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Automation in accounting

A study of impacts in accountants' practice
and attitudes towards automated accounting

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Abstract

Background: The technological development in accountants' practice is a major trend that has grown substantially during the last years and is today more prominent than ever. The development has now entered a new phase where automation of accounting processes is perceived as a growing concept that will affect the accounting profession. Speculations have arisen about what effects the implementation of automated accounting may bring into the profession.

Purpose: The purpose of the study is to investigate how automation has been integrated in the accountants' practices and in their professional role. Further, to examine the accountants' attitude towards automation and the explanation behind the variation of attitude.

Method: The research questions are answered by using a qualitative method where the empirical findings are collected through semi-structured interviews. The interview guide was based on a theoretical framework which was developed on previous research. The participants in the study represent eight accountants located in the Jönköping region.

Findings: The findings in the study showed that automated accounting may have impacts on both the accountants' practice and their professional role. The accounting process has been more efficient and beneficial due to automated processes, but it has also increased the risks of faults and loss of control. Along with the impacts on the practice, a shift has been made in the role as an accountant to a demand for more consulting and controlling roles. This has led to the accountants requiring more IT knowledge and higher qualifications compared to earlier. All of the respondents showed in general a positive attitude towards automated accounting. Although several respondents expressed some negative attitudes towards certain effects.

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1 Introduction

The first chapter introduces the thesis and includes a background about the subject. Further, the chapter aims to highlight the problem as well as introduce the purpose of the paper and the research questions. Lastly, delimitations are presented since it is necessary for the reader to consider those during the thesis.

1.1 Background

In today's society, digitalisation¹ is perhaps the strongest force for change globally. More of our activities, both private and professional, are taking place in the digital world. Further, in the debate, it is often stated that jobs will disappear and be replaced by robots and algorithms. In the accounting field, there are many indications that the pace of change will accelerate in the coming years. For many companies that operate in the accounting industry, it is crucial to get acquainted with the changing digital landscape and get involved in digitalisation to keep up with developments in order to survive. (Kairos Future, 2016)

Accounting is a central part of an accountants' task and is the method of collecting and documenting information about the economic- and financial situation in a firm to stakeholders. The accounting is divided into external and internal accounting. The external accounting is regulated by law and aims to provide the external stakeholders, such as suppliers and investors, with information about the firm's economic situation. The internal accounting main objective is to provide information that include transactions, analyses and reports for the internal stakeholders within the firm. (Visma, 2018)

Digitisation² has had a major effect on the accountants' practice during the later years where the development of technology in accounting has grown extensively (Güney, 2014; Kairos Future, 2016). This is a result of the increased usage of computers that were introduced on the market in the 1980's (Güney, 2014; Boggs, 1999). The development changed the accountants'

¹ Digitalisation – the use of digital technology.

² Digitisation – when information is converted into digital.

methods for carrying out tasks. Before, administrative activities including distribution of hard copies were slow and not cost efficient. The introduction of computers created a need for digitisation with the administrative purpose of simplifying the financial information to stakeholders (Güney, 2014; Boylan & Boylan, 2017).

During the 1990's, the development of computers continued (Frey & Osborne, 2017) and decreased the accountants' manual work and created new possibilities in the accounting process since the accounting software now could be used for writing and calculating (Frey & Osborne, 2017; Ghasemi, Shafeiepour, Aslani & Barvayeh, 2011). In the beginning of 2010 until now, the development of computer technology in accounting activities increased further (Mukhametzyanov, Nugaev & Muhametzyanova, 2017). The digitalisation within companies became important to improve the accounting process, but also regarding the storing and protection of accounting data (Jurubita, 2017). In addition, the digital solutions in accounting reduced the price of software as well as the programs based on the Internet and the need for information access (Jurubita, 2017). Furthermore, the digitalisation enhanced the security and increased the speed of data gathering in the accounting activities (PwC, 2016).

The technological development in accountants' practice is a major trend that has grown substantially during the last years and is today more prominent than ever. The development has now entered a new phase where automation of accounting processes is perceived as a growing concept that will affect the accounting profession. (Kairos Future, 2016)

Automation is a highly debated phenomenon in the related profession of auditing, and there it can be connected with four concepts; Artificial Intelligence (Gotthardt, Koivulaasko, Paksoy, Saramo, Martikainen & Lehner, 2020), Big Data, Cloud Accounting (Kairos Future, 2016) and Blockchain (KPMG, 2017). However, in this report the authors will focus on a more overview of automation and taking all of these concepts into consideration. To understand the concepts involved in automation, a short description of the four concepts is needed. The first is Artificial Intelligence (AI) and it can be described as a mix of software and equipment that replaces human intelligence in order to solve problems using learning, elucidating, reasoning and recognising the same patterns as humans do (Askary, Abu-Ghazaleh & Tahat, 2018). Artificial Intelligence makes it possible for managers to obtain some support with for example repetitive decision making and providing more precise information (Askary et al., 2018). The second concept is Big Data which includes the four V's: Volume, Variety, Veracity and

Velocity (Kairos Future, 2016). Big data analyses a great number of both structured and unstructured information with algorithms and can be described as a huge volume of data derived from different sources (Kairos Future, 2016). When it comes to the accounting profession, big data can be useful in bookkeeping by for example finding relationships with previous invoices and also analysing the invoice (Kairos Future, 2016). Thirdly, Cloud Accounting is the concept of using cloud services in the sense that accounting software is internet based and stored on the cloud provider's server (Kairos Future, 2016). The cloud function creates the possibility for an accounting firm to access for example financial data on different locations, not only at the workplace (Kairos Future, 2016). Lastly, the technology of Blockchain allows digital information to be distributed without being copied or altered (Wang, P. Wang & Shou, 2017). By using Blockchain, data can be stored at a central database which only can be accessed from various places (Wang et al., 2017).

The concept of automation within the accounting profession can be described by three different steps. The first step involves support to the already existing processes. The accountants have been assisted with for example computers in their daily work. The next step is that automation is acting as a complement and takes over certain tasks. For example, the computers contain systems that autocorrect misspellings which proposes that the need for proofread declines. The third and last step argues that automation replaces tasks and human workers are no longer needed to perform a task. Hence, it appears to be a fear of the implementation of the third step among workers (Lee & Tajudeen, 2020). However, according to Swedish Institute of the Accountancy Profession (FAR), so far, the most efficient way of working is to combine human workers and computers. (Kairos Future, 2016)

Speculations have arisen about whether the accounting profession will be replaced by automation in the future (Lee & Tajudeen, 2020; Kairos Future, 2016; Swedish Foundation for Strategic Research, 2014, p.7). Lee and Tajudeen (2020) made a study showing that 95 percent of the accountants interviewed experienced a fear of losing their jobs in the future. The fear described is based on the fact that automation is taking over the roles of accountants when it comes to tasks like data analytics and number crunching (Lee & Tajudeen, 2020). Especially entry-level accountants run a higher risk of being replaced by automation due to the fact that they are relatively structured (Lee & Tajudeen, 2020). Further, tasks that do not require human judgement during the process or are not dependent on human interaction to make decisions are more likely to be replaced by automation (Kokina & Blanchette, 2019).

According to the predictions made by Swedish Foundation for Strategic Research (2014, p.7) around 46 percent of business economists will be affected by automation within 20 years. Hence, many thousands of jobs run a risk of being replaced in the future due to automated processes (Swedish Foundation for Strategic Research, 2014, p.7). Moreover, business students also run a high risk of being replaced by automated processes and the year 2019 Sweden had around 7800 business students that graduated, which is a large number that possibly will be affected by automation (SCB, 2020).

1.2 Problematization

It is stated in previous research that individuals have different attitudes towards business changes (Hunton, 2002). If the attitudes towards technological changes are not accepted, it may affect the efficiency in the working process and the technology becomes problematic to implement in the firm. This is because the responses towards the technology are important in order for the automated processes to fulfill its capability. (Yang, Sun, Zhang & Wang, 2015)

Individuals are complex since one adapts differently to changes (Hunton, 2002). Therefore, it is difficult to understand how their attitudes are shaped (Hunton, 2002). A model that is widely used when studying attitudes towards new technology is the Technology Acceptance Model (TAM). The model shows how a user can accept and use new technology based on the variables: perceived usefulness and perceived ease of use (Davis, 1989, p.4). As mentioned in the earlier section, user acceptance is an important part of the implementation of new technology (Yang et al., 2015). Hence, the Technology Acceptance Model is the most applied model when studying users' acceptance (Davis, 1989). However, in the article by Legris, Ingham & Colletette (2003), the model is criticised for being too narrowed since significant factors that could influence the use of technology are not included in the model. From the results, it was shown that the TAM model is useful but that it needs to be integrated into a more comprehensive model. For instance, it needs to be improved in terms of more variables that exist for both human and social change processes and variables for the adoption of innovations (Legris et al., 2003). Salovaara and Tamminen (2009) also state that the model does not take into account if the technology first might be accepted but later abandoned, and vice versa. Further, the model does not cover the approach to what problems that may arise in a project which may affect the user's acceptance (Salovaara & Tamminen, 2009). There are indications from this previous literature that the model has not taken into account all factors

that are of importance for explaining the acceptance of technology (e.g. fear of losing one's job, uncertainty about the future, technology development in the firm). Furthermore, since automation in accounting processes has grown substantially in recent years and is expected to affect the accounting profession to a large extent (Kairos Future, 2016), the accounting industry is a great alternative to illustrate this. More research is needed since there is potential to further develop the theoretical picture of what explains how new technology is received by accountants. The acceptance towards new technology will in this study be examined in accordance with the automation in the accounting industry. Hence, the thesis will use the case of automation of accounting as a springboard to develop TAM.

The concept Automation experiences a rising curve with continuing and growing interest in the research field (Sutton, Holt & Arnold, 2016). Further, automation is expected to change the accounting profession along with it becoming more efficient (Guthrie & Parker, 2016). Guthrie and Parker (2016) emphasises that accountants will experience extensive challenges with automated processes completing tasks faster than themselves. Automation is a constantly current topic as technology is developing continuously. The accounting profession is an industry that consists of most standardised tasks where there is a risk that the technology will be able to replace it in the future. If the accounting industry will disappear or if new tasks are created are one of the considerations that makes this topic interesting to study. (Kairos Future, 2016)

Previous research that has been conducted over the years has touched upon the role of automation in several contexts, especially within other professions such as the auditing field (Issa, Ting & Vasarhelyi, 2016; Kokina & Davenport, 2017; Rozario & Vasarhelyi, 2018). However, the automation process within accounting has started to emerge in recent years and are yet to be discovered (Cooper, Holderness, Sorensen & Wood, 2019; Fernandez & Aman, 2018; Rozario & Vasarhelyi, 2018). As mentioned, there is more research in the field when it comes to the related profession auditing. However, there are differences between accounting and auditing since their work processes are divergent and hence, could not be comparable. An auditor is examining and reporting on a company's financial statements and management while an accountant is acting as a consultant and is doing the bookkeeping, salaries, invoicing and tax returns (Swedish Companies Registration Office, 2016). Kokina & Blanchette (2019) states that tasks that do not require judgement or that rely on human interaction to make decisions are more likely to be replaced by automation. Therefore, the different professions

could be affected differently. However, the role of automation within accounting and its effects on the attitude among the accountants has not been studied to the same extent.

Taipaleenmäki and Ikäheimo (2013) states that the adoption of automation in accounting processes might decrease the demand of accounting skills. Employees should instead complement technological skills to comprehend the automation process (Güney, 2014). It is further stated by Taipaleenmäki and Ikäheimo (2013) that accounting firms in the future will be replaced with other professions since their education is no longer needed. Hence, when the automated development can perform accounting without a human involved, firms might lose their clients, since the expertise is no longer demanded (Taipaleenmäki & Ikäheimo, 2013). Among the professions that are most likely to be replaced within 20 years, accounting assistants stand on the second place according to the Swedish Foundation for Strategic Research (2014, p.12). Further, a researcher believes that the labor market will change due to automated processes (Fölster, 2014). However, Andreassen (2020) emphasises the importance of accountant practices by a human employee. With for example interpreters of numbers and representations that are open to interpretation and discretionary judgements (Andreassen, 2020). Accountants expressed an uncertainty during a study made by Kokina and Blanchette (2019) regarding that robots have the capacity to perform tasks that were previously completed by a human employee. Further, an uncertainty regarding the role a human employee would play working alongside robots (Kokina & Blanchette, 2019). Moreover, there has to be considerations regarding the consequences of the accounting profession when adopting automated processes (Sutton et al., 2016). Otherwise, researchers (Sutton et al., 2016) states that for example 94 percent of the accounting professionals in Australia could be replaced by automation within the next ten years. These possible outcomes of automation in the accounting profession could create a negative attitude among accountants when it comes to the development of new technology. Because it is unpredictable to which extent the profession will change, this might evoke feelings of fear and anxiety towards implementation of technology (Ujhelyi, Barizsné & Kun, 2015).

There is absent research in the field of automation in accountants' practice and their professional role. The practice refers to the working tasks performed in the role of an accountant. Whereas, the professional role is considered as the expected function an accountant has at a particular company based on the education and knowledge necessary to perform their specific tasks (Greenman, 2017). Previous research has examined automation in

accounting and its effect on the accounting profession (Greenman, 2017; Fernandez & Aman, 2018; Ghasemi et al., 2011), but there is a lack of research on what effects automation has on the practice and the professional role as an accountant. In order to understand the effects of automation in the accounting profession, it is important to understand the individuals' attitude and reaction towards new technology. The accountants' attitude towards the possible impacts of new technology are of interest to understand their stance to these technological changes. Depending on the individuals' behaviour towards technological changes, it could affect whether the automated processes fulfills its capacity or not (Murtagh, Gatersleben, Cowen & Uzzell, 2015). Hence, it is crucial to study the accountants' attitude towards the possible impacts. Studying the impacts on the practice and professional role is moreover crucial to understand because of the importance of accounting for the organisations, individuals and in the society as a whole (The Swedish Tax Agency, 2020). Further, how automation might affect the practice and professional role as an accountant is a contribution to the professional research where there is a research gap that this study tends to fill.

Previous studies (Lee & Tajudeen, 2020; Swedish Foundation for Strategic Research, 2014; Taipaleenmäki & Ikäheimo, 2013) mentioned in this thesis have highlighted possible negative outcomes that automation might bring into the accounting profession. However, there are still possibilities and advantages that could arise from the adoption of automation. Greenman (2017) emphasises that automation might provide the accounting profession with tools that create higher efficiency and effectiveness in the working processes. As a result, Lee & Tajudeen (2020) argue that this could lead to advantages such as time saving, cost reduction and increased productivity. Andreassen (2020) also shows that digital technology might contribute to more specialised and narrow roles among accountants. As well as the implementation of automation might bring a negative attitude among accountants, it might also generate a positive attitude. This in a sense that an enhanced and a more efficient working process that is less time consuming can result in a satisfaction of doing their work.

In the light of the criticism that is presented towards TAM, there is a need for the model to be further developed in the form of more variables. Therefore, this thesis is a contribution to the development of the theoretical picture of the TAM model. In a sense that it is going to be examined what other possible variables that might explain the acceptance towards new technology. Along with this, automation in accounting is a new phenomenon that is increasing extensively. The accounting profession consists so far of most standardised tasks and

therefore, the profession runs a higher risk of being replaced by new technology in the future. However, there is insufficient information about what effects automation has had and even less about what impacts the automation will have on the accountants' practice and professional role. As automation in accounting is experiencing a rapid growth, an updated study is needed to identify the new impacts on the accounting profession. Further, a study is needed to examine the possible attitudes among the accountants towards the possible impacts of automation. Understanding the impacts in relation to attitude takes a different angle that previously not have been covered. This is of importance since the attitude builds the acceptance towards new technology (Davis, 1989), which shapes how automation is involved in accountants' practice. As previous literature takes a macro perspective of the impacts in the profession, this study takes a micro perspective from the individual perspective which creates an academic value. This study also creates practical value because of the changes one can expect in the future in the accounting profession. Thereby, individuals, i.e. employees or students, that have a connection to accounting become aware of how the profession may change and future possibilities may be discovered. The empirical findings in this study could be useful in the change of work at an organisational level in the accounting industry as this study might show how changes in an organisation can affect the attitudes of the employees. Thus, it is significant to study both the impacts and attitude of the implementation of automation in the accounting industry.

