to as a circular research process where scientists examine both existing literature and empirical surroundings simultaneously to create a context-sensitive theory or to discover a theory that fits the empirical surrounding (Polsa, 2013). In our study, we were moving back and forth between theory and empirical evidence as we gained more knowledge about the problem. During our interviews, new information

appeared concerning our research problem that had not yet been addressed in theory. This empirical foundation gave us new questions and approaches that we could use in the next interviews. Simultaneously, we had to go back to the theory and see if there was previous literature about what we had found in the empirical evidence. Therefore, the abductive approach was best suited for our thesis.

Moreover, we have tried to be open-minded during the data collection and the analysis, to get the respondent's answers unaffected by our opinion. In this sense, we have tried to be as objective as possible. Chua (1986) has criticized the researcher in the accounting field of being self-righteous in decision-making because they construct the empirical reality as they observe. We pursue this argument and consider ourselves as self-interpretive about the empirical reality, and we have tried to be self-critical. However, some subjectivity will always occur because of our existing knowledge and experience about the topic.

3.1.2 Data approach

To answer our research questions, we needed to obtain data. There are two ways to gather data, by quantitative- or qualitative method (Thagaard, 2018). We believe a qualitative approach would be favorable for our thesis because we wanted to have a deeper understanding of the topic and gain more knowledge of the underlying factors affecting the accountant. It gave us the ability to evoke responses that were meaningful, unanticipated by the researcher as well as rich and explanatory (Mack et al., 2005). Further, a qualitative based approach gave us the possibility to immerse various phenomena by providing room for closeness between the respondents and us (Gibbs, 2018).

3.2 Data Collection

Data collection approaches are based on primary and secondary sources. In our thesis, we wanted to collect data that was relevant to our particular study and research problem, and therefore, we used mostly primary data (Ghauri and Grønhaug, 2005). When collecting data, our approach was based on qualitative research using personal interviews. According to Thagaard (2018), using an interview is a beneficial method for collecting great information. Consequently, we could gather information about the respondent's self-understanding,

motivation, and personal thoughts regarding digitalization. We collected secondary data from the web pages of the accounting firms to get information about their firm, size, and industry.

3.2.1 Selection of companies and respondents

The data used in our research consist of interviews with 13 accounting firms. The respondents differ in experience, ages, and gender and have been equally diversified. Their experience ranges from 6 months to 40 years. Also, the informants represented the CEO, the department leader, or the accountant from the company. Besides, all firms were free to choose who was going to be interviewed. The benefit of interviewing the CEO was to look at the overall picture of the company. By interviewing an accountant, we received information from the accountant himself/herself and received a vision of how the digitalization affected his/her role, challenges, and opportunities. Further, the benefit of interviewing the accounting leader is that we received an insight into the opinions of the mediators between the CEOs and accountants have. We interviewed six CEOs, four accounting leaders, and three accountants.

In this thesis, we recognized it was relevant to use purposive sample method as our primary sampling strategy. Mack et al. (2005) explain that purposive sampling involves identifying participants based on selected criteria. Because of the thesis time frame, expenses, the location of our university and our hometown, Oslo, we contacted several accounting firms located in Kristiansand, Lillestrøm, Ski, Moelv, and Oslo by email. We reached out to 109 accounting firms, and we received positive feedback from some firms. However, due to the nature of the profession, most of the firms were too busy at the beginning of the year to set aside time for an interview. Only eleven replied to our email, and one wished to participate. This firm responded early in April, two months after receiving the email. Due to the lack of desired participants from the emails, we had to use our network from students, family- and work relations to get in touch with other firms who wished to contribute.

The 13 companies that participated in our thesis were small, medium, and large. We have used definition of the company's size format by López and Vasquez-Brust (2012). Consequently, we considered firms with 1-20 employees as small, firms with 21-100 employees as medium and firms with above 100 employees as large. The 13 respondents included four small, four medium, and five large firms. By diversifying the companies by

size, we got an insight to see whether size mattered when we considered their opinion regarding digitalization and its impact. Also, in our opinion, we felt that having a variety of company selection increased the credibility of the results.

Company	Size	Job position
1	Small	CEO
2	Large	Accounting leader
3	Medium	Accountant
4	Medium	Accountant
5	Small	CEO
6	Large	Accounting leader
7	Medium	Accounting leader
8	Small	Accountant
9	Medium	CEO
10	Large	Accounting leader
11	Large	Accounting leader
12	Small	CEO
13	Large	CEO

Table 1: Presentation of company size and job position

3.2.2 Interview method

As mentioned earlier, we selected interviews as our primary source of collecting data. It is the most common method when using a qualitative approach (Thagaard, 2018). We believe interviews would be a suitable approach to access data on how people within accounting firms experienced digitalization. The purpose of using an interview is to get better and extensive information about the person's experience, point of view, and perspectives concerning the topic. We decided to use this method because it could provide us valid and reliable data that was relevant to our research questions and objectives of our thesis (Saunders et al., 2015).

Saunders et al. (2015) categorize the interviews as *structured*, *semi-structured*, or *unstructured* (in-depth). We have used semi-structured interviews because these kinds of meetings allowed us to structure the interview in one direction, but at the same time allowing flexibility and let the interviewee express their thoughts freely (Cooper and Schindler, 2014). Besides, the interview made it possible to clear up any misunderstandings (Saunders et al., 2015). By having a semi-structured interview, we could structure the order of the questions.

Also, we had the opportunity to add follow-up questions, and at the same time, have complex and open questions (Tjora, 2017; Thagaard, 2018). Due to the flexibility of using this kind of interview, we thought the best way to answer our research questions was to use semi-structured interviews as it complements exploratory research (Saunders et al., 2015).

3.2.3 Interview guide and preparations

To create a structured framework during the interviews, we developed an interview guide. Thagaard (2018) explains an interview guide as an overview of subjects and questions that the researcher wishes to get answered from the interviewee. When using a semi-structured interview, we were not obligated to use the guide to the letter. Indeed, we used the guide as a tool to remember essential topics and questions.

The interview environment is essential, and Tjora (2017) explains it is beneficial if it includes a relaxed atmosphere where the respondent can think out loud if they wish to. Moreover, the respondent should also feel free to provide input during the conversation. The interview began with an introduction of the topic and us, followed by simple questions. These techniques would give the interviewee a soft start (Tjora, 2017). We began asking questions about their experience and education, such as "What is your job position?" and "How long have you worked in the accounting industry?" In most cases, after these questions, the respondents felt comfortable with the situation, and we were able to ask for more personal matters. We followed Thagaard (2018) recommendations by including small pauses, to let the respondent think and reflect, and we informed when moving over to a new subject, to allow the respondent to decide if they were ready for a new topic or had more on their mind.

Some of the personal subjects discussed in the thesis included themes such as identity, role, self-understanding, changes, private thoughts of digitalization, opportunities, and challenges. The questions sounded; "What challenges and opportunities do you associate with the digitalization of the accounting industry?" and "What attributes are important in order to take advantage of digitalization?". These questions were open, and thus, the respondent could add more information regarding the topic (Saunders et al., 2015). As mentioned earlier, we sometimes had to use closed follow-up questions to clarify the answers. According to Tjora

(2017), the last questions should be simple, and therefore, we ended the interviews by asking the respondent if they had more to add and if they had questions for us.

During the interviews, we made some small changes in our interview guide. We made most of the changes after the first interview. We felt we needed to change the structure of the questions because when using open questions, the respondent usually informed about subjects we intended to ask later in the interview. Therefore, we believed some questions needed to be reformulated to create a better context, and some questions were left out. In the beginning, we did not send out any preparation material to the interviewee beforehand because we wanted to avoid rationalized stories. However, after a couple of interviews, we realized some of the questions required more considerations, and therefore, we send out a simplified guide consisting of the main topics. After this, we believe the participant felt more comfortable and prepared. Our impression was that all respondents had skimmed through the questions, except one who had some answers prepared with notes. Overall, we felt the responses were not rationalized because of the little time of preparation, considering the respondents received the interview guide a few days ahead and due to hectic workday during this time of the year. The last edition of our interview guide is in the appendix.

3.2.4 Completion of an interview

A qualitative interview can be performed face-to-face, through telephone, chat, or email (Jacobsen, 2015). We chose to have most of our meetings face-to-face because it created an atmosphere of trust and openness. This method enabled conversation flow and generally few distractions. Moreover, we were able to observe and have control over the situation. For this research, we conducted 12 face-to-face interviews and one telephone interview because of the geographic issue at the time of the meeting.

According to Jacobsen (2015), there is no right answer for how long the interview should last. However, the meeting should not exceed two hours, since then, both the interviewer and the respondents would be exhausted. Interviews lasting less than thirty minutes would be considered too short of receiving all relevant information. We thought a time frame between thirty to sixty minutes would be optimal to gather enough information. Our interview guide consisted of 14 main questions, and we also asked follow-up questions. Therefore, we asked

the respondents to set aside one hour for the interview. Most of our meetings lasted for approximately 45 minutes. However, the shortest lasted for 30 minutes, and the longest lasted for one and a half hour. The shortest interview was the interview completed on the phone.

During our interviews, we used a voice recorder, which all respondents agreed to, both orally and in writing. The voice recorder allowed us to be more present during the interview because we could focus entirely on the respondent's answers and it enables effective communication (Tjora, 2017; Saunders et al., 2015). Although we had a recorder, one of the interviewers had a pen and paper to take notes. We thought this was the most appropriate approach because then the respondent could relate to one of us. By doing this, one was able to focus on communication. While, the other focused on the answers. The one taking the notes also asked follow-up questions when she felt some answers needed more information or clarification.

It is essential for the respondent to feel comfortable and not distracted during the interview (Jacobsen, 2015; Tjora, 2017). Therefore, we thought about the environment and surroundings of the respondents. Consequently, we went to the respondent's workplace to make them feel comfortable, save time and expenses. However, we had two interviews, where one took place at our university, and the other was a telephone interview.

3.3 Data Analysis

In our thesis, we have tried to be as consistent and objective as possible. The purpose of this section is to interpret and report the informant's voices for others to read and learn from this study (Bui, 2013).

Often, the term "thematic analysis" is used in qualitative research and is outlined in five steps: compiling, disassembling, reassembling, interpreting, and concluding. We will describe the process of thematic analysis within the framework of Castleberry and Nolen (2018). When conducting a thematic analysis, we used a template that consisted of a list of codes or categories that expressed the themes reported from the data collection (Saunders et al., 2015). We chose thematic analysis because it gave us the chance to have a structured analysis of qualitative data from interviews, but at the same time offering a more flexible route to analyze, which permitted us to alter its use to the needs of our thesis (Saunders et al., 2015).

Using this method also made it possible for us to select central themes to investigate key themes and to recognize new issues that appeared through the process of data collection and analysis that we initially did not intend to focus on as we commenced our thesis (Saunders et al., 2015). For instance, nearly all informants talked about how the age-difference among accountants affects their view and standpoint regarding digitalization. Interestingly, this was not a theme we considered before we conducted the interviews.

Compiling

The first step to finding meaningful answers to our research questions is compiling the data into a useable form. Compiling means transcribing the data from the interview so that we can easily see the data (Castleberry and Nolen, 2018). We found the transcription process of 13 interviews to be time-consuming. However, by doing this ourselves, we achieved closeness to the data (Castleberry and Nolen, 2018). We tried to be consistent and detailed when we wrote down word for word. By doing this, we found non-worded expressions, which meant the respondent struggled to find the right word to explain or changed explanation. These expressions gave us an indication that the informant was unsure (Tjora, 2017). Moreover, by doing the transcription process coherent and detailed helped us stay objective as possible (Saunders et al., 2015), and at the same time gave us control over the raw data and facilitate the analysis (Jacobsen, 2015).

Disassembling

Next, we had to disassemble the data, which implies taking the data apart and develop meaningful categories. This procedure often requires coding (Castleberry and Nolen, 2018). The researchers define coding as *"the process by which raw data are gradually converted into usable data through the identification of themes, concepts, or ideas that have some connection with each other"* (Castleberry and Nolen, 2018, p. 808). We have used an Excel spreadsheet and coded after different patterns as experience and opinions. In our thesis, we have used open coding, which involves the disaggregation of data into units and then gave a label or a name to the units (Saunders et al., 2015). We wanted to have an open approach when categorizing because then we were able to see clearly which topics the respondents considered as significant. We had to think about the size of categories because we did not want a few units because of the chance of losing information or too many because of the possibility of losing control (Thagaard, 2018).

Reassembling

The next step is reassembling, which involves putting the codes or categories into context with each other to develop themes. Castleberry and Nolen (2018, p. 809), defines a theme as a concept that *"captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set."* When doing this, we were able to structure and reduce qualitative data as well as communicate relation among informants, codes, and context.

Interpreting

Interpreting was a crucial stage in the research work, where we had to make logical conclusions from the data introduced as codes and then themes. We had to interpret the meaning of our findings because data do not "speak for themselves" (Castleberry and Nolen, 2018). Moreover, the authors explain that after data has reassembled through coding, the scientist can take out a section from the data and view them with each other. This process is part of our next chapter Empirical Findings, where we will present our findings from our data collection and use direct citation from the interviews. Our interviews were in Norwegian, and we have translated the quotes to English as objective as possible. For anonymize the respondents, we refer the respondents as he or him in our findings. Castleberry and Nolen (2018), point out that in thematic analysis, what is relevant regarding the theme is not depended upon how much data is included within the theme or how often it occurs. Instead, the relevance is connected to whether it captures something meaningful concerning our two research questions.

Concluding

Our last step of the thematic analysis was to give a conclusion of the responses to our research question (Castleberry and Nolen, 2018). This section belongs to our last chapter's discussion and conclusion, where we discuss our empirical findings regarding our theoretical framework.

3.4 Evaluation of Method

In our last section, we will consider the quality of the data material presented in the thesis. We followed Saunders et al. (2015) recommendation for assessing the reliability and validity for evaluating our research method. At last, we discuss the ethical aspects of the research.

3.4.1 Reliability

Reliability refers to the stability of the measure and involves to what extent the researcher has influenced the data results (Ghauri and Grønhaug, 2005). Saunders et al. (2015) explain that reliability concerns the ability for another researcher to get the same results by using the same method. Generally, research would be reliable if the outcome of the measuring process is replicated (Jacobsen, 2015).

A potential threat to the research's reliability could be related to the relation between the respondent and us as interviewers. Saunders et al. (2015) point out that the respondent's answers might be affected by our body language, cadences, and if we adjust the situation with additional questions. We have tried not to have leading questions and not give any expressions to what our opinions were or desire of outcome during the interviews. Further, we used mainly open questions and used closed questions if necessary. By using the open questions, we gave the informant independency and flexibility to answer what was on their mind. The closed questions were used to a minimum and associated with clarifications, they mostly sounded, "So you think...?" and "Do I understand you correctly by saying...?" We tried to influence as little as possible during our interviews. However, one informant wanted reassurance from us when the person answered the question. We tried our best to say there is "no right or wrong answers," and we just wanted the respondent's honest opinion. Still, this could be a bias in our thesis. Nevertheless, we were aware of this when we analyzed the data.

Another aspect Saunders et al. (2015) point out is that the respondents often wish to present themselves as a good figure, and sensitive subjects can be harder to answer than other topics. We have explained both orally and in writing the importance of their participation and emphasized the anonymity. Also, we thought to anonymize would make the respondent feel comfortable and open more up to questions regarding sensitive- and personal subjects.

Our audio recordings were used to reinsure the information provided by the respondents. However, it can affect the reliability of the research (Bell et al., 2018; Saunders et al., 2015). We ensured the respondents that the tapes were stored safely in the cloud, which only we had access to and will be deleted after the submission of the paper. None of the respondents hesitated or declined when we asked for permission for using the recorder. Some respondents were cursing during the interview and said right after, "I should not say that while we are

recording," which we perceived they told humorously. Otherwise, none drew attention to the recorder, and we got the impression the information received would be the same with and without the recorder. During the process of the transcript the records, we tried to be detailed and accurate. Gibbs (2018) explains that through accurate transcription, the reliability will increase.

When undertaking research, it is necessary to be reflexive and not neglect or ignore our own biases. Even though we have tried to be subjective and self-interpretive, avoiding our biases would likely be impossible. Thus, we aimed to be up-front with our choices and explained our thought process behind this thesis. We have used the literature and received advice from our supervisor under the process of preparing, gather, and analyze the data. Further, we explain and describe in detail about our approach, and we believe the data collected are as reliable and correct they could be under the circumstances we had. However, according to Bell et al. (2018), it is difficult or even impossible to replicate qualitative findings. We have chosen to focus on what stroke us as significant regarding digitalization, whereas other researchers are likely to empathize with other issues. Therefore, it would be challenged to replicate our thesis.

3.4.2 Validity

Validity refers to how well the data material actual answers to the research questions (Tjora, 2017). There are two types of validity: internal and external (Jacobsen, 2015). The internal validity concerns whether the results are perceived as correct. Thagaard (2018) indicates that the researchers' interpretation influences the validity. In this paper, the internal validity concerns if we have gained insight into the significant factors for how the digitalization affect the accountant's role today and in the future.

The interviews and analysis of the data can be affected by our opinions (Saunders et al., 2015), and therefore, we have tried to be objective during the interviews and the analysis of the data to secure the intern validity in our thesis. During the study and discussion of the data we have used coding and always compared each item of data with others, moving between inductive (data to theory), but at the same time had a deductive approach (theory to data). While discovering relationships between codes and interpreting them, we are thinking inductively, meaning we developed our theory from the relationship among codes. This

interpretation needed testing with other data from our theoretical framework, where we had to think deductively. We also went back to the transcripts to get the whole picture and understand the codes in the right context. To strengthen the internal validity, we have compared available theory with the data (Saunders et al., 2015).

The external validity is about to which extent the findings can be generalized to all relevant context (Jacobsen, 2015; Saunders et al., 2015). The purpose of this qualitative research is to investigate further into our research questions, and due to the nature of this study, it is challenging to generalize the findings to another context. We cannot claim that our results from a sample size of 13 accounting firms can be generalized for the entire accounting industry. However, the findings can be relevant in other contexts. We expect the change in different professional roles can have similarities with our findings, but since we are focusing on accounting firms, this should be considered before generalizing to other industries. The external validity in this research can be regarded as low, but due to the approach and purpose of this research, we believe it is not problematic.

3.4.3 Ethical considerations

It is crucial to be conscious of the ethical challenges that must be addressed to maintain a high level of research ethics during the study (Jacobsen, 2015). The objective of the research ethics was to ensure that no one was harmed or suffered adverse consequences from our research activities (Cooper and Schindler, 2014). We will now present Jacobsen's (2015) ethical concerns when undertaking research.

First, Jacobsen (2015) explains a fundamental ethical requirement in research is informed consent. This requirement involves the respondent freedom to decide whether he wants to participate and ensures that he receives full information regarding the investigation and understands the concept. We aimed to satisfy the ethical principles of treating all respondents respectfully. Therefore, we were responsible for the analysis of data, reporting by acting with objectivity and integrity (Tjora, 2017). By doing this, we informed all the respondents about our purpose, research questions, and promised anonymization. All the respondents had to sign a consent form, which ensured their participation is voluntarily and their right to withdraw from our study at any time. Written consent can both protect the researchers and the

participants (Thagaard, 2018). Also, it can secure information regarding confidentiality and availability of the data.

Another requirement in the research ethics is privacy requirements (Jacobsen, 2015). This concern an evaluation regarding the possibility to identify individuals from the data and how sensitive and private the gathered information is. Information about religion, political view, sexual relations, and health conditions are considered confidential (Jacobsen, 2015). We believe private- and sensitive information is irrelevant for answering our research, and consequently, the information gathered from the respondents does not deal with any sensitive or private matters. Moreover, we think it will be challenging for other researchers and readers to recognize our informants; this is because we have kept their anonymity by only describing the respondents' firm size and location.

Furthermore, Jacobsen (2015) explains that concession and notification obligation is also crucial for research ethics. To start the data collection, we had to describe and send in a presentation of our research to Norsk samfunnsvitenskapelig datatjeneste (NSD), a Norwegian organization that focuses on securing research data. We presented our approach, research questions, the desire for anonymity for the participants, and a description of the preservation of data. After receiving the approval to conduct our study, we started the interviews. We used a dictaphone as our audio recording tool to preserve the data. Even though the recordings included sensitive, private, or identifiable information, the data were stored safely in the cloud.

The last aspect claimed by Jacobsen (2015), is a requirement for the correct presentation of data. The requirement entails the respondents' right to correct the presentation of the data. It was essential for us to interpret what the informants intended and wished to express during the interview. As mentioned earlier, we used closed questions only to clarify any confusion or potential misunderstandings and transcribed the audio recordings precisely. Besides, we have tried to emphasize all aspects of the data collected equally, and not strategic present one aspect and withhold or conceal others. Overall, we believe we have been able to preserve an adequate ethical consideration throughout the thesis.

4 Empirical findings

In this chapter, we are presenting our main findings. Our findings form the basis for answering our research questions:

- *How has digitalization influenced the role of accountants today?*
- *How do accountants believe digitalization will affect his future role and their self-understanding?*

This chapter unfolds in two main sections, the first describes the accountants' present situation, and the second section describes the future situation.

4.1 Present situation

4.1.1 Digitalization of accounting

In this subsection, we will present what the accountants, accounting leaders, and CEOs believe the meaning of digitalization involves and what influence it has for the accountants. Subsequently, we will present what the respondents recognize as they key drivers of digitalization. In order to do this, we have compiled data from the respondents.

What is the meaning of digitalization?

Most of the respondents explained digitalization rather short and consistent, while a few informants elaborated more in-depth connecting the question to other themes. Still, the majority of the respondents claimed digitalization was about converting analog to digital systems, and it involved making the process more effective and automated. One accounting leader (7) answered this when we asked what the meaning of digitalization involves:

"After all, it is about everything that will be electronically. Human hands do not touch it. Everything goes into the cloud. There is little use of paper. The woman sitting next to me does not have a single paper on her desk." Accounting leader (7)

Furthermore, another accounting leader (10) elaborated more about digitalization and pointed out it is more than just the manual work disappearing:

"The next step is what everyone is talking about; it is the robot-thing. There have been many improvements in the systems, even though you have not called it something special. There has always been efficiency improvement." Accounting leader (10)

The quotation illustrates that technology has always been a part of the accountant's work, and digitalization is associated with an ongoing process that increases the effectiveness and productivity of the firm.

What does digitalization mean for the accountant?

The majority of the respondents explained that digitalization influences the accountant concerning changing their work and characteristic. For instance, four respondents believed digitalization removed many of the accountant's tedious tasks such as bookkeeping, invoicing, and reporting. Further, one accounting leader (11) replied this when we asked what digitalization meant for the accountant:

"For the accountant, it becomes as I said before, some other types of tasks. By doing things automatically, you will have a greater need for controlling, analyzing, and then you have to understand the numbers better." Accounting leader (11)

What are the key drivers of digitalization?

Overall the majority of the respondents explained the key drivers of digitalization were the expectations from customers, regulation of authorities, taking advantage of being productive and saving expenses. Some also believe everything is expected to move faster because of rapid technology development. When we asked one accounting leader (11) what the key drivers concerning digitalization were, he replied:

" I believe it is the customer, the market and customers demand and the expectations of what will happen [...]. You want to know what is on your account now, not receive the information at the end of the month. That is not so interesting, that is old news." Accounting leader (11)

The quotation acknowledges that the essential drivers of technology are the need for always to be updated. Everyone wants real-time information because otherwise, you are not following the market.

While another accounting leader (6) points out the key drivers are:

"To be honest, it is about money. This is how one gets a competitive advantage over its competitors. After all, taking the big step in order to get the whole market for yourself. That is the biggest driver. It may not be politically correct. However, I think everyone is aware of this. Cash is King." Accounting leader (6)

The quotation illustrates how people are mostly concerned about money. Therefore, the accounting leader (6) believes the drivers for digitalization is the desire to have a competitive advantage in the industry, and then the accountants need to be concerned about which technology they are going to pursue because there is always a risk related to new technology. Thus, he claims money is essential.

Besides, one CEO (1) and one accountant (3) believe in order to profit, the industry needs to change and be willing to digitalize. They believe the accountants do not have an option, and the CEO (1) argues it is not the accountant that is the key driver:

"Nobody wants to change just to change. We are changing because we have to and we have to follow the market in order to survive. It has to be an external influence in order to change." CEO (1)

The quotation recognizes that it is not the accountant himself or the company that are the drivers of digitalization. He believes the accountant must change because of the influence of external industries, such as the vendors of accounting systems. Moreover, the CEO (1) explains the vendors are pressuring them to automate in order to stay digitalized and updated. He argues the vendors are dependent on the accountants to purchase their newest systems because unless the accountant survives, the vendors will not survive either.

On the contrary, other respondents believe the accountant and the company are drivers of digitalization. For instance, one CEO (13) explains their employees are the drivers because of their desire and commitment of new technology, and he says:

"The one who drives digitalization is the company and most of the department managers. We have one at the top, which is very fond of digitalization and is engaged and committed. We have a department of 20 IT-people, and they think it is fun, and I agree it is fun." CEO (13)

4.1.2 The accountants' exposure to digitalization

Most of the firms are in the early stage of digitalization. We observe that some companies have a great amount of data concerning clients, products, transactions, and more. Therefore, the respondents are enthusiastic about Big Data.

"I believe Big Data will make it possible to analyze greater and more complex data, which makes the outcome faster and more accurate than earlier." CEO (5)

The quotation acknowledges Big Data comprehend vast amounts of data. This is a tool the respondents are fond of and express Big Data is an essential part of the digitalization movement. However, our impression is that the respondents are more enthusiastic about newer technology such as Artificial Intelligence (AI) and Robotics Process Automation (RPA).

The firms are undertaking projects and pilots regarding AI and RPA. Seven respondents are using RPA, and four respondents have AI systems. Every firm undertaking RPA also uses AI. Besides, many of the respondents use cloud-based ERP systems. Our findings imply the respondents are generally satisfied with the cloud solution, and they express the data is available anytime and anywhere. Also, they explain that many customers find it exciting and convenient because they can use it on mobile applications and follow the progress of the financial data. Moreover, accountant (4) compares the traditional ERP system with the cloud-based solution: *"The systems we use are built in the cloud, and therefore, they are more suitable in the cloud than traditional systems that have been moved to the cloud."*

The quotation above indicates more value of using cloud-based systems than a conventional ERP system. Further, the accountant (4) explained the benefits of applying a cloud-based system that are built in the cloud involves a shorter implementation time than the traditional ERP system that has been moved to the cloud. Moreover, two of the respondents expressed they still have an operating computer from the 80s in addition to an ERP system. However, a CEO (12) mentions that the old operating system is still useable because of the continuous updates. Thus, our findings indicate that firms are in different stages concerning digitalization:

“If there is a new system, not everyone will use it straight-away. There are some innovators, some in second place and then you have the rest. We will come trotting after. And those who fail to keep up with technology are out of business.”

Accounting leader (7)

The quotations illustrate that there is a distinction in the industry, between the *innovators* and the *followers*. More specifically, the innovators are the firms who are further in the digitalization, and the followers want to wait and see how the technology unfolds before implementing the tech.

Several respondents recognize that digitalization is evolving gradually, and many have just begun using robots and AI during the last 1-1,5 year. They are in the early stage of becoming digitalized fully, and most of our respondents using robots say the RPA-technology enables manual processes to become more automated. It is a tool that many firms are committed to and continually test to find out how to make manual actions more effective. Until now, the primary task usually involves managing incoming invoices. One accounting leader (11) explained: *“What we see when using RPA, is that there must be quite similar and standard processes.”*

Even though the majority of the respondents recognize robots as a suitable and attractive tool, two of the respondents pointed out that robots are a temporary solution, because they have suboptimal systems. For instance, one accounting leader (6) explains that their payroll system is outdated. He mentions they are considering replacing the system because having a system that is not cloud-based is preventing productivity. Further, he explains that the reason that prevents them from replacing the system is the sunk-cost effect of the traditional ERP system.

It is expensive for the firm, and therefore, another accounting leader (11) argued that using robots as a short-term solution can help save cost.

“I do not think robotics is the most significant thing because Robotics consists of a software robot that only performs standard repetitive tasks for you. That requires zero thinking. Also, in my world, those tasks should instead be gone. Then, either the system must solve it, or there must be some regulatory change.” Accounting leader (6)

The quotations specify that robots are not the leading technology firms should focus on utilizing. This is because robots are rule-based and only perform standard repetitive tasks, which the respondents recognized as a waste of time. He believes the standard tasks are going to be automated, which means the procedure completes with minimal human assistance. Therefore, he argues that the systems need to be sufficient enough to automate the repetitive tasks, and the authorities need to facilities innovation. As of today, he feels the regulatory do not follow technological development. However, the respondent acknowledges that robots could be used on suboptimal systems to help save cost.

From the observation, we recognize that Artificial Intelligence is a tool the firms only use on a few customers. This is because it is complicated in the sense that the accountants need to monitor it accurately. The respondents explain they are cautious, and AI should be in use with consideration and openness. We observe that there are different opinions regarding the ability and potential of AI. One accountant (4) was more doubtful about the ability of AI to simplify the accountant's work. He had been a part of the AI project at the firm, which they started to develop six months ago. The accountant (4) uses AI provided by a Norwegian IT-firm that is a platform for storing a large amount of information, and it learns continuously from how the accountants work.

“I think AI is entirely hopeless. It should be able to interpret everything. For instance, we had a customer in the restaurant industry. They buy a lot of milk, and when AI interpreted the percentages, it recognizes it as alcohol every time, so then cream became strong wine, while milk became beer. This happened every single time, no matter how much I directed it.” Accountant (4)

While accounting leader (6) who has worked with AI for one and a half year said:

"In the beginning, it was complete chaos. It was terrible to use, but that is how technology is. For example, if AI gets an incoming invoice, then he increases the amount. I think it was a thousand each time because he did not understand the sign, comma. Also, it does not look terrific when you try to pay 11 billion from the customer's bank account. It was like that for a while, it was a lot of error, and everything was interest because somewhere on the invoice it says that you are charged interest if you do not pay. [...] We spent much time trying to figure it out. However, let us say the last half year, I feel that it is now a tool we can use, and we now save time using it." Accounting leader (6)

These quotations recognize that AI can be challenging to comprehend and needs to be carefully monitored and directed. Indeed, the firms who are in the early stage of implementing AI are often struggling, while the companies who have used it for a lengthened period is now starting to see the benefits and is positive towards its ability.

4.1.3 What is a good accountant?

The description of a good accountant varies across the companies and respondents. All the respondents use short characteristics when defining a good accountant. The qualities mentioned repeatedly are precise, attention to details, focus on customer needs, and communications skills. Also, six respondents mentioned fundamental knowledge as an essential characteristic.

"They must understand accounting. It is easy to record a debit, credit on an invoice. When people do not think about the meaning of the numbers, it could get very wrong. Also, they must know a bit about accounting rules, of course." CEO (9)

The quotation acknowledges the accountants need to know the bottom line of accounting, meaning the CEO (9) wants to ensure that the accountants understand their solutions and how the results arrive. Otherwise, it will have consequences for the firm and clients. If the accountants do not understand the basic principles of accounting, then their clients could make poor financial decisions and put themselves in a difficult financial situation. Even though some respondents mentioned fundamental knowledge is essential, one CEO (1)

explained that a person is not a good accountant if he/she only obtains a fundamental knowledge of accounting.

"If you have personal qualities such as be willing to learn, punctual, positive, have a good work ethic and are passionate about accounting, then I can teach you accounting. It will be no problem to learn when you have these qualities. However, if you do know to account and do not have these qualities, then you will not be a good employee in this company. Most probably not succeed elsewhere either. So, I am most concerned with people's attitudes, values, and settings for life, the field, and the job."

CEO (1)

The quotation specifies that everyone can learn the fundamental of accounting. In order to succeed as an accountant, the CEO (1) explains the accountants need to obtain some personal qualities because the soft skills are not something a person quickly can learn, but a part of who you are. Besides, one accountant (3) agrees that the accountants need to understand more than the bottom line of accounting. Thus, he recognizes a good accountant as:

"A good accountant must do more than just the basic. All accounting companies have more to go on when it comes to talking unsolicited contact with customers concerning consulting. [...] The customer is mostly satisfied, but they expect this, in a setting where the competition is high. To come up with the overall picture and come up with advice that the customer may not have thought of before is important." Accountant (3)

The quotation clarifies that the respondent expects more of the accountant. Some clients already expect consulting services nowadays, and therefore, many accountants have stepped out of their comfort zone and taken unsolicited contact with their clients regarding consulting. We observe several accountants want to do more than the preparation and examine financial records for their clients. Many respondents believe giving advice and consulting are a part of being a good accountant. Also, the expectation among the customers differs:

"I have companies that are large with high revenues, to the "carpenter in the corner." The carpenter in the corner does not want to deal with any digitalization, and he would rather have it in the old way. Of course, not all, but the average carpenter."