1.3 Purpose

The purpose of the study is to investigate how automation has been integrated in the accountants' practices and in their professional role. Lastly, to examine the accountants' attitude towards automation and the explanation behind the attitude.

To examine the purpose, the following research questions was developed:

- *What are the effects of automated accounting in accountants' practice and in the professional role?*
- *What are the attitudes of the accountants toward automated accounting? What explains the variation of the attitudes?*

1.4 Delimitations

This thesis will focus on accountants that work either on an accounting firm or at a company's accounting division. However, the investigation is limited to only accountants and is focusing on the accounting division and no other services (e.g. auditing). Moreover, the focus in this paper is limited to firms that have accountants who work full time or have recently worked full time with accounting tasks. This since the individuals have to be involved and have expertise in the accounting process in order to understand how automation may affect their practice, which is the purpose of the study.

2 Literature review

The following chapter of the thesis aims to provide the reader with previous research in the field in order to obtain an overview and to create a deeper understanding about the topic and its key concepts. The literature review includes a description of automated accounting, the effects of technology within the accounting industry and how the role as accountant has changed. Additionally, advantages and challenges with automated accounting are presented. Lastly, the professional role as an accountant in the future is discussed.

2.1 Automated accounting

The accounting profession involves a number of different tasks, such as invoicing, payroll and book-keeping, and hence includes a process of large amounts of numerical data (Wilson & Sangster, 1992). These types of tasks are according to Wilson and Sangster (1992) a cost burden on organisations and therefore, the early introduction of computer systems was motivated. There are some accounting tasks that have been more affected by automation than others, such as tasks that are based on simple algorithmic processing of numerical data, for example book-keeping, payroll and invoicing (Wilson & Sangster, 1992). Further, journal entries which consist of debit and credit and transactions like income, expenses, liabilities and receivables are handled by regulations (e.g. ÅRL, BFN) established by the systems (Ghasemi, Shafeiepour, Aslani & Barvayeh, 2011; Güney, 2014). Thereafter, these digital accounting documents are created automatically (Ghasemi et al., 2011; Güney, 2014). These types of tasks that previously were performed manually have been computerised and almost been replaced by computer systems (Wilson & Sangster, 1992). Moreover, looking back 20 years, the job description of an accountant looks very different compared to how it looks today (Greenman, 2017).

As mentioned earlier, automation is a technological phenomenon that might provide the accounting profession with demanded tools for higher efficiency and effectiveness when it comes to the working process (Greenman, 2017). The need for automated accounting is due to the manual time consuming process within the accounting firms (Drum & Pulvermacher, 2016). Further, Drum and Pulvermacher (2016) states that gathering data from different processes and divisions for the account distribution results in that financial statements are in

the hands of decision makers too late and that the data has been outdated. Hence, automated accounting makes this process faster and more efficient (Drum & Pulvermacher, 2016). Moreover, high pressure from i.e. clients with cost reduction demands and service differentiation are also factors that motivates the use of automation in the accounting profession (Wilson & Sangster, 1992).

2.2 The effects of technology on the accounting industry

Within the next 20 years, the accounting profession will see a full implementation of automation (Kairos Future, 2016). The stage that automation is heading towards proposes that the majority of industries on the labor market have to prepare for new changes regarding the working methods within companies' organisations (Kairos Future, 2016). In the accounting industry, it is crucial for companies to be open to the change of automation if they want to survive and continue to succeed (Kairos Future, 2016). Therefore, Banker, Chang & Kao (2002) suggests it is necessary for accountants to understand how technology could affect their work processes and to understand if the technology will result in increased productivity or not. Goodhue (1995) emphasises that there should be good interaction between technology and the employees' tasks in order for new technology to have a positive impact on employees' performance. With the rapid progress of automation, it is therefore difficult for companies to avoid these changes (Kairos Future, 2016).

Big data, cloud accounting and artificial intelligence (AI) are some of the development areas in technology that have become one of the most important assets in companies and that has changed the tools for accounting (Dimitriu & Matei, 2014a; Bhimani & Willcocks, 2014). This aid primarily affects society but also companies (Digitaliseringskommissionen, 2016). The continuous advances in artificial intelligence and companies' growing ability to interpret and analyse big data has increased the threats that a larger number of professional groups may be fully automated in the future (Bhimani & Willcocks, 2014; Nagarajah, 2016). The development of Big data has also been of great importance for cloud accounting and how accounting firms carry out organisational activities from distance (Dimitriu & Matei, 2014a). The usage of cloud accounting makes the information more easily accessible from any location (Dimitriu & Matei, 2014a) and has enabled companies to store and share resources at lower costs with greater flexibility (Bhimani & Willcocks, 2014; Dimitriu & Matei, 2014a).

As a result of the development of more advanced computer usage, digital accounting has got a substantial breakthrough and has got widespread use (Güney, 2014). Automated accounting software has now replaced traditional accounting books and has made it possible to track and record all financial transactions within the same accounting system (Ghasemi et al., 2011; Güney, 2014). In addition, distributions of debit and credit items are now handled automatically with the help of computerised systems (Ghasemi et al., 2011; Güney, 2014). Bhimani and Willcocks (2014) states that accounting systems will continuously develop as the society, the market and the demands of customers are changing. Fortnox and Visma are two leading software suppliers in the Swedish accounting industry that work actively with automated processes in their programs for accounting (Tidningen Konsulten, 2015). In recent years they have launched several automation projects within the accounting field (Tidningen Konsulten, 2015).

The development of technology within the accounting industry shows how accountants' profession may change in various ways and what effects it has, which is going to be investigated in this thesis. It follows from the fact that individuals are responding differently to changes which assume that there are implications for implementing new technology depending on whether individuals' attitudes towards the changes are accepted or not. If individuals resist change it may affect the efficiency and capability of the technology in the accountants' practice and vice versa.

2.3 Changes in the role as accountants

Fernandez and Aman (2018) states that the effect of automation in accounting creates an increased demand for more advanced consulting. Therefore, the introduction of automation also requires experienced accountants to a larger extent (Henry & Hicks, 2015). Moreover, Levy and Murnane (1996) emphasise two main working tasks by accountants, tasks that are based on routine and working tasks that are more advanced. The more advanced tasks require more competence by accountants to solve problems that are impossible for the computer (Levy & Murnane, 1996). The advanced working tasks in accounting have not yet been automated because it requires more human intervention and competence (Kairos Future, 2016).

The continuous increase when it comes to automation in the accounting profession also creates a demand for technology competence among accountants (Pan & Seow, 2016). Pan and Seow (2016) further state that accountants are not only expected to handle IT-systems but also have knowledge about technology risks. Hence, this could lead back to the statement made by Levy and Murnance (1996) that human competence and intervention is still needed, to for example identify problems in the systems.

As a conclusion, the increase of automation in accounting has influenced the competence demanded in the profession. Some years ago when the working tasks were performed manually, another competence was needed (Levy & Murnance, 1996). The competence among accountants gets a different meaning as automation becomes a larger part of the profession. The implications the role as an accountant will experience is a change in skills demanded and changes in the practice, where the distribution between structure and judgement goes towards more time spent on consulting (Fernandez & Aman, 2018; Pan & Seow, 2016; Kairos Future, 2016).

2.4 Advantages and opportunities with automation

Automation in the accounting profession might bring both advantages and disadvantages. The following section will highlight the possible advantages with automation.

The most emphasised advantage with the introduction of automation is the fact that it is time saving, which makes the working process more efficient and flexible (Ghasemi et al., 2011). This is in line with the argument from Lee and Tajudeen (2020) article, where it is stated that automation in accounting is time saving, it reduces costs and increases productivity.

Furthermore, several other authors (Greenman, 2017; Cooper, Holderness, Sorensen & Wood, 2019) also believe that automation creates higher efficiency and effectiveness when it comes to working processes in accounting. In addition, Askary et al., (2018) argues that automation can help to cover all variables involved with a problem, not just a few of them, in solving an accounting dilemma. Therefore, automation would be the solution to remove weaknesses of the internal control system, without the need of human intervention or making a judgement. Further, automation can analyse a control activity in an organisation and then provide recommendations to increase the awareness of the likelihood that the control will be at risk. Robots can be used in accounting in the sense that it analyses transactions and account

balances, humans make decisions and act, and bots help to identify alternatives and optimise recommendations. (Askary et al., 2018)

Almost all of today's book-keeping systems contain several control systems that minimise mistakes made by humans and enhance the accuracy, which leads to another advantage with automation (Ghasemi et al. 2011). Automation also makes it easier to access information and hence, leads to a larger amount of people that can access updated information (Güney, 2014). Thus, this would result in advantages such as time saving and cost reduction (Güney, 2014), which are in line with previous statements by Lee and Tajudeen (2020). Andreassen (2020) argues that accountants' role might become more specialised and narrowed due to automation. Technology makes it possible for the computer to perform parts of the accounting process, therefore, the accountants can focus more on tasks like analysing the results of a company and consulting the company e.g. in their financial situation (Bhimani & Willcock, 2014). Since automation creates possibilities for accountants to analyse for example the financial statements, the quality of the financial statements increases which in turn leads to increased reliability (Lupasc, Lupasc & Zamfir, 2012).

These possible advantages and opportunities of automation may have an impact on accountants' attitude towards the increase of technology in the profession. This proposes that there is a greater chance that the changes in their practice are accepted, if one sees the opportunities with it, according to technology acceptance model (Davis, 1989; Davis & Venkatesh, 2000).

2.5 Challenges with automated accounting

As a result of the automation process, it is argued that it could lead to a knowledge gap among accountants (Güney, 2014). The new eventual working methods that are created requires new skills and competence for the accounting profession in the future (Güney, 2014). Therefore, it is necessary to keep up with the changing conditions in accounting and that accountants are adaptable and flexible to new technology (Fernandez & Aman, 2018; Pan & Seow, 2016). Güney (2014) argues that one has to enable information about accounting technology in education to prepare students for the changes in the profession.

It is today known that technology over the years has replaced human physical abilities (Kairos Future, 2016). Automation is one of the processes that has been going on for a long time according to Kairos Future (2016). However, individuals adapt differently to changes, where some are positive about change, others counteract or question the meaning or value of new technology (Hunton, 2002). The attitudes towards technological changes and the understanding about what the changes entail and the possible benefits are important since the technological changes affect the efficiency of the work process (Murtagh et al., 2015). Together with this, the behaviour is crucial in order for the automated processes to fulfill its capacity (Murtagh et al., 2015). Otherwise, Kairos Future (2016) believes that there is a risk that users make resistance.

Ujhelyi et al., (2015) argue that implementing a change in an organisation can be a challenge as users of the technological solutions can refuse. If the users accept or resist the change depends on how extensive the change is in the organisation. The reasons for why users resist can be due to that users need to learn new skills or how new technology works. Hence, this can evoke fears of failure or fears that one has to break old habits. However, it was also shown that users had a positive attitude if the changes were smaller rather than extensive. (Ulhelyi et al., 2015)

Dimitriu and Matei (2015) further argues that a challenge with automated accounting is its dependability on the Internet. If it is a discontinuity of the Internet connection, the result is that the accounting process is interrupted. Other risks with automation is the loss of control over the accounting data as handling tasks manually has decreased (Dimitriu & Matei, 2014b).

As shown above, individuals adapt differently to changes due to various reasons (Hunton, 2002). If one is not willing to accept technological changes it could be a challenge for accounting firms. This since it becomes difficult to get the full capacity of the new technology. In turn, this may have implications on the accountants' practice and their working process (e.g. the efficiency might be affected if the user resists the implementation of new technology). (Murtagh et al., 2015; Kairos Future, 2016; Ujhelyi et al., 2015)

2.6 Accountants' professional role in the future

There are speculations about the upcoming changes when it comes to the role of the accountants, Taipaleenmäki and Ikäheimo (2013) discuss the rapid growth of automation and how it will affect the profession in the future. In their article, the authors emphasise that the automation could lead to that the reporting and analyses of accounting instead transfers to the end users of the accounting information, which leads to a type of self-service (Taipaleenmäki & Ikäheimo, 2013). Further, it appeared in a study made by Henry and Hicks (2015) that accountants should in the future focus on working processes that are not possible to automate, such as cognitive based tasks (Greenman, 2017). Thus, it can be concluded that the demand of accountants will not disappear, but the question is to what extent they are needed (Greenman, 2017).

However, according to McAfee and Brynjolfsson (2016) the current rapid growth of automation in accounting would also imply a threat of the qualified working tasks, not only the tasks based on routine. Further, the challenges of computers and AI develop a capacity that replaces the human competence (McAfee & Brynjolfsson, 2016). Sun and Lu (2017) do not fully comply with that statement and argue that humans can never be replaced by computers since computers are not fully developed to do processes like analyses. The future will tell possible consequences of this in the accounting profession (McAfee & Brynjolfsson, 2016). However, it will create extensive changes in the accounting sector (McAfee & Brynjolfsson, 2016). A study shows that almost all of the accountants are satisfied with the development of automation in the profession (Glantz, 2016). However, Glantz (2016) argues that accountants are critical if they in the future would have the dare to give over all of their working tasks to AI-robots. The technological development will continue to influence the accounting profession, and this requires accountants to be up to date about the demanded competence to tackle the challenges of the future (Bhimani & Willcock, 2014).

As mentioned earlier, the accounting profession will look noticeably different in 10 years from now (Shaffer, Gaumer & Bradley, 2020). Shaffer et al., (2020) argues that accountants will survive the implementation of automation but their professional role will become more specialised. By offering consulting services and focusing on helping clients integrate the automation, instead of focusing on calculating financial data. However, it is further argued

that accountants have to train, and even re-training in some instances to be able to handle the development of automation. (Shaffer et al., 2020)

It is highly speculated about the comprehensive changes the profession will experience in the future. This could in turn have implications on the attitudes among accountants towards the development of automation. In a sense that accountants create a fear against the changes, this may cause a negative attitude and a resistance towards new technology.

2.7 Summary literature review

As stated in the introduction, the purpose of this thesis is to investigate how automation can be identified in accountants' practice and their professional role. Further, to investigate the effects of automation in the practice and professional role as an accountant and to examine the accountants' attitude towards automation. Automation in accounting has led to that simple algorithmic processing of numerical data has been automated, such as book-keeping, payroll, invoicing (Wilson & Sangster, 1992) and journal entries (Ghasemi et al., 2011; Güney, 2014). These types of tasks that previously have been done manually have now almost been replaced by computers (Wilson & Sangster, 1992). This has resulted in extensive effects of the accounting profession, in terms of new working methods like cloud accounting and computerised systems which makes it possible to manage all tasks within the same accounting system (Ghasemi et al., 2011; Güney, 2014). Automation might also bring effects on the role as an accountant, where higher competence is required in the future (Pan & Seow, 2016; Levy & Murnane, 1996). This is due to an increased demand for more advanced tasks performed by accountants such as consulting (Fernandez & Aman, 2018; Pan & Seow, 2016; Kairos Future, 2016). The implementation of automated processes might also bring advantages and challenges into the profession. The most highlighted advantages are known as time-saving, which results in a more efficient and flexible working process (Ghasemi et al., 2011). However, Ujhelyi et al. (2015) asserted that the implementation of changes within an organisation can be a challenge. This is because users of the technological solutions can refuse (Ujhelyi et al., 2015). If users resist, it could be a challenge since it becomes difficult to get the full capacity of the new technology, which in turn could lead to implications for the accountants' working process (Murtagh et al., 2015; Kairos Future, 2016; Ujhelyi et al., 2015). Lastly, there are ongoing speculations and uncertainties about how the future will look like in the accounting profession due to the development of automation (Taipaleenmäki &

Ikäheimo, 2013; Lee & Tajudeen, 2020; Kairos Future, 2016). The accounting profession will experience extensive changes within 10 years from now (Shaffer et al., 2020). However, it is questioned and uncertain about to which extent the accountant's tasks will change and what their role will look like (Greenman, 2017; Glantz, 2016). The following chapter will present the theoretical framework of the thesis.

3 Theoretical framework

The purpose of this chapter is to introduce several theories of importance that will be used to explain different attitudes among accountants towards automation. Further, theories are presented to be able to understand the definition of profession and understand the reasons behind certain behaviours and actions made by organisations. The theories will be used to analyse the empirical findings in section six of the thesis.

3.1 Technology Acceptance Model

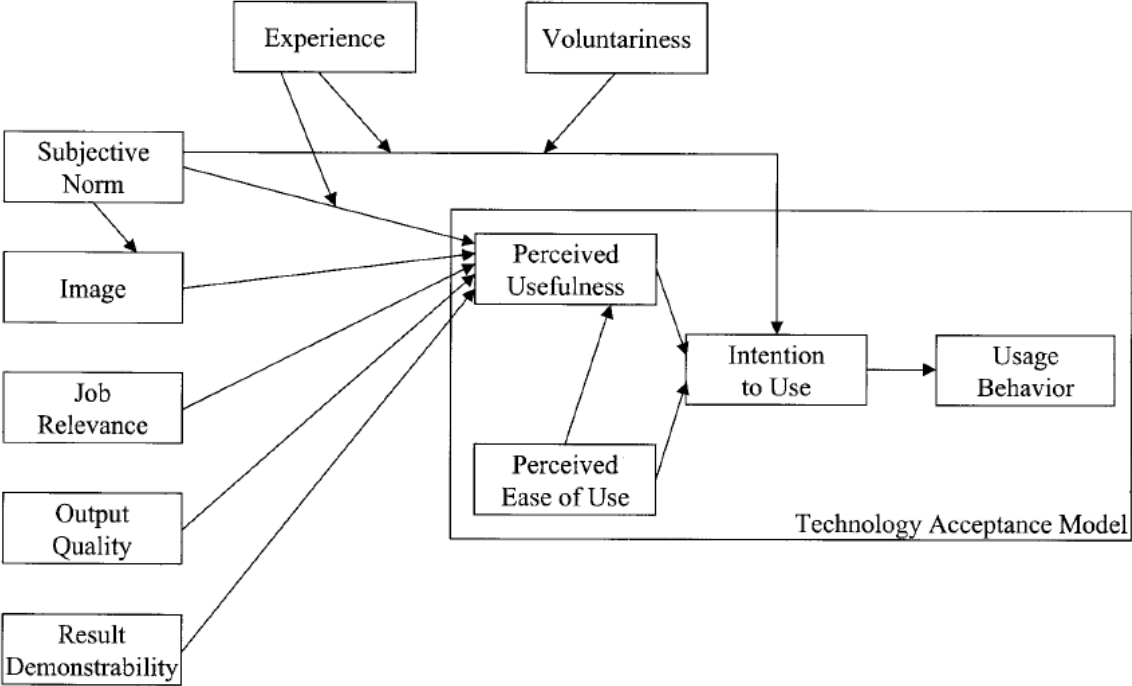
The Technology Acceptance Model (TAM) was developed by Fred Davis in 1989 with the aim of explaining and predicting users' behaviours towards new technology. More precisely, examine users' acceptance and beliefs of information technology (Davis, 1989). The TAM model theorises that individuals' attitudes towards new technology is determined by two primary factors (Davis, 1989; Davis, Bagozzi & Warshaw, 1989). The first factor, named perceived usefulness, is defined by Davis as *“the degree to which a person believes that using a particular system would enhance his or her job performance”* (Davis, 1989, p. 4). The second factor, perceived ease of use, is defined as *“the degree which individuals believe that using the system will be free from effort”* (Davis, 1989, p. 4). These factors together determine the attitude towards using the new technology (Davis, 1989).

In 2000, the model was extended by Davis and Venkatesh (2000) that added several impacts to the factor perceived usefulness. The aim was to increase the understanding of user acceptance and usage of new systems. The first three impacts that were added were; subjective norm, voluntariness and image. These are reflected as social forces affecting individuals' attitude to either adopt or reject a new technological system. Subjective norm refers to people who might perform a behaviour even though they are not favorable towards the behaviour. This might be the case if individuals' choices are being affected by social pressure. Voluntariness describes if the adoption of the technology system is perceived as mandatory or not. The attitude to technology can also be affected by image that refers to the degree to which use of technology is perceived as increased social status in one's social system. (Davis & Venkatesh, 2000)

Three additional factors that were added were; job relevance, output quality and result demonstrability. These are reflected as cognitive determinants in terms of subcategories of perceived usefulness and were added because they are perceived as having impact on whether individuals accept technology. Firstly, job relevance is explained as an individual's perception that the technology is applicable to the job. Output quality is defined as an individual's consideration for how well technology performs their tasks. Lastly, result demonstrability refers to that individuals will have more positive perceptions of the usefulness of the technology if the relationship between usage and result of it is clear and discernable. (Davis & Venkatesh, 2000)

The extended model by Davis & Venkatech (2000) is illustrated below in figure 1:

Figure 1: TAM (Davies & Venkatesh, 2000, p. 188)



As stated above, the TAM model has a prominent applicability on attitudes towards technology. Hence, using TAM fulfills the purpose of the study since the thesis will be able to explain accountants' attitudes towards automated accounting from a technology perspective. TAM relies on two factors that affect individuals' attitudes towards technology, *perceived usefulness* and *perceived ease of use*. On the other hand, the model does not provide a

definition of attitude. Therefore, there is a need for a model that grasps the underlying components that constitute an attitude. A model that can be used for this is the ABC (affect, behaviour, cognition) model.

3.2 ABC Model

The definition of attitude can be explained by a summary of an object or a thought (Jain, 2014). An attitude is defined as *"a relatively enduring organization of beliefs, feelings, and behavioral tendencies towards socially significant objects, groups, events or symbols"* (Hogg & Vaughan, 2005, p. 150). The explanation behind the structure of attitude relies on the ABC model which is the most commonly used model by scholars to define the attitudes (Jain, 2014). Hence, in this thesis the model will be used to define what constitutes different attitudes.

Since the attitude consists of beliefs, feelings and behavioural tendencies (Hogg & Vaughan, 2005), the ABC model includes the three elements; affection, behaviour and cognition (Breckler, 1984). The first element is affection and it involves the individual's emotions and feelings towards an object (McLeod, 2014; Jain, 2014; Eagly & Chaiken, 1998). If one has positive feelings about an object, it might cause a positive attitude to the object and negative feelings might cause negative attitudes (Jain, 2014). The affection element can be measured by monitoring physiological responses, such as heart rate or galvanic skin response (Breckler, 1984). The second element in the ABC model is behaviour, which corresponds to that one's attitude towards an object is dependent on how one acts and behaves (McLeod, 2014). Further, experiences of an object from the past can also influence different attitudes towards an object (Jain, 2014). The third and last element, cognition, corresponds to that a person's belief and knowledge about an object affects the attitude (McLeod, 2014). This proposes that e.g. information that a person has about an object can influence the attitude towards that object (Jain, 2014). Even though attitude can consist of all these three elements, attitude can also be based on only one of these elements. Hence, each element can answer where the attitude comes from (Breckler, 1984).

The concept of the ABC model has been criticised for several reasons even though it is the most commonly used model by scholars. The definition of attitude in the model is said to be inconsistent, because the users of the model use different definitions and the three elements of

the model do not represent the whole picture of attitude (Wilt & Revelle, 2015). Hsu and Lin (2016) further argues that the ABC model is too generalised to be able to understand the connection between a specific belief and a certain behaviour. Moreover, Stedman (2002) argues that the cognition element in the ABC model is too subjective. More research in the field is needed to explain the real concept of its meaning (Steadman, 2002).

The reason for using this model in this paper is to understand the components that are involved in the concept attitude. In order to develop an understanding of the attitudes among the accountants, it is crucial to understand what constitutes attitude which encompass the three components described above. Hence, the ABC model is used to investigate how these components constitute the attitude towards automated accounting among accountants. However, this model might not provide a full perspective of the components that influence the attitudes towards automated accounting, since there might be other components illustrating the attitude as well. Therefore, it is needed to involve the path dependency theory (PDT) in this thesis as well, in order to consider an industry's and an individual's historical actions, since that might also influence the attitude.

3.3 Path Dependency Theory

Path dependency theory (PDT), contains the philosophy that past events influence future events (Bergek & Onufrey, 2013). The definition of path dependency suggests *“that what has happened at an earlier point in time will affect the possible outcome of a sequence of events occurring at a later point in time”* (MaHoney, 2000, p. 510). Also, decisions made in the past can impact the present and define alternatives for the future (MaHoney, 2000). Further, MaHoney (2000) shows that several scholars suggest that crucial social phenomena can be explained in terms of path dependency theory. The path dependency theory is traditionally used on industry level (Stack & Gartland, 2003). However, it has also been applied at personal level to explain different behaviours (Egidi & Narduzzo, 1997; Roedenbeck, 2011). In this thesis, the technology aspect will be considered in the path dependency theory. The theory further states that organisations and individuals' experiences of technology may be locked in the past (Stack & Garthland, 2003). This since it is difficult to change because it is more costly to invest in a new system rather than continue with the existing system (Trouvé, Couturier, Etheridge, Saint-Jean & Somme, 2010; Stack & Garthland, 2003).

As with all other theories, different scholars have criticised the path dependency theory. First, it is not fair for an inefficient technology to be locked-in and at some stage, the market participants will adapt to more efficient technology (Altman, 2000). Further, it is argued that the path dependency theory model is too narrow, because it is difficult to see which historical path is the reason for the lock-in (Haydu, 2010). Lastly, Kay (2005) proposes that some things just happen, that an individual's actions are not influenced by the experiences from the past.

The reason for using path dependency theory in this thesis is to be able to analyse and investigate the possible constraints expressed by the accountants. The authors believe that potential negative attitudes might derive from an unwillingness to accept the new technologies. Hence, because of unwillingness, the accountants may restrain the usage of automation. In order to understand different attitudes among the accountants, the path dependency theory might help to understand the historical aspect of an individual's behaviour. Furthermore, the theory can be used in this thesis to explain underlying reasons why decisions and actions that are carried out by the accountants' in their practice are taken.

3.4 Institutional theory

The central assumption of institutional theory is that there are different forces in forms of social structures, rules, norms and routines that lead to that organisations behave like each other (Deegan & Unerman, 2011). Automation can be considered as one of the driving forces for both society- and organisational development and acting. Thereby, the fact that the accounting industry is being automated can thus explain the connection to the central assumption of institutional theory.

From the previous institutional theory, the new institutional theory emerged. This is because the old institutional theory was criticised for being too descriptive and abstract (Eriksson-Zetterquist, Kalling & Styhre, 2015). Both theories consider the relationship between the organisation and its surroundings. Further, the theories involve cultural aspects in order to understand how the organisation develops (Czarniawska & Sevón, 2011). However, the new institutional theory includes assumptions about how the organisation is affecting its surroundings (Eriksson-Zetterquist et.al., 2015). DiMaggio and Powell (1983) states that organisations are not affected by direct effects from other organisations, but rather affected by changes in the structure within its organisational field. This focus is based on the fact that

there are structures and processes that are the same for all organisations in an industry (DiMaggio & Powell, 1983). That organisations do not seem to act independently is explained by the fact that they strive to be similar to each other, which results in a homogenisation process (Eriksson-Zetterquist et al., 2015; DiMaggio & Powell, 1983). The homogenisation process can be explained by various factors that are included in the concept of isomorphism (Eriksson-Zetterquist et al., 2015; DiMaggio & Powell, 1983).

There are three different forms of isomorphism; coercive, mimetic and normative (DiMaggio & Powell, 1983).

Coercive isomorphism is influence and pressure from strong organisations in an organisational field, but also politics and the state can influence through legislation. This causes other, weaker organisations to adapt and follow these requirements. (DiMaggio & Powell, 1983)

Mimetic isomorphism suggests that uncertainty is a driving factor for organisations imitating each other and those who are considered successful (Eriksson-Zetterquist et al., 2015). Through this, Eriksson-Zetterquist et al., (2015) states that organisations do not have to come up with their own solution to the problems. Instead, they might gain the same legitimacy as the organisation they are imitating (DiMaggio & Powell, 1983).

Normative isomorphism has its roots from professionalising, where the way of acting is influenced by other organisations (DiMaggio & Powell, 1983). Examples of organisations in this perspective could be professions and qualifications because they can create a common representation and appreciation about legitimacy in the profession (Suchman, 1995).

Although the institutional theory is widely usable, it has been criticised in several aspects. The scope of the theory has certainly been expanded, however it has often been criticised as generally being used to explain both persistence and the homogeneity of phenomena (Tina Dacin, Goodstein & Richard Scott, 2002). Further, the theory relatively neglects the role of both interest and agency when explaining actions, which also has been criticised (Tina Dacin et al., 1988).

The new institutional theory will in this study be used to explain why accountants' practice

looks the way it does. It is stated that the environment influences the way an organisation behaves and what an organisation does (Eriksson-Zetterquist, 2015; DiMaggio & Powell, 1983). Further, based on the isomorphisms (coercive, mimetic and normative) presented, it is investigated through the study's data collection with accountants for what reasons the automation has been implemented in the accountants' practice. It is stated by Eriksson-Zetterberg et al., (2015) that if companies institutionalise practices that exist in the society, the companies will increase their legitimacy and survivability. For an accounting firm it may thus be a strategic idea to implement new technologies in their work processes. Furthermore, the new institutional theory can be used to explain behaviours and actions of organisations. In addition, behaviours and actions made by organisations could further reflect behaviours and actions of the employees (e.g. accountants) at the organisation. In turn, this could result in an attitude towards the actions the organisation is taking.

3.5 Theory of professions

Theory of professions is a theory that defines the concept of professional role from eight categories (Brante, 2009). A professional role is according to Brante (2009) based on their income and status on the fact that they are using scientific knowledge. It is further stated that economists, doctors and engineers are some examples of professional roles (Brante, 2009; Broberg, Umans & Gerlofstig, 2013). The model is built on eight categories that together defines a profession (Brante, 2009):

1. Education
2. Abstraction
3. Uncertainty
4. Autonomy
5. Trust
6. Organisational structure
7. Interchangeability
8. Knowledge Conveyance

The first category consists of the philosophy that higher education is needed. However, it is important to have in mind that this perspective is decreasing in the sense that some professions do not demand education to the same extent anymore. The second perspective is

abstraction, which argues that abstract knowledge is needed. However, it is further stated that the knowledge should not be too abstract. The balance between practical and abstract knowledge is needed to be able to develop competence and confidence from the society. The next perspective involves uncertainty, where the professional role within the profession is seen as a ‘‘hero’’ and resolves the uncertainty problem in the society. Moreover, the theory of profession involves the perspective autonomy, which proposes that one has to be able to make decisions independently. Therefore, according to the model trust is seen as crucial when it comes to the practitioner’s integrity. The trust is based on both internal and external factors, e.g. the society and co-workers. The profession has some sort of organisational structure. However, history shows that the organisational structure is different from organisation to organisation, therefore there are no rules on how the organisation should be structured. The next category consists of interchangeability, which proposes that all practitioners with the same competence have the knowledge of doing the same working tasks. Hence, there should be no differentiation between the practitioners in the organisation. Lastly, knowledge conveyance should be involved in the definition to be recognised as a profession. Knowledge conveyance argues that a profession has to be able to meet the demand in the society with their skills and knowledge. (Brante, 2009)

By using this theory to investigate the professional role makes it possible to also examine the accountants practice. The professional role refers to the expected function an accountant has at a particular company based on the education and knowledge necessary to perform their specific tasks (Greenman, 2017). As the practice refers to the working tasks performed in the role of an accountant, studying the professional role is necessary and a way to examine the practice. This theory makes it possible to characterise how the profession (e.g. professional role and practice) changes due to automated processes in accordance with the eight perspectives. This theory could also make it possible to examine the attitude towards it. In the sense that it could be possible to analyse if the attitude towards automation can be explained by changes in the different parts of the accounting profession. Since professions are associated with a certain social status, it might be a connection between changes in the profession and attitudes towards what creates the changes.