CEO (5)

"Customers expect the accountant to fix everything related to accounting and finance. They put it away to a professional part and expect the accountant to notify if there is something they need to do. I think this applies to the customers who are not so good with accounting, numbers, and finances. While the customers who are familiar with accounting and finance will probably expect more [...] They will expect the quality to be excellent and to provide advice and input on things that can be improved."

Accountant (8)

These quotations illustrate that there are different expectations among the customers, and not every client is familiar with accounting practice. The clients with limited accounting background want to deliver their accounts to a professional because they trust the accountant will inform them when accounts are incorrect. The expectation increases when the customers have more fundamental knowledge regarding accounting. These customers want advice on how they can change their strategy in order to save cost and earn more money.

4.1.4 Challenges with digitalization

Concerning challenges with digitalization, all the respondents believe it is essential to take action in technology, but there has been difficult for some. Also, others mention the transition from paper to digital tools has been challenging, while some believe it has been a natural and unnoticeable change.

Challenges adapting to digitalization

Several respondents mentioned that the technological process has been slow, and they believe it is because of the accountants, customers, and authorities. They have heard the last decade that the automation and digitalization are just right around the corner. Nevertheless, the majority of the industry is not there. Some of the respondents have managed to come far, as we have seen in previous sections. However, one accounting leader (7) explained it took extended time before the employees wanted to scan documents electronically:

"It took five years from I said it, till it was up and running [...] While now if you deliver an accounting document and it is not scanned, people are almost looking down at you. So, that is pretty funny." Accounting leader (7)

Furthermore, one accountant (8) mentioned that when Altinn, was introduced, many accountants were skeptical. Altinn is an Internet portal for digital dialogue between business, private individuals, and government agencies. This is a platform where firms can send in documents electronically. However, not everyone accepted it in the beginning:

“Not everyone was a fan of Altinn in the beginning [...] there are many accountants who think it sounded quite foolish to send things electronically. Why should we do that? We have always submitted on paper! Now, I believe most of the accountants think Altinn is a good thing. It only takes time to get used to it and implement it, and then you will save time”. Accountant (8)

The quotation explains a typical situation where people resist trying new approaches to work. Interestingly, the respondents recognize that the reason might include the fear of the unknown, and if the old systems and routines are still working, many accountants do not perceive the point of changing their behavior. Notwithstanding, the illustration could recognize a general understanding that does not only apply for accountants but most people. Overall, the respondents argued that people are reluctant to change because we are comfortable doing what we are used to. For instance, our parents were familiar with reading news on paper, they have been doing this way from some time, and consequently, they believe it must be the best way. Nevertheless, now, most people read the news online. For the most part, we love routines and procedures. It only takes time before we get used to changes and can experience the benefits such as news online are always accessible.

Throughout the observation, we recognized that the respondents experienced difficulties with changing their mindset. One CEO (5) explained: *“The challenge is to adapt and use the necessary digitalization.”*

Also, one CEO (13) mentioned:

“The challenge is really about changing mindset when we work with digital programs than when we worked with so-called manual programs [...]. We must turn around how we work, our routines inside the office, and our mindset.” CEO (13)

These quotations indicate the accountants found it challenging to adapt to new working routines because they are familiar with working with manual accounting. When a CEO (5) mentions "*necessary digitalization*", it implies that he only wants to use the digital tools when he feels it is relevant. From the observation, he mentions that it is not necessary to use all new digitalization tools such as Artificial Intelligence and robots.

Furthermore, some respondents mentioned that customers also hesitate to adopt new technology. Even though some customers expect digitalization, other customers struggle using new programs and submission methods of accounting documents.

"We still have a lot of customers who live in the "Stone Age" who do not realize for us to deliver the price we provide, we are dependent on receiving the documents in a certain way from the customer. For example, if we are handling the documents in paper, it will cost them very much." Accounting leader (2)

Moreover, many respondents mentioned that the authorities put restrictions and rules that slow down the digitalization process. Besides, there are rules to follow that might not be compliant with the digital movement. One accounting leader (10) tells about the difficulties to digitalize because rules changes, and they must shift the focus of how they work:

"We need to consider authorities regulations. Also, it goes slowly. There are laws and regulation that puts limitation that one must follow and continue to adapt. However, it may not be the same in 5 years because then there are changes or something new. So, this is a limitation that we need to comprehend." Accounting leader (10)

The authorities have set a standard format for invoice messages in the Norwegian market called Electronic Commerce Format (ECF) or in Norwegian called Elektronisk Handelsformat (EHF). ECF is a standard for the electronic exchange of information between the client and supplier. The respondents explain the purpose is to establish a standard format for the client and the accountant, and if the customer follows the standard, then the accountant could read the document in his system. Many respondents argue that the format facilitates an efficient implementation. However, many of the respondents explained the process is moving slowly, and most of the respondents said that only 30-50% of their customer uses ECF.

"I was surprised how long it took to implement ECF. Such electronic invoices have taken a long time. Also, that is because the industry is generally slower to adopt new technology. Everyone, all the 100 % should be able to send electronically today, but that is not the case. Many still send them by mail, but fewer are doing this. All accounting systems can send the documents electronically so there should be more of it." Accounting leader (11)

Resistance from the older generation

According to some respondents, the resistant to new systems and technology can be the fear of losing their job. Especially for older accountants who are retiring in a few years and do not see the point by changing their work behavior. Further, one accountant (8) told that when he finished college and began working in a new big company, he experienced some hesitation from the older generation:

"You could say that those who were a little older in the office where like 55 +, they had their way of doing things. [...] We tried to introduce such a template, what we called a reconciliation template. Where we could reconcile the whole balance on a common template for all customers. So, everyone could jump in, because if one was sick, then one could take over. However, the old ones were struggling. They would not enter that spreadsheet in excel and save it. Already here we saw how difficult it was to get them to switch to an electronic reconciliation template. They did it eventually, but it was difficult. It was not done in a week, but it took several years." Accountant (8)

The quotation addresses the problem of age in the accountancy industry. Some respondents believe the mature accountants are less adaptable and have difficulties to keep up with the technology because they still believe their way of doing things is the most suitable. Besides, one accounting leader (6) expressed that the firm consequently has young employees because they are more familiar with technology:

"I think age has a lot to say in terms of having a low average age in this firm. I do not have any numbers, but let us say it is well below 30, maybe 28. It has a lot to say in terms of people who have grown up with technology and grown up with the Internet and mobile phones, apps, and all this. It would have been something else if we had an average age of 55, and no one owned a Laptop. Then it would be a little difficult."

Accounting leader (6)

While some companies focus on younger employees, a couple emphasizes the older generation are the ones with fundamental knowledge. Those are the one who has been working with accounting for several years and understands the work itself. Besides, one respondent believes the influential company culture will have an impact on the mindset, and the age difference is not a significant factor.

"There are many elderly people who have great expertise because they have worked there for many years, and you should not underestimate them." Accounting leader (10)

Data quality

Moreover, some respondents mention it is challenging to program systems, and they emphasize this is highly important because otherwise, the machine will continuously make mistakes.

"Data quality is a problem. Because I have seen many projects where you put a machine to learn on a data basis that might be crap. So, what has been done before is not correct. It is defective, and then the computer will learn based on this. Then you will get the wrong answer. Therefore, it is crucial how you compute the machines. We have seen many examples where it is not correct. When you receive the wrong values, people will be furious and not trust the system. It will take a long time before people start trusting them again. Therefore, it is crucial to set it up correctly the first time".

Accounting leader (10)

The quotation acknowledges that maintaining data quality is a challenging but necessary task. For clients to attain reliable and dependable customer data, companies must always manage the quality of data in order to trust the information and facilitate faster and more informed decisions.

4.1.5 Opportunities with digitalization

Technology has brought many possibilities, and in this subsection, we will describe the main opportunities. We find the respondents positive and eager about the opportunities regarding digitalization, where it brings less paper and a more productive workday.

Less paper

Most of the respondents recognize that the most noticeable change is the shift from manual to automated accounting systems where there is less physical paper than before.

"There has been a huge change between today versus five years ago. Five years ago, we were using paper and writing on the document number and all that, while now we almost do not have any paper." Accounting leader (11)

"Most accounting offices had to rent storage space outside their office because there was no room for all the binders in the past." Accountant (8)

These quotations indicate the change has been remarkable the later years. Many of the accountants have worked in the industry for several years. Notwithstanding, it is the past five years they have seen the impact of technology. Throughout our observation, we only saw one accounting firm that had binders at the office, while most of the firms digitalized their accounts. Several respondents mention cloud-based solutions has made it more time-efficient by collecting all the data in one place. Respondents believe the system has made it more clearly, orderly, and easier for the accountant and customers. One accounting leader (10) points out: *"The web-based was such a mile-point before, and now, it is almost a prerequisite."*

More efficient workday

We observe that digitalization has made the workday for the accountant more effective. Previously invoices were received by mail and punched manually by the accountant where he spends numerous hours. However, today, digitalization is making the processes more automated. When we asked an accounting leader (2) what possibilities digitalization brings, he explained how automation had reduced the time spending on tedious tasks:

"For example, a gas station had many thousands of lines of merchandise purchases. We previously punched each line and recorded on different cost accounts. Also, now it is programmed to recognize the item numbers. Before, maybe one hour was spent on punching, and now, it takes two seconds." Accounting leader (2)

Furthermore, another accounting leader (6) explains the benefits of having standardized customers:

"If I have a standardized customer, I can automate the process approximately 80-90 %. This is a huge change compared to what I remember from earlier when I was studying and did this by punching" Accounting leader (6)

These quotations illustrate how the accountant has saved time by implementing new technology and the accounting leader (6) suggest that the customer needs to have useful input in order to standardize their processes. This involves sending electronic invoices for the machines to read and record into the system. Then he can automate the process and save time.

Moreover, one CEO (13) mentioned their company had focused more on consulting regarding HSE (Health, Safety and Environment), because of the time saved by digitalization. Besides, it is an overall agreement from all the respondents that the accountants have a closer customer relationship than before. However, another CEO (12) mentioned that the accountant always had a close customer relation, while other respondents believe this is a new relation.

4.2 Future situation

4.2.1 What is a good accountant in the future?

The center of this subsection will be explaining the qualities needed to become a good accountant. All the respondents believe the accountant must change focus and have different qualities to succeed in the future, due to the influence of digitalization and the changing industry.

In order to become a good accountant, the majority of respondents mentioned one needs to have the same qualities as today, but also other qualities are required. The new attributes include being open-minded, outgoing, technical, and problem-solver. While a couple of respondents mentioned, the accountant must be a seller and be useful in language, willing to learn, curious, systematic, structured, and adaptable.

“What you do today does not last 2-3 years. Therefore, it is important to be able to know about what you are doing pretty well and learn from the job and not only from the studies. It makes you develop, so it is quite important.” Accountant (3)

"When things become automatic, you will have an even greater need for doing controls, analyzes, and then you have to understand the numbers better. Not just recording the numbers. Therefore, you must be an analytical type. I think there will be a lot of understanding of the system and having technical insight."

Accounting leader (11)

These quotations illustrate that the accountant needs to be adaptable with the evolving technology. In order to be a good accountant, they need to reskill and learn from past mistakes. It is also vital that the accountant understand the basics of accounting because otherwise, he cannot control and analyze the numbers. Indeed, approximately half of the respondents believe that IT knowledge is a huge factor in the future. One accounting leader (7), acknowledges the requirement for broader skills such as technical skills:

"You must have basic knowledge so that you understand what is going on, and you must almost be a bit of such data engineer on the side." Accounting leader (7)

The respondents emphasize some qualities more than others. Many mention the importance of having more customer contact and excellent communication skills. The accountant, as an outgoing person, is a new quality that can be challenging. According to most respondents, the accountant is usually shy towards the customer, and one CEO (11) mentions that the accountant would rather send an email instead of calling the customer. Besides, another CEO (13) emphasis:

"Very important to have good communication skills. So, that you can convey it to the customer. Because if you get something presented positively and simple, then the threshold is often lower to be able to participate in it than not." CEO (13)

The quotation recognizes the importance of developing excellent communication skills with their clients. The CEO (13) argues that the accountant needs to present the financial data understandably and straightforwardly for the clients to learn. He believes this is a general understanding that most people can relate to. For instance, he explains:

"If I was going to learn how to drive with a driving instructor who cannot convey rules and knowledge on how to drive, then the threshold for learning to drive will be higher than if you have a driving instructor who is good at teaching" CEO (13)

4.2.2 Future challenges

In this subsection, we will look at the future challenges the respondents recognized. We will look at the main obstacles accountants addressed, such as retaining competences, customer satisfaction, pricing services, system vulnerability, and industry challenges.

Retain competences

Many respondents pointed out that future challenges are about preserving knowledge and competence. One accounting leader (2) explained that it could be difficult for accountants to maintain an understanding of the accounting field and expertise. He explains the reason is that *"we learn, by doing"* and therefore, he argues it would be challenging to maintain the competencies when computers perform the dirty accounting task, such as bookkeeping. Also, some accounting leaders informed they have students and new employees who perform simple tasks, which involve examining statements to ensure accuracy, organize and maintain financial records. Another accounting leader (10) recognizes a significant dilemma most accountants needs to be aware of and consider in the future:

"I think bookkeeping is going to be very automated and it is about to do so. Therefore, we must think about how people should learn to account? You will never learn the basics because some computers do it for you. How are you supposed to be able to control the computers? This is a dilemma we need to think of." Accounting leader (10)

An interesting observation is that the respondents believe the current educational system does not prepare the accounting students for their workday. Therefore, they believe this educational system is outdated and need to change to prepare the students.

"When you come straight from the university, you do not have the skills to bookkeep an invoice, you only learn the theory, but not the practical." Accounting leader (6)

The quotation illustrates that the current education system needs to change in order to facilitate fundamental accounting learning. Further, the accounting leader (6) mentioned that the new employees and students perform the dirty task such as bookkeeping in order to understand the basics of accounting. He explained they are currently engaging in a project where Artificial Intelligence systems are doing the same task as the students and new employees. Interestingly, he believes firms will experience a downscaling in expertise when technology takes over the simple tasks. He also explained that the only way to learn is when you do it yourself, make mistakes, and are fully engaged in the entire process. Moreover, he pointed out: *"We must somehow retain the competence when the robot, AI and everything takes over."*

Customer satisfaction and System vulnerability

Furthermore, several respondents recognized the customer satisfaction is vital. However, one accounting leader (7) explained that they are not able to implement a new system just because one or two customers request it. He believes it is too expensive and complicated to use a completely new system in addition to the one they already have. When we asked the accounting leader (7) what their biggest challenges are, he said: *"The biggest threat to us is that the system we use is not timely and up-to-date."*

Besides, many informants believe the biggest challenge is that many customers wish to have special requirements. For instance, AI cannot interpret and understand specific systems that are complicated and distinctive to a customer. One accounting leader (6) emphasized: *"The customer must be willing to sacrifice his special solution to be fully automated."*

Moreover, several respondents mentioned that it is challenging to consider whether to implement a system or not. One accounting leader (6) explained that if you are going to implement new systems, it will require a lot of resources, training, competence, and licenses on all the new systems. He pointed out that it is essential to find the right time concerning keeping up with the evolving technology and warns about changing:

"I think it is deadly to say, change for change. Where you change because you want to change. Change bias. That does not mean you are moving in the right place. Facebook has a motto as they say: move fast and break things. Also, yes, it is probably cool when it works, but in most cases, it probably does not work straight away. Thus, when we introduce a new system, we do it in a careful and orderly manner and just turn it on some customers before it is completely launched." Accounting leader (6)

The quotation recognizes "change bias" as the need to change just because you want to change, and many times, the person has not thought about the consequences or why it is crucial to change. The accounting leader (6) expresses the importance of thinking why you want to change and if it is the right time to do it. For instance, when they first applied AI, they only used it on a few customers. He heard of a company who were struggling because they used AI on every customer, and they did not think about the extra need for control and supervision of AI in the beginning. Also, one accountant (4) pointed out: *"AI makes mistakes and needs to be directed."*

Pricing services

Many of the respondents mentioned it would be challenging to price their accounting services. Pricing is supposed to be in line with the value of the benefits that the firm provides to its clients, and at the same time, the respondents must think about the prices of their rivals. Most of the respondents find it challenging to set a price for their services because it is usually hourly rated, and one accounting leader (7) explains:

“The accounting industry used to charge hourly, but an accountant that spent 100 hours on the service in one year and now you spend 2 hours on it. Then it will be challenging on how you set the price. Because you buy a lot of expensive systems, so the competition is going to be pretty tough.” Accounting leader (7)

The quotation illustrates that when tasks become automated, and accountants spend less time, it would be challenging to set a price on their services. Further, one accountant (8) said that the customers would expect more of the accountants. He argued that if the customer were conscious that the accountant only uses half their time on the same tasks, they did the year before, the customer would not want to pay the same price. Also, he would most likely expect the price to fall. Besides, an accounting leader (11) mentioned it is challenging with the price strategy regarding using new technology, such as robots.