3.6 Summary of theoretical framework

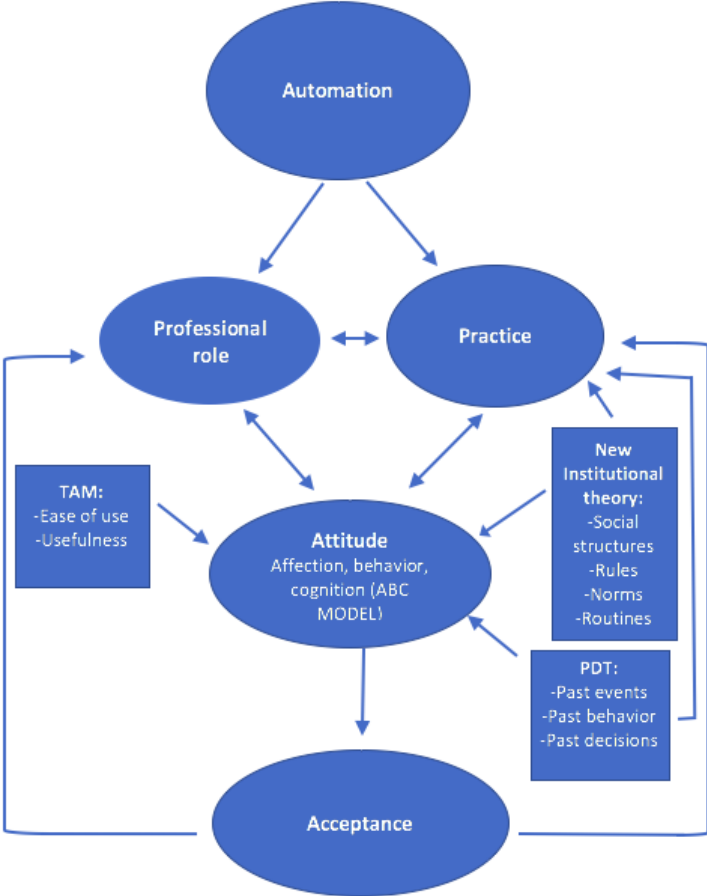
A conceptual framework has been created from the theories presented above, to illustrate the relation and connection between the different theories, see figure 2. The framework is created to strengthen the understanding and connection between automated accounting, its impacts on the accounting profession and the attitudes and acceptance towards automation among the accountants. Hence, to be able to answer the research questions in this thesis.

The development and usage of automated accounting has led to that the profession may experience several impacts mentioned previously in the literature review. Thereof, the theory of professions will be usable to be able to analyse how automation may impact the accounting profession. The professional role and practice (i.e. working process) are related to each other in a sense that if the accountants' practice is changing due to the development of automation, the accountant might experience a change in their professional role. On the other hand, if the professional role is changing, there might be changes in the accountants practice as well. Furthermore, the new institutional theory will be used to explain why accountants' practice looks the way it does as other organisations might influence what an organisation does. Also, to explain the underlying reasons for why certain decisions and actions are taken by the accountants in their practice, the PDT will be used.

Since the professional role and practice are affected and are under an ongoing development of new technology, the attitude among accountants might as a result be influenced, which in turn could affect the acceptance of the new technology. However, it could also be the case that the acceptance among accountants towards automation affects the professional role and the practice. In the sense that if one does not accept the new technology changes, it may affect the efficiency in the working process and the technology becomes problematic to implement in the firm. In order for the technology to fulfill its full potential and capacity in an organisation, it needs to be accepted by its users. Hence, TAM will be used since the two factors in the model; perceived usefulness and perceived ease of use, affects the attitude towards new technology. However, what influences the attitude for why an individual accepts or resists new technology can be explained by different theories. First, the ABC Model is used in this figure to constitute the attitude with the three different components; affection, behaviour and cognition. Attitude can further be explained by past events, behaviours and decisions. Therefore, PDT is included in this figure. Finally, attitude can be influenced by driving forces

such as social structures, rules, norms and routines which makes organisations behave like each other. This assumption is given by the new institutional theory, which is included in the figure below. These theories will give a clear understanding of the empirical findings and hence, significant insight for the analysis section in the study.

Figure 2: *Theoretical model*



4 Method

This section aims to introduce the reader to the methodology of the thesis. Firstly, the research philosophy, research design and research method are presented. Secondly, the data collection is provided combined with an analysis of the reliability and validity. Lastly, the data analysis and ethical considerations are presented to the reader.

4.1 Research purpose

This thesis includes a contextual research which aims to outline what can be found in the social world and how it displays itself. Furthermore, contextual research makes it possible to analyse what issues are about, what can be found within those issues and how the issues are experienced by people that are associated with those issues (Ritchie, Lewis, Nicholls & Ormston, 2013). This study investigates the impacts of automation in the accounting profession and the attitudes among accountants when it comes to the automation development. Furthermore, the authors of this thesis use a qualitative method in order to capture the individual perspective and closer studying the individual practice. Thereby, our research analyses what exists in the social world (automated accounting) and how the experiences are among the people (accountants) that are associated with the issue.

4.2 Research philosophy

To understand new research, it is of great importance for the authors to explain the philosophical factors behind the study. This is because one develops a comprehensive picture for the reader of how the reality is apprehended in the study. While conducting new research, there are two different terminologies within research philosophy that can be interpreted, which are ontology and epistemology (Bell, Bryman & Harley, 2018).

The ontology consideration is theorising about the nature of reality and is referred to how individuals interpret the reality. The ontology can be understood by two positions; *objectivism* and *constructionism*. Objectivism asserts that the social reality is separated and independent from social actors' imaginations. Constructionism rather takes the view that the social reality

is dependent on the view and actions of humans and that the object of the study is created by observing it (Bell et al., 2018).

In this study, the effects of automation on accountants' practice and the attitude towards automated accounting is going to be investigated. Hence, this takes the stance in the objectivism position within ontology. This since the authors believe that the social phenomena (attitude, professional role and practice) can be understood as independent objects, regardless whether these are studied by the viewer.

On the other hand, the epistemology consideration refers to the theory of knowledge and focuses on what there is to know about the reality and how the knowledge could be obtained. The epistemology assumption is divided into a *positivism* and *interpretivism* position. The positivistic position proposes that knowledge is gathered through observation and experiments. Positivism holds that the data should be gathered using surveys or other instruments. On the contrary, interpretivism focuses on the way individuals interrelate and focuses on the understanding of individuals' thoughts and assumptions. While the purpose of positivism research is to explain human behaviour, interpretivism is concerned with understanding human behaviour. (Bell et al., 2018)

The thesis will create a deeper understanding of the effects of automated accounting and investigate the underlying explanation of the attitudes towards automated accounting among the accountants. As the qualitative method can analyse human behaviour from a more individual perspective, this makes the interpretivist perspective most suitable for this thesis.

4.3 Research design

In order to answer the research questions and fulfill the purpose of the study, there is a need to collect experiences from a range of actors within the accounting profession. It is necessary to obtain information about how the profession looks and in what ways the individuals' practice has changed for the accountants in accordance with the development of automation. As well as study what the feelings, emotions and thoughts are towards this and what explains those attitudes. The two main strategies to gather data is a quantitative study or a qualitative study (Polit & Beck, 2010). For this thesis, a qualitative research design is used in order to obtain a deep understanding about the research questions. Qualitative research aims to answer

questions like ‘why’, ‘what’ and ‘how’ instead of ‘how many’ (Bryman, 2016). This thesis requires more in-depth data, with an extensive understanding about attitudes among the accountants since the purpose is to grasp the individual perspective of accountants’ thoughts and underlying assumptions towards automation. Moreover, qualitative research allows for gathering rich and in-depth information. Hence, through a qualitative approach, the authors obtain a more detailed and insightful understanding of their opinions and their underlying behaviours that can be used to explain different attitudes. Thereof, qualitative research design is the most suitable method for this thesis. The challenge with using a qualitative approach is that it still can be difficult to capture the attitude since it is planted in their heads.

Furthermore, the thesis includes an exploratory research design which is a design that builds on an existing theory. Additionally, it involves an area with scarce research or an area where previous research exists but is not conducted in a certain context. Exploratory research often involves research questions that begin with ‘what’, ‘to what extent’, ‘how many’ or ‘how much’ (Blaikie, 2009). Previous research exists about the impacts of automation and acceptance towards technology. However, it is a nascent research about it in the context of the accounting profession. Furthermore, there is a lack of research that considers the individual perspective as well as a study that grasps the closer look at the accountants’ practice and professional role. The implications of using an exploratory research design is that the result can not be accurately interpreted for a whole population since the design mostly involves a small sample size. Furthermore, the exploratory design provides qualitative data, which proposes that the interpretation of such information can be biased.

The thesis is a cross sectional study which contains a study on a phenomenon, that analyses data on a specific point in time. Further, a cross sectional study is also defined as a study that includes population characteristics, attitudes, values and beliefs (Blaikie, 2009). Cross sectional study is not suitable when studying changes over a long time or when analysing historical time (Blaikie, 2009). Automated accounting is an ongoing development which is undergoing radical changes in the profession. However, this study takes a stance in the present time of the process of automation. This since the study examines the effects in the accounting profession that has happened until today. Furthermore, the current attitudes among accountants towards automated accounting are studied, which also characterises a cross sectional study. The limitations of this kind of design is that it can not be used to analyse behaviour over a period of time. Further, it does not help to determine cause and effect of

research. Nevertheless, the cross sectional study makes it possible to analyse findings and outcomes to create new theories/studies and in-depth research. Also, since the study is limited by time, it is suitable to use cross sectional study.

4.3.1 Research approach

There are several approaches that can be adapted when conducting research which are inductive, deductive and abductive approach. The inductive approach implies that the author builds knowledge from observations of the world and tries to create theories based on this. The deductive approach on the other hand starts with a theory from which a hypothesis is developed. Thereafter, the hypothesis is tested through observations of the world. It can then be concluded if the hypothesis will be accepted or rejected. Lastly, the abductive approach is a combination of both the inductive and deductive approach. The abductive approach is used when existing theories can not explain the empirical data. Therefore, the author instead has to look at existing explanations from previous empirical data in order to find answers to the research question. (Ritchie et al., 2013; Bell et al., 2018)

In this study, an abductive approach is used which is a combination of both the inductive and deductive approach. This thesis starts from a deductive approach with analysing existing literature and theories to create research questions of what effects automation has on accountants' practice and what attitude accountants have towards automated accounting. From this, the authors were also able to create our own model which then was the basis for the qualitative data collection. Subsequently, to adjust the model based on the empirical data takes an inductive approach.

The empirical part of this study takes a deductive approach where the authors interviewed several accountants. The objective of the interviews was to analyse if the empirical data connects with the theories. Also to identify if there are additional factors that can affect the attitude towards automation that are not covered in previous literature, which proposes an inductive approach. This was done in order to develop the existing Technology acceptance model (TAM) and hence, contribute something new to the theory and fill the research gap in the literature.

The use of an abductive approach makes it possible to conduct research more flexibly and it also reduces the risk of being restricted due to the choice of research approach. If only using a

deductive approach, there is a risk that the research is guided by available theories in a way that the research ignores relevant information that might lead to new findings. On the other hand, if only using an inductive approach with a limited sample, there is a risk that the theory can not be generalised. This could also be linked to the fact that the study has an exploratory research design.

4.4 Research method

4.4.1 Primary and Secondary data

This thesis combines both primary and secondary data. The secondary data in this study is gathered from mostly articles by other researchers. The secondary data in this thesis are included in the introduction, the literature review and the theory chapter but also in the method section. To obtain usable data, the authors used the databases Scopus, Google Scholar and Primo. The keywords used to gather relevant articles were words such as; “automation”, “technology”, “accounting”, “accounting consultants” and “accountants”. Additionally, to confirm that the articles used were reliable and trustworthy, the authors used mostly articles from journals that are peer-reviewed and included in the ABS list. Further, the authors selected the most cited articles to confirm that the thesis is based on the most contributed authors and also to receive the most reliable research.

The primary data is original data that is collected by the authors from sources such as surveys, interviews or experiments (Bell et al., 2018). For this study, semi-structured interviews were used to collect data. Semi-structured interviews propose that an interview guide with pre-prepared questions based on identified themes are followed (Bell et al., 2018). This type of interview allows the author to be flexible since the questions are open-ended and one can ask follow-up questions to the participant's response. The choice of this method was considered to be most suitable for our purpose. This is due to the fact that the authors want to receive more in-depth information when it comes to the accountants' feelings, emotions and thoughts towards automated accounting in their practice. The next section follows a more detailed description of how the semi-structured interviews were designed.

4.4.2 Semi-structured interviews

For the semi-structured interviews, an interview guide was constructed which is attached in Appendix 1. The interview guide was firstly shaped in English and later translated in Swedish

since the semi-structured interviews were held in Swedish. The reason for this was that the respondents should feel comfortable when answering the questions. If the interviews on the other hand would have been executed in English, there could be a risk that the respondents would not be as open when expressing their thoughts and opinions. Hence, the answers would not be as complete as if the interviews instead were performed in their native language, Swedish. The questions were further written in a language that were easy and straightforward to simplify for the interviewees. The respondents' identities were held anonymously in order to create their participation in the study safe. Further, with permission from the participants the interviews were recorded to reduce the risk of bias. Also, both authors were present during the interviews which prescribes that subconscious bias is reduced to a greater degree than if only one of the authors were present.

The interview guide was prepared in accordance with our purpose and based on the literature review as well as on the theoretical framework. Some interview questions might overlap with each other since the authors wanted to make sure that nothing important was missed out. Depending on the interviewees' answers to the questions asked, additional questions were asked that were more in-depth in order to obtain a deeper understanding. The aim of this research is to investigate and analyse both impacts of the automation but also the attitude among the accountants towards automation. Thereby, the interview questions are foremost open-ended questions. The reason for this was to obtain a more detailed and nuanced understanding about the thoughts and feelings of the respondents when it comes to automation. Furthermore, in this sense the authors could capture the individual perspective which is the aim of the thesis. In addition, the authors aimed to be as objective as possible, therefore they opt for non-leading questions.

The first part of the interview guide consists of questions regarding the participants background. The questions that were asked generated information about the participants' experience in the accounting industry and how long he/she has been working in the company. Further, to obtain a description of the company, questions were asked about the company regarding number of employees, the size of the company in terms of customers, what services they are offering and which computer system(s) they are using. The main objective of this part was first to get to know the participant and the company and secondly to obtain information that can be used when comparing the answers among the accountants in the findings.

The next part of the interview guide involved questions about how automation has changed the accounting profession up until today. Questions regarding the experience of working with automated accounting and if the skills required in the accounting profession have changed, are some examples of the questions asked to the respondents. Further, questions were asked to understand the individual perspective, more specifically the accountants' experiences of automation in the profession. This creates the possibility to compare previous literature with the research obtained from the interviews regarding the accountants' perspective. The reason for including this section of questions was to obtain a deeper understanding about how the implementation of automation looks today in the practice and professional role within accounting. By doing that, the authors could analyse relationships between the development of automation in the accounting profession and the attitudes among the respondents towards it. Further, this creates a deeper background information about the development of automation which makes it easier to move on to the next section that involves more in-depth questions about the impacts and attitudes (Q12-Q20).