"If suddenly, the hours we use begins to decrease, and we have spent much money on developing processes to make it more efficient. How do we make sure we get paid for it? I think the industry generally moves away from hourly billing and uses more transaction and fixed prices [...] something we are talking about at the office is that when we use the robot on a customer, we should charge the customer 100 NOK. This is something we started doing. It is not easy to explain to the customer why we charge extra." Accounting leader (11)

The quotation illustrates that it is difficult to set a price for the accountant's services because when the robots have performed the work faster than the accountant, the customer expects a decline in prices. At the same time, there are many expenses concerning developing the robot. Consequently, the firm charges extra when they use the robot, and it could be confusing for the clients to understand this expense. Thus, the industry will probably move away from hourly billing services.

Industry challenges

Lastly, the respondents who have customers in the investment and real estate industries believe it would be difficult to automate their processes because the rules are complicated, and the accountant needs to do many considerations. Therefore, one CEO (9) who has customers from the investment and real estate industries believes that it will use more of Big Data, Robotics, and Artificial Intelligence in other segments.

"I think Big Data, Robotics, and Artificial Intelligence are further in the future. Investment and real estate industries are difficult to automate. You probably get some systems that comprehend more than the programs we have today. However, I guess you always must do some of your reviews yourself, but not everything is black and white when it comes to the law. There are a lot of guessing and pros and cons. You can argue for one or the other, with or no tax deductions or what should be expensed."
CEO (9)

The quotation recognizes the difficulties of using advanced technology in complicated segments. For instance, many considerations need to be examined, and the respondents do not believe machines can do this in the real estate and investment industry. These difficulties are mainly because of the complex rules concerning VAT, tax, and interest. Besides, one accounting leader (6) says it is difficult to automate the tasks because processes are not standardized, he believes the complicated rules make the technology inadequate and expresses *"AI will not work on real estate today"*.

4.2.3 Future opportunities

The center of this subsection, we will present the most significant opportunities the respondents recognize. As mentioned earlier, they are in the early stage of digitalization. Some firms are innovators, and others are following. Still, many agreed that the process has been slow, and the last year they have seen many changes in their firm that gives them the possibility to continue evolving.

Digital solution

Many of the respondents mentioned that digitalization has great potential in their firm. One accountant (4) believes the firms need to take advantages of the possibilities brought by digitalization, and as mentioned earlier, some respondents are testing and using robots. In company 6, they are thinking about connecting Artificial Intelligence with the robot. Today, these are two separate functions that are not related. The robot is mainly rule-based, and AI is the development of intelligent machines that work and react like humans. When we asked one accounting leader (6), what digital solution they are considering using, he answered:

"If AI has some standard things that it must do, then we can connect AI with the robot. We have thought about using a robot inside the AI. Connecting the two, but it is difficult [...]. It will not replace human intelligence but be more like a supplement. I think in the future maybe they will understand social cues and emotional information and can process it, so it is much potential it can do for us. However, the technology may not entirely be there yet. And it certainly gives the impression that it is going there." Accounting leader (6)

The quotation recognizes that AI brings many possibilities, and even though the technology is not entirely developed, many respondents are eager and excited about how digitalization evolves. They notice that AI is a tool they can use when they have standardized tasks that lead to routine work that can easily be automated.

Furthermore, another accounting leader (10) present an interesting finding, which involves setting a materiality threshold on AI programs. The materiality involves setting limits on deviations from the accounts. Setting limits allows the accountant to recognize which deviations are significant. The size of the limits has an impact on the effectiveness and productivity of the accountant's work. However, the accounting leader (10) mentioned it could be challenging to implement this because accountants usually have attention to details:

"Most accountants are very quality conscious and quality oriented. They do not give up until they find out what the 3 NOK that deviates from the financial statements. Thus, one could think of setting a materiality threshold. After all, auditing does that in a different way than accountants. For accountants, there is no materiality threshold. Everything should be right. Also, that can be a challenge because then it may not go fast enough. Because if you can set a limit and say: okay, that is good enough, then the robots or technology would be able to do more." Accounting leader (10)

The quotation acknowledges that accountants are usually quality conscious and focus on details. Therefore, the automation and digitalization process is not optimal. When the accountant needs to check every number of the financial statement, it is time-consuming. The accounting leader (10) argues it is not relevant to control every aspect of the financial statement because it gives no value for the customers to know what the deviation of 3 NOK concerns. Therefore, he thinks about the possibility to use materiality on AI systems, because

then the accountant can set the limit themselves and only check the ones AI recognize as a need for control. In this way, the accountant's work will become more efficient. However, he also warns the data needs to be reliable.

New services due to digitalization

We asked the respondents what kind of new services they could offer because of digitalization. The majority of respondents said there are many opportunities, but at the same time, they are not sure what the new services could be. One CEO (12) mentioned it is something the firms need to be aware of and acknowledge. He pointed out: *"If I knew, I would be rich."*

In terms of providing other services, one accounting leader (11) said:

"We are looking at the possibilities of being able to sell other services. For instance, insurance and help the customer with purchases. We obtain much information about our customer. Also, we know how much they are paying in insurance today".
Accounting leader (11)

Lastly, another accounting leader (10) explained a new service they can provide would be to take over the work of their customers' internal financial department. This is because technology has enabled firms to be more efficient and intelligent:

"There are much-unrecognized potential and possibilities in the industry [...]. It will be an advantage for customers to outsource their accounts to the industry."
Accounting leader (10)

From the quotation, we observe that not many respondents have thought about the new services they can provide. The reason might be that they are in the early stage of digitalization and focus on the implementation of technology. Additionally, there are many products and belongings people have today that they did not think about twenty years ago. For instance, no one thought everyone would own a smartphone when the first telephone entered the market. As for today, many people cannot imagine a life without a smartphone. From our observations, many respondents believe new services will come along, and maybe in the next

twenty years, people will have new services they will be dependent on, which we cannot imagine today.

New possibilities provided by the authorities

Several of the respondents explained that the government plays a significant role in digitalization. As mentioned earlier, the authorities put regulation and restriction for accounting. However, many respondents mentioned the introduction of SAF-T from 2020 is going to be a great accomplishment and explain that SAF-T is the standard financial format used when exchanging accounting information. It is a collaboration between the business and the accounting sector, and its purpose is to make it easier for those obliged to keep accounts to submit accounting records to public authorities upon request. Half of the respondent mentioned that the introduction of SAF-T would enable many possibilities for making the workday more comfortable and efficient:

“When the authorities introduce the SAF-T format hopefully, some of the reporting will diminish.” CEO (9)

“The better we become to standardize our processes and routines the more efficient implementing SAF-T would be” Accounting leader (10)

Fragmented industry

Most of the respondents believe there would be more corporation and competition among different industry, a so-called fragmented industry. Respondents explained it involves competition comes not only from participants in the same industry but also from participants from other industries. One CEO (1) explained this when we asked about the future possibilities of digitalization:

“I guess we will get some fragmented industry. Where we cooperate with other types of similar business [...]. If I think about our company, there are so many options and potential out there we have not started to look at. The industry is relatively homogenous; everyone does everything for everyone. When we are pressured, and competition is getting harder, then someone will specialize in some customer needs and become good at it. I think this is a transition we will see more of.” CEO (1)

The quotation illustrates that when the accounting industry is under pressure, and competition increases, the accountants must search for other options, where the CEO (1) mentions cooperation with other industries as a possibility. He explains there is a lot of options and potentials that are not recognized. Besides, another CEO (13) explained that the accounting- and auditing industry are about to melt together, almost merging. He said they are currently involved in the entire accounting process where the auditor revises the work afterward:

“If the auditing threshold increases, as it signals, then these two professions, audit and accounting, would melt more together because the debit-credit person is gone, and it is just the analytical person viewing the statement remaining.” CEO (13)

4.2.4 Accountants’ role in the future

In this last subsection, we are presenting findings regarding the accountants' role in the future. Further, we present the respondents’ belief whether they find the profession is under pressure, and lastly, we will present the respondents’ thoughts about the media's representation of the accountants' role.

Accountant in a different role

There was an overall agreement among the respondents that the accountant is probably going to provide the customers with more advice through consulting:

“You move more towards the advisory and less focus on accounting.” Accountant (4)

Notwithstanding, there were different opinions about how the accountant's role will evolve. The degree of responsibilities differs whether the accountant should be a clean advisor or if this is only a part of the services provided by the accountant. Approximately half of the respondents believe consulting will be a significant part of the accountant's role:

“We are moving towards a clean consulting profession in the future. An advisory industry. Everything else is done automatically. Then we only have to process the end product and guide the customers. It becomes a completely different way of working.”

The profession is gone, meaning the accountant. However, there will be more advisors". Accounting leader (2)

The quotation recognizes that the traditional accountant who inspects the accounts and accounting systems will be gone. Nevertheless, he believes the accountant will not face extinction but transform into clean advisors. While, other respondents believe consulting will only be one of many other services an accountant will offer, meaning the accounting will not be a clean consultant. When we asked one CEO (1) what he thought about the accountants' role in the future, he said:

"I think the old-fashioned bookkeeper who keeps track of receipts and places them right will never disappear. As it becomes more efficient and less need for that kind of jobs and tasks. The number of bookkeepers will decrease. So, if you want to have as many people in the industry, then you must find other things to do. Counseling can be a part of the services provided by the accountant. There will be no room for all in the accounting industry." CEO (1)

The quotation illustrates that the traditional accountant will never disappear, but the number will decrease because of the automation and efficiency of their tasks. The CEO (1) believes there will always be a need for the bookkeeper because people must have a fundamental understanding of accounting to accomplish that function. He addresses the bookkeepers are an integral part of the business. However, in order to stay relevant, the traditional bookkeeper will need to develop and evolve. He believes the accountant can provide other services, and consulting is only one aspect.

Also, one accountant (4) mentioned that the profession could move towards a payroll consultant as a more secure occupation because it is too complex for AI to comprehend:

"One aspect that is worth mentioning is that there are many who believe that payroll consultants are a safe way to go within the accounting industry. It is more secure to become a payroll consultant than an accounting consultant. It is because no one can pay the salary for you. No AI can do this because it is too complicated, difficult, and too many factors come to play. No one gets the same payment every month." Accountant (4)

When is the role changing?

Most of the respondents believe the transition of a new role will take longer time than expected. This is because of the accountant's experience and forecasts regarding digitalization.

"The transition happens much slower than most people think. Because when I started this business eight years ago and participated in accounting-courses, many lecturers said in five years this industry would be upside-down, and we will not have any bookkeepers left. Eight years have passed, and there have been no dramatic changes. We have been a bit more efficient, that is what happened." CEO (1)

The quotation acknowledges that accounting-courses are exaggerating the future of the profession and overestimate the time perception. Most of the accountants do not believe the changes would be drastic and revolutionary. It would rather be a smooth transition. During the later years, one CEO (1) does not think there have been many changes, only that accountants are more efficient than before. While another CEO (5) express throughout history, there have been significant changes, for instance, moving from manual- to computerized accounting. He believes the transformation has been effortless and the accountant has always adapted when authorities are putting a restriction in terms of recording and reporting financial information. Overall the majority of the respondents is positive towards the changes and believes it would be unproblematic for accountants to enter the new role.

Furthermore, three of the respondents believe the accountant's role will not change significantly because of the complex rules and laws:

"There will be more counseling, in order to save time because of digitalization, but at the same time, accounting rules and laws are complex and are constantly evolving. Although we save time on many simple processes, there will still be other requirements that we will spend more time on. I do not think the role will change so much, but it will change by not having time-consuming tasks because they are standardized and simple." CEO (5)

The quotation illustrates that digitalization infiltrate accounting tasks to take over the more repetitive and tedious tasks and it will free up accountants to spend more time on consulting

services where they use their professional knowledge to analyze and interpret the data to provide recommendations for their customers. At the same time, the CEO (5) argues that the authorities put a restriction on the digitalization process, making the transition slower. For instance, when new rules establish, the accountant will spend more time to follow them. Consequently, the profession will not change as much because of the complex rules.

A role under pressure

The findings show that the majority of the respondents believe it is only the traditional role of the accountant that is under pressure. When we asked a CEO (1) if he thought the accountant role would change, he answered:

“Yes, I believe the role will change. I think there will be fewer of the non-authorized accountants. While those who are currently not bookkeeping, are not certain that will get a decline of those. For they already provide advice today.” CEO (1)

The quotation recognizes that the traditional accountant needs to be willing to change unless they will face extinction. There are already some accountants that are providing consulting services today, and therefore, the CEO (1) believes there will not be a decline of them but only of the conventional accountants. Also, one accounting leader (2) does not believe in a downsizing of the accountants because they can adapt to a "different accountant": *“I do not believe in downsizing. Rather, it will evolve into another role.”*

Moreover, the respondents express the importance of staying updated with advanced technology in order to comprehend the new role. When we asked one CEO (12) if he thought it was room for all accountants in the industry, he expresses:

“I think the one who does not follow the development gets less to do. However, I believe that overall, the number in the industry will increase, even though we hear predictions that the accountant is gone [...]. I think the accounting industry is getting bigger. You need people who have a little different knowledge than some of those we might have today. It does not mean we have to resign three and hire three new with different knowledge.” CEO (12)

The quotation clarifies that the accounting industry will continue to grow. He explains the industry will need people with "different knowledge", meaning that accountants must have more expertise and skills towards IT. However, he emphasized that there is no need to resign three accountants and hire three with IT-knowledge. As mentioned earlier, the transition is expected to be effortless and smooth. Therefore, the average accountants might need to attend more IT related courses in order to reskill.

Overall, the respondents are not afraid of losing their job. They believe the complex rules and legislation will make the accountant more attractive. The difficulties involve digitalization bring more work for the accountant, such as controlling and analyzing the data. Further, one CEO (5) expresses he is not concerned about advanced technology replacing him:

"I feel very confident that we are in an industry that cannot be exterminated. It is because of a complex set of rules and legislation that makes us more demanding. After all, the more complex and more digitalized, the more we are needed." CEO (5)

Besides, four of the thirteen companies mentioned they had a foreign department in Romania, Myanmar, or Latvia, which performed the dirty accounting tasks such as bookkeeping of invoices. One accounting leader (2) explained the tasks of the employees in the foreign department were typically what an accountant did before the implantations of the advanced technology. Further, he expresses that digitalization will eventually replace this department:

"The department in Romania is the start of automation. We have prepared the Norwegian consultants that bookkeeping will be gone because a computer will eventually take over some of it. So, it is done in a smoothly way by giving those kinds of tasks to the department in Romania instead. These are the workplaces that will eventually disappear and not the workplaces in Norway" Accounting leader (2)

The quotation demonstrates that it is the bookkeepers in Romania that would lose their jobs and not the Norwegian accountants. Indeed, the accounting leader (2) believes the traditional accountant who performs dirty work will disappear because advance technology will automate their tasks. Also, he recognizes the importance of retaining the fundamental knowledge of accounting.

Media influence

Throughout the observation, the respondents expressed that media was exaggerating about their profession being a dying field. It was an overall agreement among the respondents because this was an observation they pointed out themselves without us asking about the topic. For instance, one CEO (5) and one accountant (4) recognize medias influence as:

“I think media has exaggerated when it comes to presenting a robot is going to take over the business, because that will never happen. When you look historically from when I started, and until now, there has been a huge difference.” CEO (5)

"Technology is often hyped up in the media, and many are terrified." Accountant (4)

These quotations illustrate that the media's portrayal of the accountants' fate is misleading. The CEO (5) is confident that advanced technology will not replace his job because of the history. For instance, when looking back when computers came, many people were afraid of losing their jobs. However, it generated new industries themselves, from computer games to movie streaming and consequently generated new jobs. Therefore, the CEO (5) embraces the technology and does not think a robot could replace him. Also, the accountant (4) tells many people are worried about their destiny. Despite this, our overall impression from the observation is that many respondents are not worried about their jobs.

The need for a new name

We observe there are many discussions at the firms regarding the accountants' role in the future. Even though the respondents believe the accountants are moving towards more counseling, they claim the profession defined as a consultant is not suitable. As mentioned earlier, the accountant is moving towards a new role with more IT-expertise, and therefore, some respondents recognize there is a need for a more suitable name of the accountant. One CEO (12) mentioned Regnskap Norge (a union for Norwegian authorized accountants) should change the name of the profession to a more attractive and interesting name, which fit the changing role.

"Regnskap Norge needs to find a title that fits better [...]. An accountant is boring and is soon extinct. We must try to find another title and description that makes this a bit more interesting in the future." CEO (12)

5 Discussion

In this chapter, we will discuss the empirical findings against the theory presented earlier, which form the foundation for answering our research questions.

5.1 How has digitalization influenced the role of accountants today?

Digitalization is today recognized as one of the essential trends in changing societies and business life in the near- and long-term future (Parviainen et al., 2017). Ghasemi et al. (2011) emphasize the importance of IT and digitalization in companies. Our findings indicate there is great enthusiasm regarding digitalization from our respondents. Nevertheless, the interpretation of the word digitalization is, to some extent unclear. We observe that some respondents recognize the term *digitalization* as the technological tools behind *digitization*. The technology behind digitization involves automation and converting analog data to digital forms, while digitalization involves exploitation of these digitization tools, for instance taking advantages of newer technology such as Big Data, Robotics and Artificial Intelligence (Unruh and Kinron, 2017). Their understanding of the terms is aligned with the statements expressed by Schumacher et al. (2016) and Brennen and Kreiss (2016), where they imply the term digitization is interchanging used with digitalization. To distinguish these terms, we have developed a table based on our observation, which presents the stage of the firms and their leading technology. In order to simplify the terms, we use the *first stage*, explaining the digitization phase and *second stage* explaining the digitalization phase in this discussion.

Phase	Digitization	Digitalization
Firms	1, 5, 7, 8, 9, 12	2, 3, 4, 6, 10, 11, 13
Main technology	Simple automatization and ERP system	Big Data, Robotics and Artificial Intelligence

Table 2: Presentation of firms in different stages of technology

From the table, we observe a distinction between how the firms utilize technology. Some firms take advantage of digitalization using AI and Robotics while others want to follow the progress of these tools before eventually implementing it. These firms call themselves *followers* and recognize the others as the *innovators* because of their advanced technology.

Chua (2013) explains that throughout the stages of technology, accountants have always taken advantage of the rising advancement of digitalization. This statement is aligned with the innovators' opinions. They believe they are in the front of digitalization and are examining the possibilities of connecting Artificial Intelligence with Robotics. Further, Parviainen et al. (2017) mention that firms are often striving to comprehend the potential impact and advantages of digitalization. The findings show that the followers find it more challenging to implement newer technology because they are familiar with manual accounting and comfortable with their routines, and therefore, they hesitate to change their mindset. Also, we observe there is a distinction between the sizes of the firms, where the small firms are mainly followers, and most of the larger firms are innovators.

Nevertheless, an interesting observation is that some innovators also struggle to adopt new technology. The large firms which use Robotics and Artificial Intelligence have either their IT-department or utilize other platforms that deliver the latest technology. Even though these companies have emphasized the importance of having this department, we observe there are scarcities of knowledge. A possible explanation is that the accountants are not able to comprehend the technical procedure because they are not part of the process of implementing the system. The difficulties underline the research by Granlund (2011) and Chukwudi et al. (2018), where the authors claim the issues of not developing their solutions and warn about the dangers of using new systems before they understand it. We argue that the average accountant does not obtain the expertise and knowledge regarding IT. Overall the respondents have not an IT-background because there has not been a need for technical competences during their studies, and therefore, we believe there would be a requirement for teaching IT relevant courses in the future. Consequently, one can argue that everyone struggles to some extent, regardless of the size of the company. Despite, we still say that there is a distinction between companies because of lacking resources and capacity in smaller firms.

According to Granlund (2011), smaller firms are more reluctant to adopt modern IT because of the expenses included, along with the hidden costs, and they are sometimes engaging in ongoing development projects. Therefore, the author raises the question of whether it could be a result of inadequate resources. The query aligns with our findings, and the followers explain they do not have the resources and capacity to invest in several new systems. Further, Granlund (2011) point out that a reason might be that the employees are suspicious and fear new technological developments. The argument supports the findings since some respondents

mention there will always be a couple of employees who do not like changes and struggle to adopt new technology and to change their mindset. Also, Granlund (2011) claims it appears to be no compelling pressure deriving from authorities, leaders, or customers if the old systems and routines are still working. Consequently, he argues the transition is slow and leads to a situation where nobody exploits the possibilities of digitalization no matter the positive arguments for it, or they have not fully taken advantages of it. Based on our observation, we argue this might explain why some firms have not participated in the second stage.

Furthermore, our observations indicate the small firms are mainly in the first stage of technology, while the larger ones are in the second stage. Besides, the medium-sized companies are either in the first- or second stage. However, the ones in the first stage have customers in real-estate and investment industries. These companies argue that they do not receive all the benefits of the technology because of their complicated rules and laws set by the authority concerning VAT, tax, and interest. Thus, newer technology such as AI will not work in these segments because the firms cannot standardize their processes. For that reason, the new technology will only be useful and valuable today for other industries with more standardizing processes. The purpose aligns with the claims by Granlund (2011), where he underlines it could be difficult for complex segments to implement new technology.

Subsequently, the literature recognizes the authority's engagement in the accounting field as an essential part (Rathod, 2015). The claim is aligning with our findings where we observe that the authorities play an essential role in the process of automation and streamlining. On the one hand, the authorities are part of enabling implementation of new technology, making the process more efficient and automated. For instance, many respondents mention the introduction of SAF-T. This format assists the accountants to exchange information effortlessly, and then work will become less time-consuming. On the other hand, authorities establish regulatory restrictions, which slows down and disrupt the digitalization process. When rules change, and new ones occur, it could bring more work for the accountants because they need to change their systems and focus. Thus, it is necessary to have accounts that are à jour and precise. Our observations align with Rathod (2015), where the author specifies the need to have good routines and up-to-date accounts from the very beginning because the mandatory tasks can be changed over time by the authorities.

According to previous studies by Baldvinsdottir et al. (2009) and Friedman and Lyne (2001), the traditional accountant is single-minded, objective, precise and concerned with details, and often associated as a stereotypical bean counter. Also, Baldvinsdottir et al. (2009) and Byrne and Pierce (2007) believe the accountants are changing to be more fun, creative, modern, and outgoing. From our findings, the good accountant is described as precise and has numerical understanding. The description fits with the explanation of a traditional accountant by Baldvinsdottir et al. (2009) and Friedman and Lyne (2001). Moreover, respondents mention that the characteristics of an accountant are having well-established communication skills and outgoing. The attributes are aligned with the business-oriented role described by Baldvinsdottir et al. (2009) and Byrne and Pierce (2007).

Furthermore, Blom (2013) and Løvaas et al. (2018) claim that the accountant is changing. From our findings, we see that more firms are moving away from the bean counter type role and more into the consulting and advising role today. An explanation from the results is that the customers are expecting more services from the accountant. Besides, digitalization has made the workday more automated, and therefore, the accountants can spend more time on other services and can have more clients. Aristita et al. (2009) believe the accountant is considered to be an advisor and a part of the decision-making processes of the business. Also, Rus (2015) points out that the accountant can provide more services because of digitalization. The authors' suggestions align with the findings, which indicate that the accountant's role will change into more consulting and advising. However, the degree of responsibility is unclear. Some respondents think the profession will convert into clean counseling, while others believe consulting will only be one of many services provided by the accountant. The reason for not transforming into a pure counseling profession is because of the complex rules and laws by the authorities.

Several authors have discussed the transition from the bean counter role to a more business-oriented role over many years (Hopper, 1980; Byrne and Pierce, 2007; Baldvinsdottir et al., 2009; Everaert et al., 2010; Marsden, 2010). Still, the findings show that not everyone has entered a new role. Overall, the respondents say they have heard the last decade that the automation and digitalization are just around the corner. Nevertheless, the majority of respondents are not entirely digitalized. From the literature, Ghasemi et al. (2001) argue that the slow-paced and conservative accounting field experienced an overwhelming change due to the rapid technological changes. This statement aligns with our findings, where the

respondents recognize the accounting field as slow-paced because of the difficulties in changing their mindset and adopting new technologies. Besides, many respondents believe the regulatory do not follow technological development because they put restrictions and rules that slow down the digitalization process. For instance, when the authorities establish complex tax regulations, they slow down the automatization process for digital tools. These difficulties prevent the transition from a traditional- to a more modern role, and consequently, we believe the accountants today are either in the bookkeeper role or in the business-oriented role, described by Goretzki et al. (2013), Hopper (1980) and Morales and Lambert (2013). From our observation, we recognize the innovators as more business-oriented while the followers obtain a traditional role.

According to Arcega et al. (2015), there has been a significant shift from manual to automated accounting systems over the past few decades. Throughout our observations, many respondents believe this is the most significant change they have experience in their career. Notwithstanding, they express the shift occurred in the last years. This makes us raise the question: *“Has technology always had an impact on the accounting industry?”* According to numerous authors, accounting has a long experience with changing how the business performs because of the technological disruption (Bhimani and Willcocks, 2014; Heinzelmann, forthcoming; Becker and Heinzelmann, 2017; Quattrone, 2004, 2016). Therefore, we will discuss our findings against this stream of literature above mentioned; where they claim technology has always influenced the accountants’ work. Ahead of the new advancement of digitalization, our respondents explain the accounting industry as being traditional, rigid, and offer very few degrees of freedom in terms of innovative content. For the accountants, digitalization is a significant event changing how they work and what type of work they perform. For instance, the majority of respondents mentioned the cloud-based solutions were a mile-point. Before the cloud-based solution, accountants spend numerous hours punching the invoices manually, and they had to rent places to store the binders with papers. Indeed, some respondents express it is during the latest five years; technology has rapidly changed their working behavior because all the financial information is stored in the cloud. Also, the respondents believe the cloud-based solution has made accountants’ work more time-efficient by collecting data in one place, and customers can use mobile applications and follow the progress of their financial data.

On the contrary, other respondents believe technology has always been a part of the accountants' work, and digitalization is associated with an ongoing process that increases the effectiveness and productivity of the firm. For instance, some respondents argue that accountants consistently take advantage of the rising advancement. Their arguments align with the claims of Quattrone (2004) and Becker and Heinzlmann (2017), where they explain from the 14th-century educational institutions and churches adopted practical techniques of recording performance-related information. They claim that technology has always affected society throughout history. However, we observe it is during the latest years, digitalization has made the most significant disruption of the accountants' practice. It has brought both possibilities and challenges. Automatization of accounting work as a key driver has changed their workday and it aligns with the statements by Cooper et al. (2018), Smith (2018), Everaert et al. (2010) and Marsden (2010), which explain that the tasks of the traditional accountant are more automated due to digitalization. Therefore, we agree with Bhimani and Willcocks (2014), Heinzlmann (forthcoming), Becker and Heinzlmann (2017) and Quattrone (2004, 2016) that accountants have always been affected by technology. Nevertheless, it is now the coming years we will see a drastic change regarding their changing role from a bean counter to a business partner due to digitalization.

Summary of research question one

We find two primary roles of accounting firms regarding digitalization: the innovators, and followers. The degree of taking advantage of the digitalization differs among the roles. The main reason is that the innovators have the resources and capacity. Notwithstanding, from the discussion, both the innovators and followers struggle with knowledge and skills regarding IT. We argue there is a need for the accountant to participate in the whole process of developing new technology, and there is a need for IT courses during their education. An interesting observation is that modern technology has the opposite effect than expected. Technology is time-consuming and brings difficulties through more controlling and rework. Nevertheless, the accountants are embracing IT in their workday because they believe that this would benefit their future career. The advantages include spending more time doing business partnering and less manual work. From our observations, most of the innovators obtain the business-oriented role while the followers are still part of the traditional roles because they are not fully digitalized. Moreover, we observe that the influence of digitalization will employ more accountants with IT-background in order to enter the new position.

5.2 How do accountants believe digitalization will affect their future role and their self-understanding?

Through the process of digitalization, the respondents explain that the accountants' tasks have evolved to concentrate more on different and desirable work. The accountants focus more on clean tasks such as business partnering and less on the dirty work such as bookkeeping. This change aligns with the studies by Cooper et al. (2018), Smith (2018), Everaert et al. (2010) and Marsden (2010). Interestingly, we found the attitudes towards the influence of digitalization of the accountants' work were in contrast with the studies of Heinzlmann (2018) and Morales and Lambert (2013), where they claim more IT systems would lead to more dirty - and less clean work. Some respondents believe the completion of the workload is more efficiently, and there is more time for clean business partnering. From the findings, we observe digital tools such as Artificial Intelligence and Robotics take over the more repetitive and tedious accounting tasks, and it will free up accountants to spend more time on counseling services where they use their professional knowledge to analyze and interpret the data to provide recommendations for their customers.

On the contrary, some respondents support the statements by Heinzlmann (2018) and Morales and Lambert (2013). These respondents experience the introduction of digitalization as more time consuming because of controlling and rework. These difficulties lead to less freedom for accountants and increase dirty work. One of the reasons is because of the newer technology are not sufficient and brings more work. For instance, from the findings, the accountants recognize AI as challenging to comprehend because it needs to be monitored and continuously directed. The idea is following the statement by Burgess (2018), which believes there will be a troublesome transition period before receiving the benefits of technology. Thus, we argue that new technology will bring more dirty work at the beginning of implantation. However, as the accountants obtain more IT-skills, they can comprehend newer technology and receive the benefits of performing more clean work.

To investigate the accountant's self-understanding, we will discuss the question "*What does it mean to be a good accountant?*" raised by Heinzlmann (2018). From our findings, we recognize that many respondents wish to move towards the new role. However, the unique qualities such as being outgoing, and a problem-solver might be struggling to obtain. The difficulties are because accountants are usually shy regarding the customers, and for instance,

they would rather send an email instead of calling the clients. On the one hand, the findings indicate even though the accountants have robots that are supposed to reduce the workload, they do not experience the benefit, because they are not highly skilled to take advantage of the new possibilities digitalization brings. The scarcity of skills implies there is a distance between how they act and their perception of an ideal role. They want to be a business advisor, but at the same time struggle to fulfill the requirements of entering this role. Therefore, the findings support Morales and Lambert (2013) research regarding creating a symbolic distinction of the profession. On the other hand, some respondents say they are already obtaining the role as an advisor in addition to be an accountant where they try to take advantage of the possibilities of digitalization continually.

Interestingly, we recognize that there are different opinions regarding the fulfillment of entering the new business role. Accountants are facing a dilemma concerning their occupational identity because of the dirty work creates tension in their self-identity and self-understanding (Heinzelmann, 2018; Morales and Lambert, 2013). We observe there is resistance among employees to perform clean work, and this is because of the skepticism to newer technology that will complete the dirty work. Moreover, they are afraid of not being able to retain their knowledge when technology takes over. This observation aligns with Scott (2015), Shiraj, (2015) and Arcega et al. (2015), which emphasize the importance of retaining the knowledge of accounting when machines automate the tasks. They explain by performing bookkeeping manually; the accountants retain the knowledge by always examine their competences.