In order to find out what impacts automation has had on the profession and in the accountants' practice, questions were asked regarding if any changes have been recognised since the participant started working in the accounting industry. The section starts with more broader questions about how automation has impacted the accounting profession and role as accountant. Further, the section follows up with more narrowed questions about for example how the tasks have changed, if the demand of services and the demand of qualities has changed. In order to capture the individuals' perspective, the authors decided to ask questions about the changes the accountant has experienced in the profession. This to be able to give an objective description of the effects in the practice. Questions related to the participants' answers regarding the impacts of automation are: Q12, Q,13, Q14, Q15, Q16, Q17, Q18.

As mentioned earlier, an attitude consists of one's beliefs, feelings and behavioural tendencies towards an object, group, event or symbol (Hogg & Vaughan, 2005). Moreover, as accountants in their practice are affected by automation, questions were asked regarding their attitude in order to understand their stance on these impacts. Questions related to what attitude there are among the accountants are: Q12, Q13, Q16, Q17, Q18, Q19. Furthermore, in order to find out the underlying factors for what the different attitudes are based on, the interview

guide involved questions based on the different theories that could give an explanation for the attitudes.

The ABC model includes the component affection, which involves the individual's emotions and feelings towards an object (McLeod, 2014; Jain, 2014; Eagly & Chaiken, 1998). Thus, a question about the technological skill of an accountant was asked since this can be connected to the affection element (Q16). If one thinks it is easy to understand and use the technology, or vice versa, automated accounting could be perceived as either easy or identified as a problem. The ABC model further includes the two components, behaviour and cognition. The behavioural aspect corresponds to that one's attitude encompass how one acts and behaves (McLeod, 2014). The cognition element proposes that a person's belief and knowledge about an object affects the attitude (McLeod, 2014). Therefore, questions were asked about the accountant's previous experience and knowledge of automated accounting, which can be connected to the behaviour and cognition component (Q5, Q9). Depending on whether the experiences and knowledge about the technology is negative or positive, this might constitute the variation of attitudes towards automation.

Further, PDT suggests that the past influences present and future actions by an individual (Bergek & Onufrey, 2013). Hence, questions concerning if the accountants are open to new solutions or locked into past techniques were asked (Q5, Q7, Q12). During the interviews, answers might appear where the respondent has a negative or positive attitude towards new technology. The negative attitude might derive from an unwillingness to adapt to new technologies and hence, restrain the usage of automated accounting. Whereas, a positive attitude might come from an openness for new technologies. Thus, an explanation for these possible negative or positive attitudes can be illustrated by the PDT.

In addition, a company's behaviour and actions can according to the new institutional theory be explained by changes made by other organisations in its organisational field (Eriksson-Zetterquist et al., 2015; DiMaggio & Powell, 1983). Thereby, questions were asked about why they are implementing automated processes (Q19, Q20). From this, there might evolve answers that express that one wants to keep up with the development of what others are doing, which can explain the reason for striving for more automated accounting. It could further evolve answers about the opinion that the organisation is implementing more automated processes, which could generate an attitude towards it.

Lastly, the TAM model demonstrates that the extent one believes that using automated processes is meaningful, would enhance their job and is easy to use, determines which attitude one has towards new technology (Davis, 1989). Hence, questions such as Q12 and Q16 were asked. The questions involved the opinion of the implementations of automation and if one perceives the use of new technological systems as hard or easy to use and understand. The answers from the interviews might prove that the attitude towards automated accounting is positive when the accountant believes that the automated processes increase one's performance and that using the technology will be free from effort. While if the accountant believes that the automated processes are the opposite, a negative attitude might appear.

The last section of questions are associated with the future of automation in the accounting profession (Q21, Q22, Q23). The reason for including those types of questions was to be able to connect and analyse an individual perspective with the previous literature in section 2.6. Further, to be able to capture thoughts and feelings among accountants about the development of automation in the future. The last question (Q24) in the interview guide aims to give the participant the possibility to add something. The reason for this is to provide the respondent the opportunity to share experiences or thoughts that the questions in the interview guide did not cover.

4.5 Data collection

4.5.1 Selection of participants

When selecting participants for a study, one needs to consider two approaches of sampling: probability and non-probability sampling. Probability sampling refers to when the population in a study is randomly selected. On the other hand, non-probability sampling can be described as when the population has not been selected randomly. Further, non-probability sampling refers to a method where the sample is selected based on specific criterias that are pre-defined. (Bell et al., 2018)

In this study, the population is referred to accountants. The pre-defined criteria for this study was accountants in the Jönköping region. Therefore, a non-probability sample is used, which is a non-random selection. In this study, the non-probability sampling has meant that the authors' contacts in the Jönköping region have been used. Also, in some cases, a snowball

selection has been made as our contacts gave us contact-information about an additional possible participant. Since the participants were partly selected based on recommendations, this could result in a certain type of respondents in a sense that they share similar opinions as the person who recommended them.

Firstly, the authors started with their three relevant contacts that wanted to participate in the study. Thereafter, 15 additional people were contacted around Jönköping that are working with accounting to ask for an interview. Of these, five people wanted to participate in the study. The sample consisted of both accounting firms and firms with an accounting division where the respondents were selected based on their role in the firm. The sample of the study included accountants that have both short and long working experience in the accounting industry. Since the attitude towards automation might differ depending on years of work. The aim was to interview eight to ten accountants from various firms. Respondents from different types of firms and with different experience were sought to fulfill the purpose and to develop the theoretical model of this thesis (figure 2). As firms use different working processes and technologies, the spread of the answers from accountants in the variety of firms gives a more representative result. The final amount of the sample was a total of eight respondents that participated in the study. In the empirical part of the thesis, the respondents refers to respondent 1, respondent 2, respondent 3 etc.

The study is delimited to Swedish firms where local offices in the county of Jönköping is in focus. In this study, the local offices are representing a small or medium-sized company that equals or has more than ten employees, which proposes a variety of firms. This since the authors think those companies can represent accounting firms or accounting divisions in general. Also, some of the accountants work at a firm that is established in several cities in Sweden which makes the study generalised and applicable in other cities.

4.5.2 Overview of participants

There were eight accountants that agreed to participate in the study. An overview of the participants and information about the interviews are given below in table 1. As mentioned above, the names of the interviewees are replaced with numbers in the study.

Table 1: *Overview of the sample*

Work title	Years of experience in accounting	Number of employees (local firm)	Length of interview (min)	Form of interview	Date of interview
Accountant	15 years	20	40 min	Teams	2021-03-22
Accountant	15 years	130	40 min	Phone	2021-03-23
Authorised accounting consultant	20 years	8	30 min	Teams	2021-03-25
Accountant	13 years	40	35 min	Teams	2021-03-26
Accounting consultant	13 years	25	50 min	Face-to-face	2021-03-29
Accounting consultant	19 years	25	50 min	Face-to-face	2021-03-29
CFO	7 years	300	40 min	Teams	2021-04-01
CFO	15 years	70	40 min	Phone	2021-04-08

Due to the circumstances with COVID-19, the majority of the interviews were conducted through Teams and Phone. Therefore, the interview guide including the questions were sent to the participants through email before the interview. The use of Teams allowed the authors to identify the participants' reactions and emotions, even though the interviews could not be performed face-to-face. However, the use of Teams might have affected the answers provided from the interviewees which in turn could lead to less thorough answers than if the interview were held physically rather than via Zoom/Teams. Further, by doing interviews through digital tools makes it harder to interpret the body language of the interviewees. Hence, it could diminish the results of the thesis. Furthermore, the interviews were held between 30-50 minutes and took place between 22 March and 8 April. The number of employees in the table represent the employees at the local firm in Jönköping. The following section includes a discussion about the reliability and validity of the study.

4.6 Reliability & Validity

There exist four criterias that are used when evaluating if the research is trustworthy. These criterias include; credibility, transferability, dependability and confirmability (Bell et al., 2018; Guba, 1981). Below follows a further description of these criterias.

4.6.1 Credibility

Credibility refers to which extent the research presented by the authors is considered as trustful and appropriate by external parties (Bell et al., 2018; Anney, 2014). In order to maintain high credibility of the study, several different sources were used to collect data. For the literature review and theoretical framework, secondary data has been collected from books, articles, and other publications. Moreover, primary data has been collected from face-to-face interviews and through phone and Teams interviews. The credibility of the study also increases due to the use of a triangulation approach. Triangulation helps the authors decrease the bias and it also examines the integrity of the participants' responses from the interviews (Anney, 2014). First, investigator triangulation suggests that there is more than one author writing the thesis, which strengthens the integrity and brings different aspects of the empirical findings (Anney, 2014). Secondly, data triangulation involves using different sources or research techniques for collecting primary data (Anney, 2014). In this study, interviews with accountants from different companies were conducted which enhances the quality of the data since the respondents' experience and knowledge varies. Thirdly, theory triangulation is applied when there are several theories emphasised in the research (Anney, 2014). This proposes that the collected data could be interpreted and analysed in different ways (Anney, 2014). By applying these triangulations methods, the authors obtain greater credibility of the study.

4.6.2 Transferability

The concept of transferability is explained in parallel with external and internal validity and refers to which extent the findings are applicable to other contexts (Bell et al., 2018; Anney, 2014). Since this study has a qualitative approach where the findings are applied to a specific group and to a special industry, this affects the extent to which the findings can be generalised and applied in other circumstances and/or in a whole population (Shenton, 2004; Polit & Beck, 2010). The purpose of the study is to examine the effects of automated accounting and reveal the underlying explanations of the accountants' attitude towards it. Hence, the findings

are interpreted in an accounting context which might be hard to interpret and generalise in another situation. However, the empirical findings from the study can be investigated using other methods or samples which is referred to as transferability (Polit & Beck, 2010).

One thing that may differ in the findings is the attitude between the participants that can be explained by various reasons. On the other hand, the effects of automation in the accountants' practice may be similar in Sweden since the selection of participants represents a wide spread of accountants that work both in accounting companies and within accounting divisions.

4.6.3 Dependability

The concept dependability refers to reliability and questions the ability of the research to be repeated (Bryman, 2016). Bryman (2016) further states that dependability should be in line with the assumption that if the same or a similar method will be used, the findings should be the same. According to Bitsch (2005), the concept of dependability refers to the research finding stability over time. Hence, dependability builds on coming up with similar results by using the same research methods (Bryman, 2016).

Furthermore, research has easy repeatability when the research is clearly designed and well defined (Anney, 2014). Shenton (2004) states that there are three sections that should be involved in a study in order for authors to get an understanding about the choice of method. The three sections included are a research design, details of how the data was collected and an analysis of the process (Shenton, 2004). This thesis follows those sections in the sense that every step is detailed and explained through the whole thesis. Further, the thesis includes a research design and clear arguments for the choice of methodology as well as a description of the theoretical concepts and an analysis of the data collected. The choice of gathering the data was clearly stated as well as the selection of the sample and an overview of the participants in the study was also included. Additionally, the authors have used peer examination which prescribes that the articles used are studied by other researchers where their opinion about the study is given. Hence, that gives the study increased dependability. Furthermore, the questions for the interviews were formulated based on the literature which contributes to objectivity. Additionally, to enhance the dependability even more, semi-structured interviews were conducted with several base questions. Nonetheless, it is challenging to ask exactly the same questions to every participant since the answers will differ. Thereof, there was a need for extended questions in some cases. The authors have presented a table of the interviews

and participants (table 1), as well as an appendix (appendix 1) of the interview guide to help other researchers replicate the study in other contexts (Anney, 2014).

4.6.4 Confirmability

The last concept, confirmability, includes the study's objectivity and possible factors that might have affected the outcomes of the study (Baxter & Eyles, 1997). Further, confirmability can also be defined as a confirmation that the authors have no impact on the empirics in the study (Baxter & Eyles, 1997). To reduce this risk, the authors recorded the interviews in order to avoid bias as well as the possibility of influencing the results (Anney, 2014). Additionally, during the interviews the authors tried to be as objective as possible to limit the influence. For instance, in order to not put the participant in any direction, the authors tried to be neutral in their expressions and body language. Furthermore, the thesis limitations are presented which also increases the confirmability of the study. The research methodology is detailed and precise which increases the study's confirmability (Shenton, 2004). Lastly, triangulation has been used which increases the confirmability in the sense that different references within the same topic have been used (Shenton, 2004). Based on those arguments highlighted above, it can be concluded that the research involves high trustworthiness of confirmability.

4.7 Data Analysis

According to Agevall, Broberg and Umans (2018), the analysis of the empirical data are divided into three different steps. The first phase includes transcribing the interviews and getting an understanding of the gathered data (Agevall et al., 2018; Braun & Clarke, 2006). In this phase, no interpretations were made to avoid misunderstandings or be biased. Instead, a neutral perspective was taken.

The second phase included a development of a structural analysis (Agevall et al., 2018; Braun & Clarke, 2006), the interviews were read several times in order to get an understanding of the answers and the structure. By reading the interviews several times, the chance of bias decreases. In this phase, unlike the first step, interpretations were made. This in order to be able to look from a holistic perspective of the impacts of automation in the accountants practice and the attitude among the accountants towards automation. At this stage, the authors developed a pleasing understanding and could convert the data into codes, see table 2. Codes refers to keywords found in the interview transcript. Later, themes, which are the dependent

variables impacts and attitude, had been developed. Hence, the authors had stepped into the third phase where the authors identified and sorted the codes into different themes (Agevall et al., 2018; Braun & Clarke, 2006). According to Bell et al., (2018), this is known as thematic analysis, which proposes that themes and subthemes are created by the authors. With the sub-themes, the authors were later able to create different categories where the codes thereafter could be sorted into. This process can help the authors to find potential patterns and underlying assumptions. This is also an effective way of analysing qualitative data regarding the perspectives of the participants and their similarities and differences (Braun & Clarke, 2006). A problem that arose during the coding might possibly be that some categories overlapped each other which propose that the same codes are identified for several categories. The implication of this was that the empirics became repetitive in some categories. On the other side, this led to that no crucial information from the data was defaulted.

Table 2: Coding scheme

Relevant interview question	Codes	Category	Sub-theme	Theme
Q7, Q10, Q11, Q12, Q13, Q21, Q22	Advisoring, more fun tasks, less manual work, more value-adding task, less repetitive tasks	Change in tasks	Practice	Impacts
Q7, Q12, Q13,	More efficient, faster, availability, less manual handling, improved follow up	Increased efficiency		
Q12, Q15, Q22	Loss of control, distrust in the system, more faults, internet dependency	IT problems		
Q19, Q20	Inspires each other, look at other firms in the field	Changes in the society		
Q17, Q18, Q21, Q23	Consulting role, controlling role	Change in the role	The professional role	
Q17	IT knowledge, new education	Competence and education		
Q12, Q18	Increased contact, better relation, more clients	Client relations		
Q15, Q17, Q23	Less people needed, less job possibilities, services disappear, more controlling	Job opportunities		
Q12, Q16	New ways of work, increased client contact, more fun, more faults	Perceived usefulness	TAM	Attitude
Q12, Q16	Easy, spare of time, time for other things, hard to understand, difficult to use	Perceived ease of use		
Q5, Q7, Q12	More value-adding, strive for more effective work, skeptical, fun with changes	Openness for changes	PDT	
Q16	Hard to understand, difficult to use, easy, easy to understand	Easy to use and understand		
Q5	Positive experience of automation, partly positive experience	Experience	ABC	
Q9	Learning by doing, IT support, internal courses	Knowledge		
Q5, Q7, Q8, Q10, Q12, Q23	Fear, uncertainty, not worried, rationalisation, the firms technology development	Other factors	Others factors	

In this study, the impacts and attitudes were studied about automated accounting. These were therefore divided into two themes. Since the impacts on the professional role and practice further are studied, these represent the sub-themes. Further, as the study is investigating what explains the attitude, the sub-themes consist of the different theories. For the sub-themes, several categories are followed. For instance, within the sub-theme professional role, four categories were identified: *change in role*, *competence and education*, *client relations* and *job opportunities*. Into each category, keywords from the interviews were sorted which represent the codes. For example, the codes identified within the category change in role were *consulting role* and *controlling role*. Lastly, the authors determined the respondents' answers from the related questions (Q17, Q18, Q21, Q23), which contained the different codes.