We observe that the mature accountants are usually working traditionally and are not used to fast-moving technology as the younger generation. Notwithstanding, a couple of respondents emphasizes that the older generation are the one with the knowledge because they have the experience and are familiar with dirty work. Following the dilemma of occupational identity described by Heinzelmann (2018) and Morales and Lambert (2013), the findings suggest that when the majority of the industry consists of the younger generation, there is a reduction of the distance between the ideal profession and how they act. A possible explanation is that younger people can comprehend the challenges of technology. Overall, we argue the new accountants are familiar with digitalization, they grew up with the technological transition, and therefore, they are not afraid of trying new tools. Nevertheless, as technology continues to

evolve, a new dilemma arises: *"How can the accountants retain their knowledge when the technology performs the bookkeeping?"*

Throughout our observations, many of the respondents are concerned about how they are going to retain knowledge when advanced technology, such as Artificial Intelligence and Robotics simplifies their work. Overall, we perceive that their workday will change, and they will have other tasks. Gooderham et al. (2004) believe this transition will increase the knowledge for the accountants. They argue the accountants will develop new competence because as technology evolves, they will have different tasks in other areas. For instance, the authors claim the accountants are moving towards counseling. Therefore, the accountants have to gain expertise and knowledge by providing these services to the clients. Thus, we recognize that technology could bring new competencies if the accountants are willing to change and adjust their focus.

In contrast, several respondents believe retaining the competencies will be challenging. These respondents emphasize the knowledge increases through performing the dirty tasks, and they wonder how the employees comprehend the new clean tasks when they struggle to retain the fundamental knowledge. Thus, the transition of the role could be challenging, and we argue the technology could also bring difficulties for new employees to learn basic accounting when advanced technology performs dirty tasks. The findings align with the statement by Parviainen et al. (2017), where they express the risks of digitalization can cause the accounting role to change entirely, and firms current business may become obsolete.

An essential aspect recognized by the respondents is that the educational sector is traditional and outdated. The teaching methods are unfitting and not in line with the technological movement. Richins et al. (2017) emphasize the importance of educators and professionals must regulate their curricula in order to comprehend technology. The literature aligns with our findings where the respondents are concerned about the importance of educational sector facilitate learning. Consequently, we argue there is a need for changing the educational system in order to facilitate the qualities expected of an accountant. Based on our observation, we suggest there will be necessary to focus on oral presentations and student participation. We believe this will shape the accountants to become more outgoing, creative, and prepared for the work life. Besides, we argue that the education sector should include more practical learning, for instance, teaching them how to perform dirty tasks such as bookkeeping of

invoices, in order to facilitate the competences among accounting students. It is crucial for the educational sector to ensure the students have expertise and fundamental knowledge. Otherwise, it will be challenging to fulfill a new role because advanced technology performs dirty tasks. Overall, our observations align with Heinzlmann (forthcoming), where he explains educational background is a vital pull factor altering the role and the identity of the accounting profession.

In order for firms to develop their competencies, they need to improve and sustain intangible factors such as the quality focus of the firm and the quality of customer relations (Gooderham et al., 2004). According to Christensen (2018), it is essential to have a well-established ERP system that should encourage innovation, and this could only take place when data quality is excellent. Further, he claims that one can only begin discussing digital ambitions such as Robotic technology when the data quality is sufficient. Our respondents emphasize the importance of data quality. Overall, the respondents mention that maintaining data quality is challenging but a necessary task. For customers to attain reliable and dependable data, companies must always manage the quality of data in order to trust the information and facilitate faster and more informed decisions. Also, they explain if the accounting systems have not been appropriately programmed from the very beginning, the programs will produce wrong information repeatedly. Therefore, it is crucial for the firm because it will be challenging to trust the data. Consequently, this brings frustration and resistance among the employees and customers. Our findings align with the statements by Gooderham et al. (2004) and Christensen (2018).

Furthermore, the literature recognizes Artificial Intelligence as a dominant force in the landscape of accounting (Smith, 2018). This claim aligns with our findings, where some of the respondents are searching for new ways to exploit the advantages. Indeed, an interesting finding is the possibility of setting a materiality threshold on AI programs. The materiality involves setting limits on deviations from the financial statements. Setting limits allow the accountants to recognize which deviations are significant. The size of the limits has an impact on the effectiveness and productivity of the accountants' work. Overall, we observe the accountants want to standardize and automate their processes. However, the accountants are concerned about the quality, and they require control in order to ensure correct accounts. This requirement can disrupt the digitalization process because it is time-consuming to ensure quality. We observe a possible solution are to set a materiality limit that is great enough to

ensure the accuracy of the information but at the same time, not interrupt the efficiency. Besides, the respondents explain there is not relevant to control every aspect of the financial statement because the nonsignificant deviations give no value for their customers. This observation makes us wonder whether AI is sufficient enough to comprehend and retain the quality of the data. We argue that the quality needs to be acceptable and justified for the authorities and customers. Therefore, it could be challenging for the average accountant to trust AI because of their need to ensure the accuracy and reliability of the data.

Despite, we believe AI would be trustworthy because the accountants can decide the materiality limit. When AI manages data continuously, it will learn from past errors, and therefore, the quality can increase over time. Overall, it depends on the motivation and willingness of the accountants to engage in new technology and also set a suitable limit for the accuracy of AI. From the academic literature, many researchers investigate what the role of the accountants is in the ongoing digital revolution (Jeacle and Carter, 2014; Frey and Osborne, 2017; Taipaleenmäki and Ikäheimo, 2013). Several of the respondents specify the requirements of an accountant are increasing, and it is not enough to deliver the tasks à jour. Interestingly, the findings recognize that accountants are expected to have more knowledge regarding technology and systems. The future CEO needs to understand as much about IT as they do about financial administration, which is aligning with statements by Chua (2013).

New technology replaces the role of the accountants as being the producer of the financial statement (Aristita et al., 2009). From the findings, we observe that many of the innovators are participating in the new project and implementing AI and Robotics today. Nevertheless, there are different opinions regarding the possibilities of these advanced technologies. We observed that many respondents are fond of robots, while some respondents recognize Robotics as a temporary solution to use on suboptimal systems. Madakam et al. (2019) consider robots to be among the 21st century most significant high-tech development. Further, Rus (2015) believes that Robotics can and will influence people lives in the nearest future. The authors' statements align with the findings where the majority of the respondents are enthusiastic about the technology where they exploit the possibilities the robots bring. We recognize many standardize tasks of the accountant are taken over by the latest innovations. This finding supports Smith (2018), where the author claims that AI enables the accountant to focus more on advisory and guidance. We observe that many accountants feel the need to reskill and change their working behavior. Also, the accountant needs to exploit the many

possibilities digitalization brings, such as efficiency gains, improved client service, and productivity (Chua, 2013).

As specified earlier, digitalization has an impact on the accountants' tasks and role. According to numerous researchers, the accountants will approximately have a 95 % chance to lose their job due to digitalization (Chukwudi et al., 2018; Frey and Osborne, 2017). Our findings indicate there will be a decline in the number of accountants. However, according to Caglio (2003), the reduction only applies to traditional accountants. The claim aligns with our findings, and the respondents specify it is only the conventional accountants that will disappear. From the results, some firms mentioned they have departments abroad that perform the dirty tasks. They believe these are the accountants that will be replaced by automation and digitalization and not the accountants in Norway. Overall, the majority of the respondents are not afraid of losing their jobs because they are willing to digitalize. Chua (2013) support this statement, where she emphasizes the importance of embracing the evolving technology. Otherwise, the profession will disappear.

The existing theory demonstrates that there has been challenging to interpret a final definition for the accountant (Richardson, 1918). From our findings, a similar dilemma occurs because of the changing role. The accountant is expected to have other qualities, such as being an IT-expert, outgoing, and open-minded. As a result, there is a need for a new name for the profession. Often the accountancy industry is described as slow and conservative from the findings, and some respondents mentioned in order to recruit people, they need a name that fits the new role better and sounds more interesting in the future. In the findings, we observed that the respondents recognized Regnskap Norge need to find a more suitable name for the profession. It is interesting to recognize that a dilemma that occurred 100 years ago is recognized once again. Moreover, Heinzelmann (forthcoming) suggests there is a need for a "different accountant" as digitalization continues to evolve. Therefore, there will be a request for more IT-knowledge and active intervention from the accountants.

According to Kolbjørnsrud (2017), the media brings a lot of fear and expectations due to the embellishment of the truth regarding the capability of Robotics and Artificial Intelligence. The author supports the findings where some respondents mentioned the media's influence is exaggerating, and it presents a robot is going to substitute the accountants. We argue this is an overall agreement among the respondents because this was an observation they pointed out

themselves without us asking about the topic. Further, we discuss whether the accountant profession is among one of the main jobs to be automated which is claimed by Chukwudi et al. (2018), Frey and Osborne (2017), Chui et al. (2017) and Manyika et al. (2017). Our findings align with the statement regarding media, and we agree that the traditional role of an accountant is outdated. Notwithstanding, the respondents believe the media dramatizes the pace of the outcome to the new role, because of earlier prognosis and experience. As we recognize, media heavily debate the role. However, from the findings, we observe that the industry is slow, and changes take longer time than expected. Initially, we did not realize the media drew vivid images of the accountants' role, and we thought the profession was going to be automated and eventually disappeared within the next years. Nevertheless, the finding showed our impression was wrong, and there will always be room for accountants that are willing to reskill and change their working behavior.

Summary of research question two

We find digitalization will have an impact on the accountant's self-understanding regarding the distance between the ideal profession and how they act. We observe that the respondents' occupational identity will reduce the distance because firms can recruit people with more IT-background. Also, when the industry consists of employees with both accounting and IT knowledge, they can understand the new systems and the technical procedure better. As mentioned, new qualities of being open-minded, outgoing, and technical are essential, and we believe the new accountants can comprehend them. However, it is vital that the education sector facilitates learning to make the accountants more prepare for entering the new role.

The prognosis and theory claim that the traditional accountant is supposed to transform into an advisor. From our findings, we recognize that the degree of responsibilities differs whether the accountant should be a clean advisor or if this is only a part of the service provided by the accountant. Due to the complexity of the industry, we argue the new accountant will not convert into a clean advisor. Further, we recognize as a result of digitalization the accountant role will transform into a "different accountant", and based on our findings, we suggest the modern role should have a new name.

6 Conclusion

The purpose of this study was to examine the influence of digitalization of the accountants' role and their self-understanding. Therefore, this chapter entails answering our research questions. Lastly, we present the limitations and recommendations for further research.

6.1 Answers to our research questions

To answer our research, we will present five main findings. The first finding relates to the accountants understanding of digitalization, where most of the firms interviewed are in the early stage of the digitalization process. Our findings indicate that knowledge is scarce regarding advanced technology such as Artificial Intelligence, Robotics, and Big Data. However, some of the firms have begun to take advantage of these technologies while the majority of the industry wait to see how these advancements will evolve before they implement it themselves.

Our second finding recognizes the importance of having technical skills in order to enter the new role. We argue there is a need for changing the educational system in order to facilitate the qualities expected of an accountant. Based on our observations, we suggest it is necessary to focus on oral presentations and student participation. We believe this will shape the accountants to become more outgoing, creative, and prepared for the work life. Also, we believe in order to have the technical skill. There is a need for the accountant to participate in the whole process of developing new technology.

The third finding concerns the accountants' self-understanding. We claim digitalization will have an impact on the distance between the ideal profession and how they act. Further, we observe that the respondents believe the distance will reduce because the firms can recruit people with more IT-background. Moreover, when the industry consists of employees with both accounting and IT knowledge, they can understand the new systems and the technical procedure better. Besides, when younger people enter the industry, our impression is that they can comprehend the challenges. Overall, we argue the new accountants are familiar with technology because they grew up with it and are not afraid of trying new things and making mistakes as the mature generation.

Our fourth finding involves that the media present the accounting industry as the top professionals to be automated and face extinction within the next years. The finding indicates that the media exaggerate. Our respondents believe there is no need for a decline of accountants in the industry as the media and prognosis present. Instead, the profession is converting into a different role. Consequently, they are not afraid of losing their jobs, and they believe everyone in the industry can keep their job if they are willing to digitalize. Initially, we did not realize the media drew vivid images of the accountants' role, and we thought the profession was going to be automated and eventually disappeared within the next years.

Lastly, we recognize from the findings the accountant is expected to have other qualities such as being an IT-expert, outgoing, and open-minded. As a result, there is a need for a new name for the profession. Often the accountancy industry is described as slow and conservative, and some respondents mention that to recruit people, they need a name that fits the new role better and sounds more interesting in the future.

6.2 Limitations and further research

There are different limitations to the analysis conducted in this study. We have tried to be reflective in line with our research approach chosen. Therefore, we have tried to be transparent throughout the process of data collection analysis and writing this thesis. The data obtained from qualitative interview-based research are challenging to generalize empirically. We cannot claim that our empirical findings from our cross-sectional case study interviewing 13 accounting firms can be generalized for the entire accounting industry in all countries. What we can say is that we fairly well understood the Norwegian setting and that might be transferable to other settings. On the other hand, the findings can be relevant in other contexts. We expect the change in other professional roles can have similarities with our findings, but since we are focusing on accounting firms, this should be considered before generalizing to other industries.

We also experience limitations concerning our sampling method. Due to the lack of desired participants from the emails, we had to use our network from students, family- and work relations in order to get in touch with firms who wished to contribute. This approach could bring bias to our study in the sense that our relations refer to those whom they know and have

similar traits as themselves. Consequently, the data might not be able to complete the study with a conclusive result. Nevertheless, in this thesis, we have interviewed CEOs, accounting leaders, and accountants in order to have a diversified sample. In our opinion, we believe that having different employees increased the credibility of the results.

We would encourage further research to elaborate more of the effects digitalization brings. Until now, we recognized that digitalization had a significant impact on the traditional accountants, making them step out of their comfort zone and take new responsibilities of being an advisor. It would be interesting to see how the average accountant can enter the new role as a "different accountant" when they are expected to have more knowledge and skills concerning IT. Therefore, it could be beneficial to do the same qualitative study as ours but include IT-persons during the interviews. Another suggestion for further research is to conduct quantitative research in order to generalize the results regarding the digitalization impact on the accountants' role.

Furthermore, we believe it could be valuable to investigate the aspect of the impact of the educational sector of accountants practice and skills. Then one could observe accounting students who are exposed to different learning method over time; a longitudinal case study, to see if they are more prepared to enter the new role. Lastly, we recommend conducting a similar study would be most suitable during the fall, as the accountants are expected to be preoccupied with completing annual financial statements during the winter and spring.

References

- Aguirre, S., & Rodriguez, A. (2017). Automation of a Business Process Using Robotic Process Automation (RPA): A Case Study. *Communications in Computer and Information Science*, 742, pp. 65-71.
- Ahrens, T. (1997). Strategic Interventions of Management Accountants: Everyday Practice of British and German Brewers. *European Accounting Review*, 6(4), pp. 557-588.
- Alexander, D., & Schwencke, H. R. (2003). Accounting change in Norway. *European Accounting Review*, 12(3), pp. 549-566.
- Alles, M. G. (2015). Drivers of the Use and Facilitators and Obstacles of the Evolution of Big Data by the Audit Profession. *Accounting Horizons*, 29(2), pp. 439-449.
- Amanamah, R. B., Morrison, A., & Asiedu, K. (2016). Computerized Accounting Systems Usage by Small and Medium Scale Enterprises in Kumasi Metropolis, Ghana. *Research Journal of Finance and Accounting*, 7(16), pp. 16-29.
- Amiri, S., & Amiri, N. (2014). Information Technology (IT) and its Role in Accounting Practice. *International Journal of Economy, Management and Social Sciences*, 3(1), pp. 28-32.
- Appandairajan, P., Khan, N. Z., & Madijagan, M. (2012). ERP on Cloud: Implementation strategies and challenges. *Cloud Computing Technologies, Applications and Management (ICCCTAM)*, (pp. 56-59).
- Arcega, C. K., Datinguino, E., Guerra, J., Guno, C., Mayuga, H. J., Villamena, E., & Manongsong, J. L. (2015). Computerized vs. Non-computerized Accounting System of Small and Medium Enterprises in Lipa City, Philippines: A Comparative Analysis. *Asia Pacific Journal of Academic Research in Business Administration*, 1(1), pp. 48-55.
- Aristita, R., Cristina, C.-A., Mihaela, L., & Vasile, P. (2009). Accounting – A Semiotic Process. *Annals of Faculty of Economics*, 3(1), pp. 1105-1112.
- Baldvinsdottir, G., Burns, J., Nørreklit, H., & Scapens, R. W. (2009). The image of accountants: from bean counters to extreme accountants. *Accounting, Auditing & Accountability Journal*, 22(6), pp. 858-882.
- Beard, V. (1994). Popular culture and professional identity: Accountants in the movies. *Accounting, Organizations and Society*, 19(3), pp. 303-318.