The collected information for this study was first recorded in Swedish. The reason for why the

interviews were recorded and then transcribed was to be able to capture the interviewees' phrases and expressions in their exact sense as these are easily lost if the answers only are written down directly. The recording provides the authors the opportunity to be attentive and focused on the respondents' answer in order to ask follow-up questions. However, a disadvantage of recording the interview may be that it can result in the interviewees being inhibited and held back when they know that they are being recorded (Bell et al., 2018). In this study, this is not considered as a problem as the study does not cover a sensitive subject.

The interviews were coded and sorted into themes in Swedish in order to easily analyse and compare similarities and differences in the answers to each question. However, quotes were later transcribed into English to be able to include those in the empirical part. The coding was limited to the relevant material for the interview questions. Hence, the authors removed for instance small-talk and answers that were not related to the question. The coding and transcription phase is a time-consuming process which is determined by our transcription document of 40 pages. In addition, there is a risk that one may miss keywords that are important for the selection of themes and codes. However, it contributes to a better and more detailed analysis of the interviewees' answers (Bell et al., 2018).

Thematic analysis has been criticised for giving the authors the opportunity and flexibility to choose their own themes during the coding process (Holloway & Todres, 2003). Thereof, it is of importance that the themes are consistent with the respondent's reflections (Braun & Clarke, 2006). An additional problem with themes and its flexibility could be that the authors develop themes and codes that are seen as too weak or unconvincing for explaining the phenomenon (Braun & Clarke, 2006). Thus, the authors had this critique in mind when they formulated the themes.

4.8 Ethical considerations

For research like this, it is crucial to have the respondents' ethical issues in mind during the process. It is especially four main principles that have been taken into consideration in this thesis; "avoidance of harm, obtaining informed consent, protection of privacy through confidentiality and preventing deception" (Bell et al., 2018). Avoidance of harm suggests that the respondent should not be physical or emotionally distressed, such as feelings of stress, discomfort or embarrassment during the whole process (Saunders, Lewis & Thornhill, 2009).

Additionally, according to the principle informed consent the participant should be given enough time to consider one's participation (Saunders et al., 2009). The participant should also obtain sufficient information about the study beforehand. Thirdly, protection of privacy through confidentiality proposes that the respondent should be respected and that the author should manage the interview data responsibly after the interview (Saunders et al., 2009). Further, the respondent should know that participation is of a voluntary nature (Saunders et al., 2009). Lastly, preventing deception suggests that the author should not mislead the purpose of the interview or present a false motivation of the study (Bell et al., 2018).

All of these principles were considered and treated in this thesis in the sense that the respondents obtained full information about the purpose and also about the elements of the thesis in a consent that were sent to them. Further, the participants got information that their participation is voluntary and that they could interrupt the participation at any time during the process. Additionally, the respondents got informed that the audio recordings from the interviews will be protected from people outside the thesis. Also, information about how the data is treated after the interview were informed in order to make the participant more comfortable. The respondents also got the information that the interviews are performed anonymously and the research will be presented in a way that makes it impossible to identify them. Lastly, the participants were informed that they had the right to not answer any question that they felt uncomfortable with or uncertainty about. The informed consent can be found in appendix 3.

5 Empirical findings

This chapter presents the empirical findings that emerged from the data collection of this study. The first part of the section introduces the respondents to understand their background. The second section involves the findings from the interviews, where both the impacts and effects of automated accounting are presented followed by the attitude of automated processes among the accountants. Additionally, an analysis connected to each heading is presented in the section as well.

5.1 Presentation of respondents

The empirical part of this thesis starts with introducing the respondents of the study. The respondents are referred to as respondent 1, 2, 3, 4, 5, 6, 7, 8 in order to not reveal their identity. Further, the authors will not reveal the name of the respondents' firm or other details that can be connected to the person.

5.1.1 Respondent 1

Respondent 1 is working as an accountant and is responsible for the finance function at a firm where there are 20 employees, whereas the respondent is the only one working with accounting. At the current workplace, the respondent has worked for almost one year, but has an experience in the accounting profession of 15 years divided into several firms. Currently, the firm is using the accounting software Fortnox and the daily tasks consist of bookkeeping, financial statements, reporting and salaries. The experience of automated accounting processes goes back 11 years when the respondent started to work with it at the previous workplace. The experience of automation mostly includes tasks within the bookkeeping process such as invoices and payments between bank and software that are digitally transferred. Over time, the introduction of automation in the work has been implemented gradually where more accounting services have become automated.

5.1.2 Respondent 2

Respondent 2 is an accountant at a business group with 130 employees, where the respondent is the only one working with accounting. The respondent has worked at the firm for one year but has 15 years of experience in the accounting profession. Before working as an accountant,

the respondent worked as an accounting consultant for 10 years. However, the respondent started the career as an accounting assistant. The working tasks performed by the respondent involve final accounting, reconciliation of balance sheets, control of income statement, bookkeeping, salaries and sometimes controlling. Today, the respondent uses the software called Navision for the accounting tasks but has experience in the Fortnox software as well. The respondent has around 10 years of work experience in automation systems. However, the respondents current working place is far behind in the automation process than the previous firm the respondent worked at. Thereof, the respondent had to take steps back in the use of automated accounting in the working process.

5.1.3 Respondent 3

Respondent 3 is working at an accounting firm with approximately 60 established offices in Sweden. The local office where the respondent is working comprises eight employees. Respondent 3 has worked as an authorised accounting consultant for 20 years but has additional years of experience in the accounting industry. The daily tasks consist of doing financial statements and tax accounting for companies and individuals, but also bookkeeping, advisory and consulting. The software used at the company is Fortnox. The experience of working with automated processes goes back almost 15 years ago where the experience mostly includes tasks related to the bookkeeping process such as invoices and tax accounting.

5.1.4 Respondent 4

Respondent 4 is employed at a firm in Jönköping and is responsible for the accounting in the firm. The firm has two units, where one of the units has their location in Jönköping. Earlier, the two units were to different firms but some years ago they were merged. The firm has 40 employees in Jönköping, whereas the respondent works alone at the accounting department. Respondent 4 has around 13 years of experience in the profession and has worked eight years at the current firm. The responsible tasks that the respondent has is bookkeeping, invoices, final accounting, budgeting etc. The firm uses the software Navision for the accounting tasks and they plan to implement an additional system. The additional system is called D365, which is a cloud system. Navision were implemented in 2017 in the firm and the respondent has some experience of automated processes in the accounting profession, mostly when it comes to invoices.

5.1.5 Respondent 5

Respondent 5 is working at an accounting firm which offers accounting, auditing and advisory services. The firm is established in Jönköping where there are approximately 25 employees, whereas 17 employees are working with accounting. The clients vary between both small, medium and larger companies. The firm uses several accounting systems such as Visma, Fortnox and Hogia and depends on the clients' preferences. Respondent 5 is an accounting consultant with approximately 13 years of experience in the accounting profession. The daily tasks consist of bookkeeping, final accounting, salaries, tax accounting and invoicing. The respondents' experience of automation and digitization is quite new since the firm was not one of the first to become digital. However, the respondent has worked actively with it for three years where more and more parts in the work have progressively become automated. Cloud based service is a function that is recognised in the daily work but the experience of automation also includes automated account distribution, e-invoices and tax accounting. To which extent the respondent works with automated processes depends on the demand and willingness from the clients.

5.1.6 Respondent 6

Respondent 6 is an accounting consultant and works at the same accounting firm as respondent 5. The respondent has 19 years of experience in the profession and has worked 12 years at the current firm. Previously, the respondent has both worked at another accounting firm and also at a firm's accounting division. The respondent works with both small and medium sized firms, which proposes that the respondent help some firms with their whole accounting and some firms with just a part of their accounting. The daily working tasks involve bookkeeping, final accounting, tax accounting, salaries etc. The firm started to implement automation and digitalisation around three years ago. Hence, the respondent has some experience of automation in accounting, mostly when it comes to e-invoices, automated account distribution, tax accounting and cloud services.

5.1.7 Respondent 7

Respondent 7 is responsible for the finance function and is also in charge of the group accounting. The respondent are employed in a firm in the Jönköping region and have previously worked at an auditing firm. The firm is involved in a business group with a total of 650 employees where six of them work at the finance department. The respondent has seven years of experience in the accounting profession and has worked at the current firm for two

years. The daily work tasks involve attest of invoices, different kinds of reports but also the handling of consolidated account statements. The respondent has some experience of automation in the profession, mostly in the previous employment in form of input data and automated payments. The current firm uses the software Movex but are planning to implement more automated processes in the near future.

5.1.8 Respondent 8

Respondent 8 works as CFO in a firm in Jönköping and has worked at the current firm since one and a half years back. The respondent has however around 15 years of experience in the accounting profession. The firm is involved in a business group with 70 employees in Jönköping where four of them work at the finance department. The firm serves both big and small firms in a variety of branches. As previously mentioned, the respondent 8 are responsible for the finance department in the business group. Because of that, the respondent is responsible for the final accounting, annual financial statements, the tax accounting, the financing and the investments. Some additional working tasks for the respondent involve budgeting, financial ratios and also to present the final account to the external board of directors every month. The respondent has some experience of automation in the accounting profession. It mostly involves input data in the form of file payments but also reading invoices. The current firm uses the software Monitor as an ERP system, the respondent had no experience in the system before the employment. However, the system works well according to the respondent.

5.2 Automated accounting today

To get a view of the degree of automation in accounting today, the respondents were asked to describe a normal working day and how automation was included in the working process. Also, they were asked about which processes that have become either partly or fully automated, what is still done manually and which accounting processes that the respondents believe could be automated in the future.

When the respondents described which parts of the accounting process that have become and today are automated, the process of invoices and tax accounting was the most common answer. All of the respondents express that the invoices and documents related to tax accounting are automatically sent into a software that is reading the invoices. Automated

account distribution is also a process that is partly automated, where the software proposes which account to use for the verification. Thereafter, one can adjust it manually. Another process that is automated is payments between banks and software that are automatically transferred. Furthermore, cloud based services are a software that is used by several respondents, where the data is automatically stored in a server continuously which provides access to the data wherever the respondent is working.

5.3 Impacts of automated accounting

In the section that follows, the present impacts of automation in accountants' practice that has been discovered during the interviews are presented. In addition, which potential impacts that, according to the respondents, automated accounting might have in the future. Practice and professional role are included in one of the study's dependent variables (impacts) and is therefore the central point in this section. First, the impacts on the practice will be presented followed by the impacts on the professional role.

5.3.1 Practice

5.3.1.1 Change in tasks

The accountants are clear in their thoughts and agree that their daily working tasks have changed and will change in the future because of automation. One major impact that one has noticed is that one now more avoids the repetitive and monotonous tasks, such as manual entering of bookkeeping, invoices and tax accounting, which is replaced by automated processes. However, several respondents propose that no tasks have been diminished, rather been more effective and shortened the tasks in time. This has led to that new tasks have arisen for the accountants and that its focus has changed to more analytical and consulting tasks. Now it is more about compiling and analyzing the data than manually entering it. As Respondent 5 stated:

“It has become more fun instead of just manually entering verifications. Also, because you feel that you can spend that time on something else and give the client some good advice instead.”

Other respondents also add that one can spend time on tasks that are more value-creating for the company where you can work with things that save money or lead to business. In addition,

one can spend time on tasks that provide both challenges and development for yourself professionally.

The respondents emphasise that even though more advisory and analytical services are offered today, one asserted that these tasks will become even more central in the future. This is considered since it is believed that managing invoices and payments will be fully automated. Nevertheless, according to the respondents, reconciliations, analyzes and controls will still need to be done as there may be incorrect matches, especially the documentation about the annual accounts. Respondent 7 argues:

“Since the tasks become more advisory and analytical, it becomes important to be able to draw conclusions from the data and further, one needs to focus more on value for the client and work more proactively with the client”.

The respondents were also asked to take a stand of which tasks they do not think will be automated in the future. It was emphasised that the human factor and the contact with the client will always be needed in the accounting industry since it in the end is about individuals and their company. A few respondents argue that there always will exist a dialogue and a relationship between the accountant and client, and that AI can never replace a feeling or create an understanding of the client’s business.

5.3.1.1.1 Analysis

As automated accounting has increased in accountants’ daily work, it has resulted in accountants’ methods for carrying out tasks has changed (Güney, 2014; Boylan & Boylan, 2017). Several tasks can now be executed automatically which has led to that the manual work for accountants has decreased (Frey & Osborne, 2017; Ghasemi et al., 2011). However, Bhimani & Willock (2014) asserted that when automation can perform parts of the accounting process, it allows the accountants to focus more on analytical and consulting tasks. By offering such services, Shaffer et al., (2020) also stated that the accountants thereby can focus more on the client and its business, instead of spending time entering the financial data manually. This is consistent with what the respondents expressed during the interviews, where all of the respondents clarified that they have more time for analytics and customer consultations. Several respondents highlighted that the tasks within the profession will align with the changes that are taking place. Advisory and analytical services have increased to a

large extent the last few years, and although they are offered today, the respondents argued that these tasks will have a central role in the future. This may be due to that, when more tasks in the accounting process become automated and no longer are needed to a greater extent, it leads to the customers being able to perform a lot of tasks by themselves (Taipaleenmäki & Ikäheimo, 2013).

Another possible reason for why consulting tasks may be more required in the future can be due to the fact that the demand of the current services offered by accounting firms will decrease. Thereby, the accountants might need to find other types of tasks where their knowledge and competence will be used and needed. This prescribes that the personal contact with clients and the advisory services delivered to the customer instead becomes more important. The majority of the respondents mentioned that an increased demand of cognitive based tasks is needed since automation can not replace an understanding of the client's business more than on a numerical level. This is in line with what Kokina & Blanchette (2019) asserted, that human interactions and judgements can not be replaced by automation, only routine tasks performed by the accountants.

One respondent also expressed that it will be more important to work more proactively with the customer in the future, which proposes that one has to be forward-looking and create an understanding for what the customer needs to do for their business. As Brante's theory of profession (Brante, 2009) describes with its abstraction category, one needs to possess knowledge in order to develop competence and confidence from society. A solution for the profession to survive could thereby be to find new services.

The accountants believe that it is possible that the new direction the tasks have taken and may take could result in either an increase or a decrease of accountants in the future. One explanation for a decrease may be that people do not choose the accounting profession because the old accounting tasks such as manual entries and administrative work have disappeared. However, the empirical findings in this study showed that all respondents like the changes in tasks. The respondents' opinions were that it is more varying and challenging. This is not in line with Path Dependency Theory (PDT), which states that people may be locked in the past and do not want to change in the future even though new technology exists (Trouvé et al., 2010, Stack & Garthland, 2003). This could be explained by that it is easier

and convenient to continue with the existing technology. On the contrary, the empirical findings in this study showed that the respondents see changes as an advantage, as the tasks become more fun and are more developing for the accountants as well. The impacts of automated accounting on the tasks are thereby not an obstacle among the accountants.

5.3.1.2 Increased efficiency

The respondents shared the opinion that a more automated accounting process has led to their working tasks becoming more efficient and less time consuming, compared to when tasks were handled manually. As Respondent 1 stated:

“I would say that everything goes much faster if you compare before and now when a system is automatically reading the payment on invoices. There, I saved myself 30-40 minutes. This also applies to supplier invoices where you before entered the ones manually that had been received. We printed out a journal and put them in a folder. I do not have to do that today, I just press ‘approve’ on the computer.”

Several respondents asserted that they get better overview and control over the tasks since you can handle a larger amount of data. Follow-ups also become easier to analyze when everything is digitised.