- Becker, A., & Heinzlmann, R. (2017). IT and the management accountant. In L. Goretzki, & E. Strauss, *The Role of the Management Accountant: Local Variations and Global Influences*. Routledge.
- Bell, E., Bryman, A., & Harley, B. (2018). *Business Research Methods* (5 ed.). Oxford, United Kingdom: Oxford University Press.
- Bhimani, A., & Willcocks, L. (2014). Digitisation, 'Big Data' and the transformation of accounting information. *Accounting and Business Research*, 44(4), pp. 469-490.
- Blom, M. (2013). *Fra regnskapsfører til rådgiver?: endring i profesjonelle roller*. SNF. Bergen: Samfunns- og Næringslivsforskning AS.
- Brennen, J. S., & Kreiss, D. (2016). Digitalization. *The International Encyclopedia of Communication Theory and Philosophy*, pp. 1-11.
- Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (1 ed.). New York: Norton.
- Bui, Y. N. (2014). *How to Write a Master's Thesis* (2 ed.). Thousand Oaks, California, USA: SAGE Publications.
- Burgess, A. (2018). *The Executive Guide to Artificial Intelligence: How to identify and implement applications for AI in your organization* (1 ed.). Cham, Switzerland: Palgrave Macmillan.
- Byrne, S., & Pierce, B. (2007). Towards a More Comprehensive Understanding of the Roles of Management Accountants. *European Accounting Review*, 16(3), pp. 469-498.
- Caglio, A. (2003). Enterprise Resource Planning systems and accountants: towards hybridization? *European Accounting Review*, 12(1), pp. 123-153.
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, 10(6), pp. 807-815.
- Christauskas, C., & Miseviciene, R. (2012). Cloud - Computing Based Accounting for Small to Medium Sized Business. *Inzinerine Ekonomika-Engineering Economics*, 23(1), pp. 14-21.
- Christensen, B. H. (2018). *ERP* (16 ed.).
- Chua, F. (2013). Technology trends: their impact on the global accountancy profession. *The Association of Chartered Certified Accountants*.
- Chua, W. F. (1986). Theoretical constructions of and by the real. *Accounting, Organizations and Society*, 11(6), pp. 583-593.

- Chui, M., Manyika, J., & Miremadi, M. (2017). *www.hbr.org*. Retrieved March 10., 2019, from Harvard Business Review: <https://hbr.org/2017/04/the-countries-most-and-least-likely-to-be-affected-by-automation>
- Chukwudi, O. L., Echefu, S. C., Boniface, U. U., & Chukwuani, N. V. (2018). Effect of Artificial Intelligence on the Performance of Accounting Operations among Accounting Firms in South East Nigeria. *Asian Journal of Economics, Business and Accounting*, 7(2), pp. 1-11.
- Cooper, D. R., & Schindler, P. S. (2014). *Business research methods* (12 ed.). Singapore: McGraw-Hill.
- Cooper, L., Holderness, K., Sorensen, T., & Wood, D. A. (2018). Robotic Process Automation in Public Accounting. *SSRN Electronic Journal*.
- CSCMP, & Sanders, N. R. (2014). *The Definitive Guide to Manufacturing and Service Operations* (1 ed.). Upper Saddle River, New Jersey, USA: Pearson FT Press.
- DeCoster, D. T., & Rhode, J. G. (1971). The Accountant's Stereotype: Real or Imagined, Deserved or Unwarranted. *The Accounting Review*, 46(4), pp. 651-664.
- Dimitriu, O., & Matei, M. (2015). Cloud Accounting: A New Business Model in a Challenging Context. *Procedia Economics and Finance*, 32, pp. 665-671.
- Dimnik, T., & Felton, S. (2006). Accountant stereotypes in movies distributed in North America in the twentieth century. *Accounting, Organizations and Society*, 31(2), pp. 129-155.
- Duncan, J. C. (1909). A Definition of Accounting. *American Economic Association Quarterly*, 10(1), pp. 75-84.
- Everaert, P., Sarens, G., & Rommel, J. (2010). Using Transaction Cost Economics to Explain Outsourcing of Accounting. *Small Business Economics*, 35(1), pp. 93-112.
- Farhaoui, Y. (2018). Big Data Analytics Applied for Control Systems. In M. Ezziyyani, M. Bahaj, & F. Khoukhi, *Advanced Information Technology, Services and Systems: Proceedings of the International Conference on Advanced Information Technology, Services and Systems (AIT2S-17) Held on April 14/15, 2017 in Tangier*. Cham, Switzerland: Springer International Publishing AG.
- Fernández-Cardena, G., Torre-Díez, I., López-Coronado, M., & Rodrigues, J. J. (2012). Analysis of Cloud-Based Solutions on EHRs Systems in Different Scenarios. *Journal of Medical Systems*, 36(6), pp. 3777-3782.
- Frey, C., & Osborne, M. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, pp. 254-280.

- Friedman, A. L., & Lyne, S. R. (2001). The beancounter stereotype: towards a general model of stereotype generation. *Critical Perspectives on Accounting*, 12(4), pp. 423-451.
- Gbadegeshin, S. A. (2019). The Effect of Digitalization on the Commercialization Process of High-Technology Companies in the Life Sciences Industry. *Technology Innovation Management Review*, 9(1), pp. 49-63.
- Ghasemi, M., Shafeiepour, V., Aslani, M., & Barvayeh, E. (2011). The impact of Information Technology (IT) on modern accounting systems. *Procedia - Social and Behavioral Sciences*, 28, pp. 112-116.
- Ghauri, P. N., & Grønhaug, K. (2005). *Research Methods in Business Studies: A Practical Guide* (3 ed.). Harlow, United Kingdom: Pearson Education.
- Gibbs, G. (2018). *Analyzing qualitative data* (2 ed.). London, United Kingdom: SAGE.
- Gooderham, P. N., Tobiassen, A., Døving, E., & Nordhaug, O. (2004). Accountants as Sources of Business Advice for Small Firms. *International Small Business Journal*, 22(1), pp. 5-22.
- Goretzki, L., Strauss, E., & Weber, J. (2013). An institutional perspective on the changes in management accountants' professional role. *Management Accounting Research*, 24(1), pp. 41-63.
- Goumas, S., Charamis, D., & Tabouratzi, E. (2018). Accounting Benefits of ERP Systems across the Different Manufacturing Industries of SMEs. *Theoretical Economics Letters*, 8(6), pp. 1232-1246.
- Granlund, M. (2011). Extending AIS research to management accounting and control issues: A research note. *International Journal of Accounting Information Systems*, 12(1), pp. 3-19.
- Granlund, M., & Lukka, K. (1998). Towards increasing business orientation: Finnish management accountants in a changing cultural context. *Management Accounting Research*, 9(2), pp. 185-211.
- Heinzelmann, R. (2018). Occupational identities of management accountants: The role of the IT system. *Journal of Applied Accounting Research*, 19(4), pp. 465-482.
- Heinzelmann, R. (forthcoming). Accounting information, evaluative infrastructures, data expertise, and changing identities and roles. In n. B. Feldbauer-Durstmüller, & S. Mayr, *Controlling – Aktuelle Entwicklungen und Herausforderungen*. Wiesbaden, Germany: Springer Gabler.

- Henriette, E., Feki, M., & Boughzala, I. (2015). The Shape of Digital Transformation: A Systematic Literature Review. *Ninth Mediterranean Conference on Information Systems (MCIS)*, pp. 431-443.
- Hindle, J., Lacity, M., Willcocks, L., & Khan, S. (2018). *Robotic Process Automation: Benchmarking the Client Experience*. Knowledge Capital Partners.
- Hopper, T. M. (1980). Role conflicts of management accountants and their position within organisation structures. *Accounting, Organizations and Society*, 5(4), pp. 401-411.
- Jacobsen, D. I. (1998). Motstand mot forandring, eller: 10 gode grunner til at du ikke klarer å endre en organisasjon. *Magma - Tidsskrift for økonomi og ledelse*, 1(1), p. 9.
- Jacobsen, D. I. (2015). *Hvordan gjennomføre undersøkelser? : innføring i samfunnsvitenskapelig metode* (3 ed.). Oslo: Cappelen Damm akademisk.
- Jacobsen, D. I., & Thorsvik, J. (2019). *Hvordan organisasjoner fungerer* (5 ed.). Bergen: Fagbokforlaget.
- Janvrin, D. J., & Weidenmier Watson, M. (2017). "Big Data": A new twist to accounting. *Journal of Accounting Education*, 38, pp. 3-8.
- Jeacle, I. (2008). Beyond the boring grey: The construction of the colourful accountant. *Critical Perspectives on Accounting*, 19(8), pp. 1296-1320.
- Jeacle, I., & Carter, C. (2014). Creative spaces in interdisciplinary accounting research. *Accounting Auditing & Accountability Journal*, 27(8), pp. 1233-1240.
- Kaarbøe, K., Knudsen, D.-R., & Meidell, A. (2018). Hvordan digitalisering endrer regnskaps- og styringsinformasjonen. *Magma - Tidsskrift for økonomi og ledelse*, 21(6), pp. 16-26.
- Kaur, D. (2017). Comparative Analysis of Traditional and Modern Accounting Approach. *International Journal of Advance Research and Innovation*, pp. 1-3.
- Kirkham, L. M., & Loft, A. (1993). Gender and the construction of the professional accountant. *Accounting, Organizations and Society*, 18(6), pp. 507-558.
- Kolbjørnsrud, V. (2017). Kunstig intelligens og lederens nye jobb. *Magma - Tidsskrift for økonomi og ledelse*, pp. 33-42.
- Källroos, C.-H., & Havelka, J. (2017). *Digitalization of the finance function and hybridisation in departmental battles: a multiple exploratory case study*. Stockholm: Stockholm School of Economics.
- López, S. D., & Vasquez-Brust, D. A. (2012). Evaluating the Firm's Environmental Hazardousness: Methodology. In D. A. Vasquez-Brust, J. A. Plaza-Úbeda, J. De Burgos-Jiménez, & C. E. Natenzon, *Business and Environmental Risks: Spatial*

- Interactions Between Environmental Hazards and Social Vulnerabilities in Ibero-America* (pp. 53-67). Netherlands: Springer.
- Lundesgaard, J. (2016). Norway. IAS 19 and Employee Benefits: Some Reflections on the Norwegian Experience. In D. P. Bensadon, *IFRS in a Global World: International and Critical Perspectives on Accounting* (pp. 325-341). New York: Springer International Publishing.
- Løvaas, I., Madsen, D. Ø., Stenheim, T., & Korhonen-Sande, S. (2018). From bookkeeper to advisor? *Scandinavian Journal of Business Research*, 32(2), pp. 165-180.
- Mack, N., Woodsong, C., MacQueen, K. M., Guest, G., & Namey, E. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. North Carolina, USA: Family Health International.
- Madakam, S., Holmukhe, R. M., & Jaiswal, D. K. (2019). The Future Digital Work Force: Robotic Process Automation (RPA). *JISTEM - Journal of Information Systems and Technology Management*, 16, pp. 1-17.
- Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., . . . Sanghvi, S. (2017). *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages*. McKinsey Global Institute.
- Marsden, S. J. (2010). *Australian master bookkeepers guide* (3 ed.). North Ryde, NSW, Australia: CCH Australia Limited.
- Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, 57(5), pp. 339-343.
- McGaughey, R. E., & Gunasekaran, A. (2009). Enterprise Resource Planning (ERP): Past, Present and Future. In M. G. Hunter, *Selected Readings on Strategic Information Systems* (1 ed., pp. 359-371). New York, USA: Information Science Reference.
- McLeod, R., & Schell, G. (2004). *Management Information Systems* (9 ed.). Pearson.
- Mezghani, K., & Aloulou, W. (2019). *Business Transformations in the Era of Digitalization*. Hershey PA, USA: IGI Global.
- Morales, J., & Lambert, C. (2013). Dirty work and the construction of identity. An ethnographic study of management accounting practices. *Accounting, Organizations and Society*, 38(3), pp. 228-244.
- Murungi, S., & Kayigamba, C. (2015). The Impact of Computerized Accounting System on Financial Reporting in the Ministry of Local Government of Rwanda. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*, 6(4), pp. 261-265.

- Norges Autoriserte Regnskapsføreres Forening; Økonomiforbundet; Den norske Revisorforening. (2014). God Regnskapsføringsskikk (GRFS).
- Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management*, 5(1), pp. 63-77.
- Polsa, P. (2013). The crossover-dialog approach: The importance of multiple methods for international business. *Journal of Business Research*, 66(3), pp. 288-297.
- Quattrone, P. (2004). Accounting for God: accounting and accountability practices in the Society of Jesus (Italy, XVI–XVII centuries). *Accounting, Organizations and Society*, 29(7), pp. 647-683.
- Quattrone, P. (2016). Management accounting goes digital: Will the move make it wiser? *Management Accounting Research*, 31(6), pp. 118-122.
- Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2018). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*.
- Rajan, C. A., & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user. *IIMB Management Review*, 27(2), pp. 105-117.
- Rathod, N. (2015). *Principles of Accounting* (1 ed.). Amazon International.
- Richardson, A. P. (1918). Need for Definition. *Journal of Accountancy*, 26(2), p. 111.
- Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big Data Analytics: Opportunity or Threat for the Accounting Profession? *Journal of Information Systems*, 31(3), pp. 63-79.
- Rumelt, R. P. (2003). Towards a Strategic Theory of the Firm. In N. J. Foss, *Resources, Firms, and Strategies: A Reader in the Resource-based Perspective* (6 ed., pp. 131-145). New York, USA: Oxford University Press.
- Rus, D. (2015). The Robots Are Coming: How Technological Breakthroughs Will Transform Everyday Life. *Foreign Affairs*, 94(4).
- Sam, M. F., Hoshino, Y., & Tahir, M. N. (2012). The Adoption of Computerized Accounting System in Small Medium Enterprises in Melaka, Malaysia. *International Journal of Business and Management*, 7(18), pp. 12-25.
- Sangster, A., & Scataglinibelghitar, G. (2010). Luca Pacioli: The Father of Accounting Education. *Accounting Education*, 19(4), pp. 423-438.

- Saunders, M. N., Lewis, P., & Thornhill, A. (2015). *Research Methods for Business Students* (7 ed.). Harlow, United Kingdom: Pearson Education Limited.
- Scapens, R. W., & Jazayeri, M. (2003). ERP systems and management accounting change: opportunities or impacts? A research note. *European Accounting Review*, 12(1), pp. 201-233.
- Schumacher, A., Sihni, W., & Erol, S. (2016). Automation, digitization and digitalization and their implications for manufacturing processes. *International scientific Conference*. Bucharest: Innovation and Sustainability.
- Schwab, K. (2015). *The Fourth Industrial Revolution: What It Means and How to Respond*. Foreign Affairs. Retrieved May 5., 2019, from https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution?fbclid=IwAR1E4IxX_0AiUIHKmr5UUwv-O-xQ9I8Kr2S_d-ZmDfCafbXcGLQLCZeOk14
- Scott, C. J. (2015). *College Accounting: A Career Approach* (12 ed.). Stamford, Connecticut, USA: South-Western College Pub.
- Shiraj, M. M. (2015). The impact of using computerized accounting systems (CAS) in financial reporting among SMEs: (Special Reference to the South Eastern Region, Sri Lanka). *5th International Symposium – 2015 South Eastern University of Sri Lanka*.
- Smith, M., & Briggs, S. (1999). From Bean-counter to Action Hero: Changing the Image of the Accountant. *Management Accounting*, 77(1), pp. 28-31.
- Smith, S. S. (2018). Digitization and Financial Reporting – How Technology Innovation May Drive the Shift toward Continuous Accounting. *Accounting and Finance Research*, 7(3), pp. 240-250.
- Stolterman, E., & Fors, A. C. (2004). Information Technology and the Good Life. *IFIP International Federation for Information Processing*, 143, pp. 687-692.
- Suri, V. K., Elia, M. D., Arora, P., & Hillegersberg, v. J. (2019). Automation of Knowledge-Based Shared Services and Centers of Expertise. In J. Kotlarsky, I. Oshri, & L. Willcocks, *Digital Services and Platforms. Considerations for Sourcing* (pp. 56-75). Cham, Switzerland: Springer Nature Switzerland AG.
- Sveningsson, S., & Alvesson, M. (2003). Managing Managerial Identities: Organizational Fragmentation, Discourse and Identity Struggle. *Human Relations*, 56(10), pp. 1163-1193.