Some of the respondents also emphasised the improved availability of documents and material. Before, the client came to the office with its material the month after. Nowadays, the material from the client is handled through automatic file transfers. Thereby, the accountants can start the accounting process directly, actively work with the client and continuously submit a forecast to the client. Hence, this makes the accounting process much quicker and more time efficient. All of the respondents argued that the accounting process is more efficient due to the fact that automation is facilitating the corresponding tasks. Also, since manual processes regarding for instance the work of entering invoices, have been replaced this decreases the amount of time for some tasks. One respondent mentioned that this enables the accountants to focus more on the clients instead of doing unnecessary tasks. Another respondent stated that one has more time to evaluate the results of the clients’ business and to focus on more complex questions.

5.3.1.2.1 Analysis

As several respondents described, automated accounting processes have resulted in a number of positive effects. Firstly, since automation has taken over tasks that before were performed manually, the accountants work process has become less time consuming. This is due to the fact that different systems execute certain tasks automatically for the accountant without the need of human intervention. Thereby, automated processes may have a positive impact on the accountants work in terms of higher efficiency and productivity (Greenman, 2017; Drum & Pulvermacher, 2016; Ghasemi et al., 2011; Cooper et al., 2019). The empirical findings in this study shows that even without using full automated processes, the respondents experienced that their working tasks have become even more efficient and effective compared to when they were performed manually, which is consistent with previous literature (Greenman, 2017; Drum & Pulvermacher, 2016; Ghasemi et al., 2011; Cooper et al., 2019).

Several respondents expressed that automation positively affects the availability of documents. When the material needed can be found digitally and be gathered through file transfers from the customers, the accountants get a better workflow. The respondents asserted that the work thereof can start earlier and be an ongoing process rather than waiting for the customer to deliver the material by paper. As this process is automated, the slack of time when delivering material is decreased. Ghasemi et al., (2011) further emphasized that automated processes make the work more flexible. The respondents also expressed this, in a sense that it enables the accountants to perform their work from anywhere. This is possible because the data is accessible from everywhere. An advantage that is valued highly by the respondents. Since the material can be found at one place, the respondents experienced that the control over the work gets better.

As stated previously, PDT contains the philosophy that past actions and behaviour influence future decisions and actions. The theory proposes that this is due to the fact that it is easier and cheaper to continue with the existing process instead of making changes (Trouvé et al., 2010; Stack & Garthland, 2003). Based on the empirical findings in this study, this is not in line with what the respondents answered during the interviews. All of the respondents asserted that they want to change their way of working and not stay in the past, due to the advantages of automated accounting. One reason could be that the respondents do not want to appear as conservative where one strives for the preservation of ancient traditions and

systems. On the contrary, one explanation could be that the respondents are in a generation that have experienced constant changes while being in the accounting profession. They believe they are used to adapting to new changes even though their opinion is that handling new technology in the beginning may take time. New changes can be adapted differently by individuals where some question the meaning or value of the new technology (Hunton, 2002). However, it is shown that this generation is willing to try new technology which is because of the beneficial impacts automation has on the working process. Individuals that have shown interest in technology often want to learn new tasks which is the case from these empirical findings.

5.3.1.3 IT problems

Another impact emphasized by the respondents was that more faults could arise when using automated accounting. Because the softwares is giving the accountant suggestions and calculations for how verifications should be accounted, this leads to that one relies too much on the software and that one approves the solution that the computer proposes. Thereby, it gets easier for invoices, transactions and other documents to slip through the system. Some respondents also argued that a feeling of loss of control arises when tasks are handled automatically which leads to increased faults. When one is not fully involved in the accounting process and when one does not understand what lies behind the calculation made by the software, there is a risk that this could create misstatements. Respondent 4 comments on this and states that:

“You lose control when things happen automatically because then you have not seen everything that happens. I think that with invoices, if they only are going straight through the system, I have no idea what the cost is or that we even have received the invoice.”

Some of the respondents discussed that one today needs to control more that things are handled correctly than one had to do when things were done manually. For example, one still has to examine invoices that have been scanned to check if the systems have done it right and to see if it matches what the invoice actually refers to. However, it is believed that the faults have not increased to a larger extent, and that there always will exist errors. A major risk stated by the respondents was also that if the Internet is not working, the accountants are not able to perform their work, since their daily working tasks are dependent on the Internet.

5.3.1.3.1 Analysis

The respondents assert that automation has led to several incremental changes that are positive for the profession. However, considering the development of automation, with advantages also comes disadvantages. According to the respondents, they believed that the risk of misstatements, faults and misreading of documents may arise as more automation is implemented in the accounting process. They therefore propose that accountants are needed to control that the systems are working correctly. As Lupasc et al., (2012) stated, when accountants have more time for analyzing and controlling, the quality of financial statements increases. Sun and Lu (2017) are also in line with these findings, who argued that the computers and software used today are not good enough. However, the accountants see a risk of misstatements and faults even though more becomes automated and argue that some risks always will exist. The empirical findings showed evidence that there exists some lack of trust for automated processes if it becomes more and more implemented. When one becomes less involved in the process, the understanding of what the system is doing disappears. What could be seen in the findings was that the accountants perceived a loss of control when the process is performed automatically. This is consistent with Dimitriu and Matei (2014b), who stressed that less control is derived from less manual handling.

In addition, the implementation of more automation makes the accounting process more dependent on the Internet. This is a risk that was pointed out by the accountants who encountered that if it is the case, they are unable to perform their tasks. Dimitriu and Matei (2015) asserted that since there is no solution to it, the uncertainty that it may disturb the accounting process will continue to exist in the future.

5.3.1.4 Changes in the society

Questions about the reason for striving for more automated processes in the respondent firm were asked. Some respondents explained a pressure from clients and suppliers to be automated, both clients and suppliers require for example e-invoices. One respondent stated that the CFO is the driving force for more automated accounting;

“The CFO at our firm is the driving force in this process, he was previously an auditor so therefore he wants things to be right and correct. And he sees great advantages with

automated processes. Partly because things has to be correct but also to save money and to save human resources.”

Almost all of the respondents pointed out that another reason for striving for automated processes is to follow the development in the society. Additionally, to follow the development of what other organisations in the same field does. The firms tend to follow the trends in the society as a whole and digitalisation becomes increasingly important. One respondent asserted that there is a kind of competition between the largest actors about which actor is on the leading edge within the accounting industry. Further, one respondent mentioned that the implementation of automation brings a sort of environmental work, in the sense that it decreases the paperwork. Thereof, that might be a reason that firms are striving for more automated processes, to copy with society's environmental work. In addition, in order to be an attractive employer, you need to follow the development of automation according to one respondent;

“It is crucial to offer exciting and developing employment in order to be attractive, and there might not be many people that appeal to firms that are far behind other firms. If it is not the case that the firm is ready for the change and you are the person that is allowed to make the change, then it could be a challenge. But if you see that the firm does not have the want and willingness to do it, I can say that I would not enter such employment....”

5.3.1.4.1 Analysis

The new institutional theory proposes that there are different forces in forms of social structures, rules, norms and routines that lead to that organisations behave like each other (Deegan & Unerman, 2011). As mentioned earlier in the thesis, automation can be considered as one driving force for both society-and organisational development and acting. The empirical findings show that pressure from society, in forms of clients and suppliers, are the leading reason for implementing automated processes. Furthermore, most of the respondents propose that following the development in the society is a reason for striving for automated processes in their firm. Also, to follow the development of other organisations in the same field. One respondent asserted that there is a kind of competition between the largest actors about which actor is on the leading edge within the accounting industry. This can be explained by the perspective Coercive isomorphism in the new institutional theory, where it is stated that weak organisations are influenced by strong organisations in the same

organisational field (DiMaggio & Powell, 1983). Furthermore, the Normative isomorphism perspective prescribes that the way of acting is influenced by other organisations (DiMaggio & Powell, 1983). Therefore, it could be argued that organisations are influenced and experience pressure from other organisations to be automated. Hence, the previous literature is in line with statements in the empirical findings of this study.

Additionally, one respondent emphasises that the implementation of automation creates some sort of environmental work, since it decreases the paperwork. The respondent asserted that it could be a reason for striving for automated processes, to copy with society's environmental work. Since it is attractive nowadays for an organisation to work with the environment, the firm does small things to improve the environmental work. One respondent also expressed that it is important to follow the development of automation in order to be an attractive employer. The firm is not seen as an attractive employer if they are far behind other firms when it comes to automated processes in the practice. This statement could be connected to the new institutional theory in the way that organisations seek legitimacy in order to survive in the society (Eriksson-Zetterberg et al., 2015).

5.3.2 Professional role

5.3.2.1 Change in role

The respondents were asked if they had noticed any shifts in demand of services in the accounting profession in the last years. Several of the respondents said that a more consulting and controlling role is required today than it was earlier. As respondent 2 said;

“Due to the increase of automation, the accountant saves time and therefore I believe that it is expected from us to be more of a controller function than earlier. Previously it was just the bookkeeping, balance sheet check and also to do the accruals and that was it.”

The reason mentioned for this change in role was due to time-saving processes and to maximise the use of the accountant. Several of the respondents also experienced a more analytical role than previously, that the accountant is expected to analyse the different numbers. Furthermore, one of the respondents mentioned that accountants are expected to come up with ideas and solutions that provide cost reduction for the firm. Lastly, the respondent highlighted that you constantly challenge yourself in the accounting profession.

5.3.2.1.1 Analysis

As mentioned in section 3, the professional role in the accounting profession can be defined by the eight categories in the model theory of professions (Brante, 2009). According to the theory, a professional role is based on their income and status on the fact that they are using scientific knowledge (Brante, 2009). Kairos Future (2016) argued that the role of an accountant will experience extensive changes with full implementation of automation within the next 20 years. Furthermore, Kairos Future (2016) proposes that the accounting firms have to prepare for new changes when it comes to the working methods. The respondents expressed that they have several automated processes in their work today and the last couple of years those processes have increased extensively. Furthermore, some respondents emphasised that the automated processes will continue to increase within the next few years. In addition, it is believed that the implementation of automation requires a different role of the accountant than earlier. The effects of automated processes in the accounting profession increases the demand for more advanced consulting (Fernandez & Aman, 2018). This statement is in line with the experiences of the participating accountants. All of them expressed that they have noticed an increased demand for consulting services but also more of a controlling role than previously.

Additionally, a more analytical role has also been experienced. The accountants expressed that they are expected to analyse numbers and come up with ideas and solutions that provide cost reductions for the firm. Furthermore, Bhimani and Willcock (2014) emphasised that the accountants are also expected to consult the company in their financial situation. This since the accountant saves time by using automated processes instead of doing the work manually and thereby have the time for other services instead. Several authors (Lee & Tajudeen, 2020; Greenman, 2017; Cooper, Holderness, Sorensen & Wood, 2019) also emphasised that automation is time-saving, but also that it creates higher efficiency in the working process.

The model theory of professions argues that to be characterised as a profession knowledge conveyance should be involved (Brante, 2009). Knowledge conveyance proposes that a profession has to be able to meet the demand in the society with their skills and knowledge (Brante, 2009). Therefore, since the accounting profession will experience a demand for more consulting and controlling roles, it creates pressure for the accountant to adapt to those demands and be able to change their role as an accountant. As Brante (2009) suggests, the

demands from society are of importance to adapt to in order for the accounting industry to not lose its status.

As a conclusion, the implementation of automated processes in the accounting profession has led to that accountants' experience a change in the role as an accountant. The accountants believe that it is required more of accountants today than previously. In the future, the accountants will experience a further change in skills demanded and changes in the practice, where the role goes towards more consulting (Fernandez & Aman, 2018; Pan & Seow, 2016; Kairos Future, 2016).

5.3.2.2 Competence and education

Questions were asked if the respondents have experienced any shifts in demand to new, other or more specific qualities or qualifications by the accountants today compared to earlier. As with the previous section above, several respondents mentioned that they are working more as a controller than previously. Thereof, the accountant needs to be analytical and be able to understand why it looks as it does on the income statement for example. Furthermore, several respondents experienced that IT knowledge is more demanded today. Respondent 5 said;

"I believe that it is important to be interested in digital changes. However, it might not be a requirement, but of course to think that IT and similar things is fun is an advantage, since many things are digital today."

It was also brought up during the interviews that it is of importance to be able to shift focus fast and be able to do various things at the same time. Additionally, a higher level of education today compared to earlier was also brought up by two respondents. One of the respondents said;

"The qualifications demanded have increased in the accounting profession and it will continue to increase because simple tasks disappear and become automated."

On the contrary, one respondent believed that university education is not needed to the same extent due to automated processes. However, the respondent also mentioned that the firm needs to have an employee that understands the system and understands why certain things

happen. In addition, there is a need to be able to report to customers and thereof, it requires some kind of specific knowledge and qualities.

Respondent 7 also mentioned that the individuals that work with bookkeeping experience the most extensive changes in the role. Respondent 7 also mentioned that a large number of customers and relations with customers are more important today. Further, the ability to analyse and notice errors are also of importance. Lastly, one of the respondents believed that the need for skilled controllers will increase.

5.3.2.2.1 Analysis

The extensive increase of automation in the accounting profession also results in a demand for technology competence among the accountants (Pan & Seow, 2016). The accountants are not only expected to handle technology but also to have knowledge about the technology risks (Pan & Seow, 2016). The respondents' answers are consistent with those statements who experienced a higher demand for IT knowledge today than previously. One of the respondents emphasised the importance of being interested in digital changes since many things are digital today. In addition, a change in qualities and competence in the accounting profession has been experienced. Due to that automation becoming a larger part of the profession, the competence among accountants gets a different meaning (Levy and Murnance, 1996). Some years ago when the working tasks in the accounting profession were performed manually, another competence was needed (Levy and Murnance, 1996). This is in line with that the accountants experienced a shift in demand to a more consulting and controlling function than earlier. The accountants are expected to have a more analytical competence. One respondent further prescribes that they are required to handle a larger number of customers and also the relations with customers are more important today. The accountants are also expected to have the ability to shift focus fast and be able to do various things at the same time. Therefore, one can adapt to Henry and Hicks (2015) statement that the introduction of automation also requires experienced accountants to a larger extent.

Several respondents experienced a higher demand for education in the profession, while one respondent argued for the contrary. The respondent expressed that university education is not needed to the same extent due to automated processes. On the other hand, the same respondent also argued that there is a need for at least one employee at a firm with education and competence. This in order to know the numbers and calculations behind the transactions,

but also to be able to solve eventual problems. In the model theory of professions, Brante (2009) emphasised that higher education is needed in order to be characterised as a profession. However, the model also emphasises that it is important to have in mind that this perspective is decreasing in the sense that some professions do not demand education to the same extent anymore (Brante, 2009). Furthermore, the second perspective in the model theory of profession, it is argued that abstract knowledge is needed. The balance between practical and abstract knowledge is important to be able to develop competence and confidence from the society (Brante, 2009). However, as mentioned above, one respondent proposes that university education is not needed to the same extent anymore. This since automated processes replace and diminish tasks made by human employees. If that is the case, that higher education is not needed, the accounting profession may lose its status as a profession according to Brante (2009).

Furthermore, the model theory of professions also includes the perspective autonomy, which argues that one has to be able to make decisions independently (Brante, 2009). Due to automation, autonomy in the accounting profession might be affected. This since one might no longer be defined by independence to make its own decisions when the process is automated. Another perspective in the model theory of profession is knowledge conveyance, which proposes that a profession has to be able to meet the demand in the society (Brante, 2009). As highlighted in the empirical findings and previous literature, the accountants will experience an increase in demand from the society for more consulting and analysing services compared to earlier. This creates pressure for change on accountants to adapt to those changes. If the tasks made by accountants are no longer demanded in the society due to automated processes, this perspective proposes that the accounting profession does not fulfill the criterias for being defined as a profession (Brante, 2009).

Lastly, previous literature and the respondents agreed that the development of automation and technology will continue to influence the accounting profession. Therefore, this requires accountants to be up to date about the demanded competence to be able to tackle the challenges of the future (Bhimani & Willcock, 2014).