- Taipaleenmäki, J., & Ikäheimo, S. (2013). On the convergence of management accounting and financial accounting – the role of information technology in accounting change. *International Journal of Accounting Information Systems*, 14(4), pp. 321-348.
- Takabi, H., Joshi, J. B., & Ahn, G.-J. (2010). Security and Privacy Challenges in Cloud Computing Environments. *IEEE Security & Privacy*, 8(6), pp. 24-31.
- Thagaard, T. (2018). *Systematikk og innlevelse – en innføring i kvalitativ metode* (5 ed.). Oslo, Norway: Fagbokforlaget.
- Tihinen, M., Kääriäinen, J., Ailisto, H., Komi, M., Parviainen, P., Tanner, H., . . . Sohlo, S. (2016). *The Industrial Internet in Finland: on route to success?* Espoo: VTT Technical Research Centre of Finland.
- Tjora, A. H. (2017). *Kvalitative forskningsmetoder i praksis* (3 ed.). Oslo, Norway: Gyldendal Akademisk.
- Unruh, G., & Kiron, D. (2017). Digital Transformation on Purpose. *MIT Sloan Management Review*. Retrieved March 17., 2019, from <https://sloanreview.mit.edu/article/digital-transformation-on-purpose/>
- Vorster, J. (2015). Evolution of the professional accountant. *Professional Accountant*(26), pp. 22-23.
- Warren, C., Reeve, J. M., & Duchac, J. (2014). *Financial Accounting* (14 ed.). Boston, USA: Cengage Learning.
- Warren, J. D., Moffitt, K. C., & Byrnes, P. (2015). How Big Data Will Change Accounting. *Accounting Horizons*, 29(2), pp. 397-407.
- Zwirtes, A., & Alves, T. W. (2014). The impacts of Technological Innovation On Accounting Firms in Rio Grande Do Sul: Factor Analysis. *Revista de Educação e Pesquisa em Contabilidade*, 8(1), pp. 39-53.

Appendices

Appendix A: Translated Interview guide

Interview guide

Introduction

Presentation about the project and us

Inform the right to anonymity

Sign the NSD document

Main section

Accountant's work

1. What is your job position and how long have you worked in the accounting industry?
2. Which tasks perform the accountant/you at the office?
3. What is a good accountant?
4. What will be expected of the accountant in the future?

Digitalization

1. What is the meaning of digitalization?
2. What does digitalization mean for the accountant and the company?
3. Have you experienced any major changes in the industry?
4. Are there any tasks that the accountant does today that you will be replaced in the future?
5. What challenges and opportunities do you associate with the digitalization of the accounting industry?
6. Do you think there are other services the accountant can offer due to the evolving digitalization?
7. What qualities do you think are important in order to take advantage of digitalization and succeed as an accountant in the future?
8. Do you think it will be more usage of Big Data, Robotics and Artificial Intelligence in the finance function?
9. What role will you have in the digitalization movement?

Ending

1. Do you want to elaborate more about the topic?
2. Do you have any questions?

Appendix B: Original Interview guide

Intervju guide

Introduksjon

Presentasjon om prosjektet og oss

Informerer om rett til anonymitet

Signere NSD dokumentet

Hoveddel

Regnskapsfører sitt arbeid

1. Hva er din jobbstilling og hvor lenge har du jobbet innen regnskapsbransjen?
2. Hvilke arbeidsoppgaver utfører du/regnskapsføreren hos dere?
3. Hva vil det si å være en god regnskapsfører?
4. Hva vil forventes av en regnskapsfører i fremtiden?

Digitalisering

1. Hva legger du i ordet digitalisering?
2. Hvordan vil du si digitalisering påvirker selskapet og regnskapsførerens arbeid?
3. Har du opplevd noe store endringer innenfor bransjen?
4. Er det noen arbeidsoppgaver regnskapsføreren gjennomfører i dag som du tror vil bli borte i fremtiden?
5. Hvilke utfordringer og muligheter forbinder du med digitalisering av regnskapsbransjen?
6. Er det noen andre tjenester regnskapsføreren kan tilby grunnet digitalisering i fremtiden?
7. Hvilke egenskaper mener du er viktige får å kunne dra nytte av digitalisering og lykkes som regnskapsfører i fremtiden?
8. Ser du for deg at det blir brukt mer av Big data, robotikk og kunstig intelligens i økonomifunksjonen?
9. Hva tror du din rolle vil være i digitaliseringen?

Avslutning

1. Har du mer å tilføye?
2. Er det noe du lurer på?

Appendix C: Reflection note Kristine Fledsberg

This reflection note is written as a part of the master program in Business and Administration from the School of Business and Law at the University of Agder. The purpose of this paper is to draw on all the knowledge I have generated from across the whole master program. Accordingly, I will begin presenting a summary of the main findings of the thesis followed by a reflection of how the master thesis connects with three essential topics: international trend, innovation, and responsibility concerning ethical challenges.

Summary of the thesis

This thesis examines how digitalization influences the accountants' role and their self-understanding. To investigate our research problem, we have developed two research questions concerning the present and future situation of the accountants' role. Our research is an exploratory study of the Norwegian accounting firms, where we have collected primary data from 13 accounting firms using semi-structured interviews. To summarize our results, it shows the respondents appear to be excited and curious about the evolving technology. Nevertheless, it seems to be a scarcity of knowledge among the accountants where the majority of the industry is in the early stage of digitalization.

Our main findings indicate the accountants need to reskill and obtain more knowledge and skills concerning IT. Indeed, the future CEO needs to understand as much about IT as they do about financial administration. Interestingly, the respondents recognize the education sector as outdated and traditional. They argue that people learn through practical learning, and many are worried about how to retain knowledge when advanced technology performs simple tasks. Therefore, it is vital that the educational sector facilitate useful learning and teaching to prepare the accountant for work life. This observation is a gap that needs to be reduced for the accountant to enter the new role to a "different accountant."

From the literature, we find there is a gap between the accountants' occupational identity, where the accountant wants to be an advisor but at the same time struggle to fulfill the requirements of entering this role. Nevertheless, we observe when the conservative accounting industry consists of younger and IT-skilled people, the gap will reduce. Thus, there will be a need for a new name for the "different accountant" to fit the role better and

make it seem more interesting in the future. Lastly, it was fascinating to observe how the media drew vivid images of the accountants' role. I was surprised to find the media's portrayal of the accountant role was not in line with the respondents' perception. The respondents believed the media embellished the truth and drew pictures of a robot taking over their job. Nevertheless, the accountants are willing to embrace and exploit the advantages new technology brings as they have always done throughout history. Therefore, we concluded the media was exaggerating in regards to presenting the accountant as the top professionals to be automated and face extinction within the next years. We believe the accountants will not lose their job if they are willing to reskill and take advantage of the evolving technology.

International Trends

The global market is developing dynamic and offers opportunities and risks to organizations. Accordingly, this means accounting firms need to be prepared for the fast-moving changes that could occur. One important international trend is outsourcing, and it involves hiring a party outside a firm to perform services and create goods on behalf of the firm (Krell, 2007). The most common process to outsource is accounting, invoicing, payroll management, IT operation, and so on (Hall, 2012). From our observation, respondents express the authorized accountants are increasing. Besides, the number of firms that have chosen to set out their accounting and other finance functions to external players has been growing in recent years. Through our observation, we have asked respondents what other services could be offered because of digitalization. Interestingly, one respondent points out that to take over their customer's internal financial department could be a solution because technology has enabled firms to be more efficient and intelligent. When the customer chooses to outsource their accounts to a professional part, the accountant profession can continue to grow. Therefore, it is essential for accounting firms to exploit the advantages of international trends.

Furthermore, the accountants are dependent on international forces, for instance, from our findings, we find external vendors pressuring the accountants to invest in new systems and continuously digitalize. Indeed, one respondent point out the vendors is depending on the accountant to safeguard their survival, because unless the accountant survives, the vendors will not survive either. Therefore, external parties put pressure on the accountant. Through the observation, we recognize foreign players could be a potential threat, where the accountant needs to be up-to-date with the rapid technology. International forces are utilizing advanced

technology such as Robotic Automation Process (RPA) and Artificial Intelligence (AI) whereas the Norwegian accounting firms are in the early stage of digitalization.

Innovation

Moreover, our topic relates to innovation, where we investigate what the new advanced technology brings for the accountant. Before the latest advancement of digitalization, many of the respondents expressed the accounting sector as traditional, rigid, and offer very few degrees of freedom in terms of innovative content. From our findings, we recognize the majority of respondents are excited and curious about the new developments. Many are engaged in the project implementing Robotic and AI. However, we observe there is a scarcity of knowledge regarding the technology behind the advances. There is a gap in the accounting industry where many accountants want to utilize and embrace the new technology, however, because of the constraints of lack of IT-skills, struggles to adapt to the latest technology and change their mindset the developments cease to happen. Therefore, it is crucial to facilitate innovation through education and emphasis to a greater extent of IT courses to prepare the accountant for the rapid digital movement. This initiative is a service that needs to be acknowledging to prepare the accountant for work life.

Responsibility concerning ethical challenges

Accounting plays a crucial role in society where the accountant is responsible for providing reliable and useful information about a firm and its transaction (Choi & Meek, 2007). The accountant is perceived as the gatekeeper of corporate data and accordingly obtains the responsibility to provide accurate and truthful information to those who rely on his or her work (Chua, 2013). Thus they have an ethical responsibility.

As technology continues to evolve, it brings possibilities, but at the same time, new advances also carry risks. These risks need to be addressed because they can relate to ethical challenges. A potential ethical problem that might arise is that advanced technology does not comply with the newer technology. For instance, from our thesis, we recognize that utilizing cloud-based technology could include difficulties when moving critical business information to the cloud do not comply with the regulations of the authorities. In recent years there has been much attention drawn to the EU General Data Protection Regulation (GDPR), which involves laws protecting the personal information that could identify a person (Goddard,

2017). Besides, the author recognizes personal data must be processed, and the accountant might experience ethical challenges interacting new advances with their work. Thus, I identify that more modern technology such, as Artificial Intelligence (AI) could be a useful mitigating risk in some accounting areas.

Artificial Intelligence involves a computer performing tasks with human intelligence, including decision making or learning. This technological tool could use detecting fraud and be trained to detect, monitor, and repel cyber attacks (Boillet, 2018). For instance, Boillet, (2018) describes the software could identify certain distinguishing features, where the technology consumes extensive data and then close down the attack. Nevertheless, the author explains increasing complexity of AI could bring biases where the accountant overestimates the capabilities of AI, and there is little legislation governing AI. Indeed, the AI systems may not comply with GDPR, where it analyzes vast volumes of consumer data.

Therefore, I suggest the accountants need to understand how AI technologies are being applied within their firm to strengthen responsibility. In place, to manage ethical issues, the accountants should ensure the firm has appropriate structures and understand how AI is addressing algorithmic bias (Boillet, 2018). They also need to know how their firm utilizes AI technology and interact with government regulations.

Sources:

- Boillet, J., (2018). *Why AI is both a risk and a way to manage risk*. Retrieved April 28., 2019 from https://www.ey.com/en_gl/assurance/why-ai-is-both-a-risk-and-a-way-to-manage-risk
- Choi, F., & Meek, G., (2007). *International accounting* (6th ed.). New Jersey: Pearson Prentice Hall.
- Chua, F., (2013). Technology trends: their impact on the global accountancy profession. *The Association of Chartered Certified Accountants*.
- Goddard, M., (2017). The EU General Data Protection Regulation (GDPR): European Regulation that has a Global Impact. *International Journal Of Market Research*, 59(6), pp. 703-705.
- Hall, J., (2012). Accounting information systems. *South-Western Cengage Learning*. (8th ed., pp. 680-685).
- Krell, E., (2007). Outsourcing the finance and accounting functions. Mississauga, ON: CMA, Canada

Appendix D: Reflection note Diem Chi Thi Duong

The thesis is drafted as the final part of my master's degree in business administration from the School of Business and Law at the University of Agder. This reflection note includes three themes: internationalization, innovation and accountability. Further, this thesis concerns investigating the impact of digitalization on the accountants' role and self-understanding. It was a natural and clear choice to write a thesis about the accounting industry, because of personal working experience in this field. My background in the industry prior to this thesis had given me an insight into how the digitalization affects the profession. This experience has made me curious about how evolving technology will influence the accountants.

In this thesis, we interviewed CEOs, accounting leaders, and accountants from 13 Norwegian accounting firms to illuminate the research problem. These respondents shared their thoughts regarding how the digitalization has influenced the profession they have today and how it will affect the future. The findings indicate there is a clear distinction between the firms who have taken advantage of technology (innovators) and the other firms who have not (followers). We argue the size of the company is a factor when it comes to exploiting the opportunities technology brings. Both our findings and the literature claim the resources is a significant aspect, and therefore, the larger firms have taken more advantage of the technology because they have the means to take the financial risk of adapting to the new ones.

Moreover, both the literature and our findings indicate that the accountants must have more characteristics and skills to enter a new role as a "different accountant". This new role concerns being a business partner towards the customers, and new features are emphasized, such as being social, technical, problem-solver, a good seller, willing to learn, curious, and open-minded. We also found evidence that shows the educational system must change to provide a better base for graduates to match the qualities and characteristics needed to complement the new role. Additionally, we saw the importance of the effort of accountants to utilize and understand the whole process of the newly developed technology. Lastly, our findings indicate that the media exaggerate the future decline in the numbers of accountants. Instead of the profession vanishing in a few years, our findings show that the profession is converting to a new role.

Internationalization

In a fast-paced world, where businesses are including more technology in their daily routines, the digitalization of accounting practices is essential for companies to follow the changes in society. International trade and regulations can be controlled and completed at a quicker velocity with a lower probability of making mistakes if a good framework is in place. Such a framework should consist of proper IT systems, educated employees, and forward-thinking policy. These elements are especially true when it comes to the accounting of import and export of commodities. For instance, if a company enable digital inventory counting, a considerable amount of manual work is removed, allowing accountants to spend more time with other customer valuable services.

I believe the main challenge of digitalization of accounting regarding international environments is the different laws between nations. Many IT systems will be bound to regulations within one country that does not correspond to a trading partner. The development of such systems must, therefore, initiate in a way that allows smooth transitions and readable data across language, policy, and laws.

Innovation

We live in an age of innovation, where technology evolves our world faster than ever before. This evolution will have a substantial effect on the way accountants work in the near future. The days when accountants had to spend several hours to record transactions of sales and purchases are gone because currently, one can scan documents and have the systems do the recording automatically.

Lack of focus on innovation in the current educational system is something I consider to be a challenge for young graduates today. Our findings presented in this thesis show that many are unprepared and uneducated concerning IT systems and modern solutions to accounting practices. Interestingly, the findings show that the current educational system has not kept up with modern systems. More oral presentations, group assignments, practical training, and IT-focused lectures should be added in the schedule to provide students with the required qualities needed to enter the role as a “different accountant”. This will give a good background for students to adjust to the modern revolution.

The technical revolution can be compared to the washing machine and how it simplified the everyday for households. Tedious tasks automatize, and therefore, accountants are left with more time for creative solution making and strategy. Increasing the numbers of time-consuming tasks are being completed by IT systems every year. The most exciting part of it all is that we have no way of knowing what the industry will look like in the next decades.

Accountability

Modern technology controls a lot of sensitive data and executes a lot of automatic transactions, which means there is much trust given to the accountants and their tools. This makes the subject very relevant to our thesis. While automated processes and easy storing of information offer many opportunities and benefits, there are also risks and threats that come with it. I hope that our thesis has managed to raise awareness of the responsibilities.

In Norway, the authorities have made sure that only authorized accountants are allowed to do the accounts on behalf of other companies. These individuals are required to take postgraduate courses to ensure the credibility of their title. Accountants are responsible for protecting their assets to the best of their ability. All data stored in a database or cloud must be protected appropriately.

Authorized accountants have a great responsibility with picking a reliable system that both proves to be efficient while following laws and protecting the sensitive data. The most significant responsibility will be the controlling of the accounts. With more automated actions, the emphasis on controlling is even greater than before. The authorized accountant will be responsible if the machine makes a mistake. That is why I believe the controlling of machine produced work must be done more carefully, and it will also increase professional knowledge.