5.3.2.3 Client relations

Two of the respondents highlighted that the relationship to the client becomes more beneficial due to automated processes. As respondent 6 said;

“You have more time to evaluate the results and communicate with the client, it has become more of a social relationship...”

Previously the only communication that existed with the client was when the client handed over the papers. Whereas today the respondents experience that they have the time to communicate and be social with the clients in a different way. Furthermore, since automation saves time, some of the respondents mentioned that they have the capacity to serve more customers than earlier.

5.3.2.3.1 Analysis

As mentioned in earlier sections, automated processes are known for time-saving and creates higher efficiency in the working process (Lee & Tajudeen, 2020; Greenman, 2017; Cooper, Holderness, Sorensen & Wood, 2019). Therefore, two of the respondents emphasised that their relationship with clients has become more beneficial than it was earlier. The accountants have the time to analyse and evaluate the results, but also communicate and be social with the clients in a different way. Previous studies also mentioned that since automation makes it possible for the computer to perform parts of the accounting process, the accountants are able to focus on analysing the results of a company (Bhimani & Willcock, 2014). Because of the time to analyse the clients' results, the quality of for example the financial statements increases which also in turn leads to increased reliability (Lupasc, Lupasc & Zamfir, 2012). This is also in line with previous sections, where it is stated that the demand for more consulting and controlling functions has increased according to both the respondents and previous literature (Fernandez & Aman, 2018).

5.3.2.4 Job opportunities

The respondents were asked about the greatest challenges and threats with more automated processes in the accounting profession. A threat that was brought up by one respondent was that it might be possible for individuals to handle the accounting themselves due to easy automated processes. If this is the case, the respondent described that the accounting role might disappear or change in some sense. As mentioned above, several of the respondents

believe that the role of an accountant might change to a more consulting or controlling role than previously. Respondent 1 said; ‘

“... some of the functions will disappear. Then you have to decide which way you want to go, be more educated and have a higher competence in order to be able to continue in the profession.”

Furthermore, one more respondent highlighted that a higher level of education is needed and more knowledge is also needed to be able to stay in the profession.

Additionally, one respondent believed that automation diminished the jobs in the sense that it is time-consuming but also that humans are not needed to do the tasks to the same extent anymore. The respondent also said that the firm had more employees at the finance function some years ago but that has changed;

“... I work alone and handle everything and I manage to do it, so of course, automation takes away working tasks and employees diminishing.”

The respondents were also asked about their thoughts when it comes to the future of an accountant. Most of the respondents agreed that the profession will involve more data gathering, analysing and consulting in the future. Respondent 3 said;

“Maybe you will be more of a problem-solver for the client, that the client tries to do the accounting by themselves but that they always demand an accountant to consult....”

One of the respondents mentioned that the importance of being analytic will increase in the future. Further, the accountant has to be able to handle a greater amount of customers in the future. Thereof, it is of importance to be able to make conclusions based on that and to have a social relationship with the customer.

The respondents agreed that the professional role will change in the future, but they were not afraid that the profession will disappear completely. One of the respondents said that there is still a need for a human employee to work with the financing part of the firm and also to

calculate finances. Additionally, there is a need for a human employee to keep track of the balance statement etc.

5.3.2.4.1 Analysis

Previous research (Taipaleenmäki & Ikäheimo, 2013) proposes that automation could lead to an absent demand of accounting consultants for the accounting processes. This since the clients might be able to operate on their own without the support from accounting firms (Taipaleenmäki & Ikäheimo, 2013). This is in line with the expression made by one of the respondents, where it was emphasised that it might be possible for individuals to handle the accounting themselves due to easy and efficient automated processes. However, the same respondent also argued that automation might lead to that accountants will experience a more problem-solver role. The client tries to do the accounting by themselves but will always demand an accounting consultant for e.g. advice. Thus, that could lead to that the accounting role might change in some sense. Furthermore, this was confirmed by an additional respondent that automation diminished the jobs in the sense that humans are not needed to do the task to the same extent anymore. This since automation makes the work more efficient but also that automation replaces some tasks that were previously made by a human employee. Therefore, less people at the finance function are needed today than earlier, which might result in a decrease of job opportunities.

However, it is argued that cognitive based tasks such as advisory are not possible to be automated in the future (Greenman, 2017). Therefore, accounting consultants will still be demanded, which is also confirmed in the empirical findings. Most of the respondents are not afraid that the profession will disappear completely. This since the respondents asserted that there is still a need for a human employee to work with the financing part of the firm and also to calculate finances. The reason brought up for that was the fact that an AI can not replace human intervention and understanding. In addition, this could be connected to the expressions made by Levy and Murnance (1996) that human competence and intervention is still needed, in order to for example identify problems in the systems.

Additionally, Shaffer et al. (2020) asserted that accountants have to train and even re-train in some instances to be able to handle and follow the development of automation. This statement was also found in the empirics where one respondent said that the accountant has to decide which way they want to go. To be more educated and have a higher competence in order to be

able to continue in the profession. Previous research (Shaffer et al., 2020) also argued that accountants will survive the implementation, but they have to be prepared for a change to a more specialised role.

5.4 Attitude towards automated accounting

Below follows the empirical findings about the accountants general attitude towards the impacts on the practice and professional role. Thereafter follows factors that can explain the attitude among the accountants. Attitude represents the second dependent variable in the study and is therefore presented in the following section.

5.4.1 General attitude among the accountants

All of the respondents expressed both a positive and a negative attitude towards automated accounting. The respondents propose that the advantages outweigh the disadvantages, which created a positive attitude in general. In the section below follows the different factors that explain the variation of the positive and negative attitude.

5.4.2 Perceived usefulness

The respondents were asked about their opinion when it comes to automated processes, where the respondents emphasised both advantages and disadvantages. Two of the respondents claim that one disadvantage with automation is that it results in a rationalisation of jobs. On the other hand, automation provides freedom in a different way, where the employer is able to work wherever they want and at which time that suits them best. This is especially beneficial in these times, where the world experiences a pandemic with restrictions. Another respondent emphasised that pointless tasks disappear due to automated processes, this is an advantage since the respondent believes that those tasks are not developing for anyone. Therefore, the accountant has the possibility to focus on tasks that are more value-creating and developing for both the firm and themselves. On the contrary, the respondent mentioned that the automated processes can result in errors, thereof it is crucial to screen those processes to be able to identify errors. However, the respondent argued that the automated processes bring more right than wrong.

An advantage mentioned among the respondents was the increase of flexibility due to automation. On the contrary, one respondent proposes that automation may bring a decrease in flexibility in a sense. This is because it is beneficial with automation when for example

transactions and invoices are standard every month. However, the respondent experiences that if you have a transaction that is different and is not a standard transaction, it becomes difficult. The same respondent also said;

“Further, I believe that you lose control a bit, when things go automatically. This is because you have not been able to see everything that happens. I think with invoices, I have a relatively good view of our expenses since I have watched the invoice. But if the invoice just goes through the system where for example a colleague has made the purchase order, then I have no clue about what the expenses are and if that expenses is even correct.”

As mentioned in the sections above, the respondents emphasised that the contact and relationship with their clients has increased due to automated processes, which they see as an advantage. However, a threat and disadvantage with automation is the risk of trusting the systems to the full. There is a need to be able to understand the background of the transactions and numbers, but also be able to check for errors in the systems. One of the respondents stated that automation makes it possible to easily and more effectively build up an internal control at the firm. Where you are able to manage which authorities an employee has by having their own account. Lastly respondent 8 said;

“I am positive to everything that ease and simplifies my daily working tasks.”

5.4.2.1 Analysis

As mentioned earlier, the factor perceived usefulness can be illustrated by the degree to which a person believes that using automated systems would enhance his or her job performance (Davis, 1989). The empirical findings show a variety of advantages and disadvantages according to the accountants. As Hunton (2002) asserted, individuals adapt differently to changes, where some are positive about changes, others counteract or question the meaning and value of the new technology. Several respondents expressed that automation leads to freedom in a different way, they are able to work wherever they want and at which time that suits them best. Furthermore, it was emphasised by the respondents that pointless tasks become automated which is seen as an advantage because those tasks are not developing. The accountants expressed that they therefore have the possibility to focus on more value-creating and developing tasks. Both these advantages mentioned, provided a positive attitude towards automation among several of the respondents. On the other hand, two respondents expressed

that automated processes can result in errors. Therefore, the respondents highlighted the importance of screening those processes to be able to identify errors. Another respondent mentioned that a threat with automation is that employees trust the systems to a full extent. This since the system can generate errors, therefore it is crucial to be able to understand the background of the transaction and numbers to check for errors in the system according to the accountant. This threat was seen as a disadvantage with automation, which generated a negative attitude against automated processes.

Furthermore, another advantage affirmed by one respondent was the increase in flexibility. However, the same respondent proposes that automation brings a decrease in flexibility as well. The decrease in flexibility occurs when transactions are not standard every month, then it becomes difficult to have automated processes. Therefore, the respondent at first expressed a positive attitude against automation, but later the attitude shifted to a negative one. In addition, a loss of control is experienced due to automated processes, which is also seen as a disadvantage. This since the respondent prefers to have a look on which transactions are correct and which are not correct. Hence, this created a negative attitude against automation.

Lastly, several respondents expressed advantages with automated processes. One respondent emphasised that automation makes it possible to easily and effectively build up an internal control system. Another respondent asserted that he/she is positive to every automated process that eases and simplifies the working tasks. The TAM model includes the factors job relevance and output quality (Davis & Venkatesh, 2000). Job relevance refers to an individual's perception that technology is applicable to the job (Davis & Venkatesh, 2000). Output quality is defined as an individual's consideration for how well technology performs their tasks (Davis & Venkatesh, 2000). The positive attitudes can be explained by those factors, where respondents express freedom, focus on more value-creating and developing tasks, flexibility and make it possible to easily and effectively build up an internal control system. On the contrary, the negative attitudes can also be explained by those factors, such as increase in errors, decrease of flexibility and loss of control. Furthermore, the TAM model includes the factor result demonstrability (Davis & Venkatesh, 2000). The factor proposes that individuals will have more positive perceptions of the usefulness of the technology if the relationship between usage and result of it is clear and discernable (Davis & Venkatesh, 2000). One respondent mentioned that automated processes are difficult to use if the transactions are not standard every month. It might therefore be possible that the respondent

does not identify the relationship between usage and results of it as clear and discernable. Therefore, a negative attitude against this can be explained by the factor result demonstrability. However, as mentioned earlier, several respondents asserted that automation makes the working process more effective. This can also be connected to the factor result demonstrability, that the respondents identify the usage and results of automation as clear and discernable, which creates a positive attitude towards it.

The TAM model also includes three other factors; subjective norm, voluntariness and image (Davis & Venkatesh, 2000). The factor subjective norm includes people who might develop a behaviour even though they are not favorable towards that behaviour, for example if individuals' choices are being affected by social pressure (Davis & Venkatesh, 2000). The empirical findings shows that one respondent emphasised that clients demand the accounting firm to use technological systems. Hence, if clients demand technological systems, the accounting firms might experience some kind of social pressure to be digital in order to meet the clients demand. However, the accountant had a generally positive attitude towards automated processes and therefore it is not possible to draw the conclusion that this factor affected the attitude of that particular accountant. In addition, the factor voluntariness illustrates if the adoption of the technology system is perceived as mandatory or not (Davis & Venkatesh, 2000). The factor image refers to the degree to which the use of technological systems is perceived as increased social status in one's social system (Davis & Venkatesh, 2000). Neither of these factors were emphasised or highlighted by the accountants as a reason for their positive or negative attitude.

5.4.3 Perceived ease of use

The accountants were further asked about if they think it is easy to understand and use new technological systems. Most of the respondents propose that automated accounting results in an easier way of working and makes the work more effective. Due to increased effectiveness, the accountant has the possibility to focus on parts which may be of more importance and also more value-creating for both the firm and the accountant. Furthermore, several of the respondents explained that the boring tasks have become automated which are seen as an advantage among the accountants.

Nearly all of the respondents agreed that the new technology is easy to use and understand, even though some of the respondents said that it can be difficult in the beginning. Further, two

of the respondents said that it is of importance to have time to learn and create knowledge from the start about the system. Additionally, that you make sure that you have the time to learn it properly. Most of the respondents also emphasised that they appreciate and think it is fun to learn about new systems. One of the respondents expressed;

“I am not afraid for new things and therefore I just try, the worst thing that could happen is that it is wrong but if that is the case, you can just correct it...”

However, several of the respondents stated that they have experienced other accountant colleagues that believe that technology processes are complex and difficult to learn. One respondent also mentioned that the older generation of colleagues does not appreciate the implementation of new technology to the same degree. Further, that the accountants do not see the advantages of automation in the profession. Respondent 1 commented on this and said;

“Everyone does not share the opinions of the advantages with digitalisation, they prefer to have a paper in front of them. I have always been positive to digitalisation, I have been the driving force and it is not appreciated by everyone.”

As previously mentioned, some respondents asserted a lack of trust towards the automated processes which is developed into a criticism against the systems. In addition, some respondents also emphasised the importance of IT knowledge and knowledge about computers. Where it is difficult for the individuals that do not have those skills to follow the development of automated processes, which is expressed as a criticism. Another criticism that was highlighted from several of the respondents was the emergence of errors due to automated processes. Respondent 2 mentioned;

“.. It requires some kind of control in order to check for errors, but overall I believe that automations brings more right than wrong.”

However, one of the respondents emphasised the importance of knowing the calculations and steps behind the numbers in the automated processes in order to understand and examine for errors.

5.4.3.1 Analysis

The factor perceived ease of use can be described as the degree which individuals believe that using the system will be free from effort (Davis, 1989). In other words, if the accountant believes that using and understanding automated processes is easy. Most of the respondents agreed that new technological systems are easy to use and understand. However, some of the respondents emphasised that it can be difficult in the beginning. The respondents argued that it is important to have time to learn and create knowledge from the start, but also that you have time to learn it properly. Otherwise, it was seen as difficult to use automated processes if you are not provided enough time to learn it from the beginning. If the accountants are not provided enough time to learn, it might evoke a negative attitude against automated processes since one experiences hassle and might therefore not be able to see the benefits of it. This can be connected with the statement made by Salovaara and Tamminen (2009) who claimed that the TAM model does not take into account if the technology first might be accepted but later abandoned, and vice versa. That the accountants might in the beginning abandon the system can be connected to the statement that it is difficult to learn the new technology. However, when one has been able to learn and understand the system, one may accept the system.

Additionally, one respondent pointed out that various systems work and are built up in a different way which leads to less understanding if e.g. you change working place or the firm changes software. This opinion resulted in a negative attitude against automated systems, which are in line with the statement of Davis (1989) that to what degree using the system will be free from effort. In this case, the accountant proposes that it is easy to use and understand when you have learned the system, but if you have to learn a new system, it might not be free from effort. Several respondents also emphasised that they are not afraid for new things, they appreciate learning about new systems. Therefore, implementing automated processes was seen as positive among those accountants.

Furthermore, the empirical findings emphasised that the respondents have experienced other accountant colleagues that believe that technology processes are complex and difficult to learn. It is far from everyone that is appreciating the development of digitalisation according to the respondents. As one respondent mentioned, the older generation might resist the development of new technology more than other generations. This might be since the older

generation has not grown up with digitalisation to the same extent and have therefore more difficulties with new technological systems.

In addition, some respondents emphasised that it can be difficult to use new technological systems if you do not bear some kind of IT knowledge. This since you have to contain certain qualifications in order to be able to handle those complex systems. This was seen as a disadvantage with the automated processes, which also generated a negative attitude against it.

5.4.4 Openness for changes

The respondents were also asked to describe their experiences of automated processes and most of them were positive experiences. Several respondents emphasised that automation has eased their practices extensively since the processes are known as time-saving for the accountant. One of the respondents described that the use of cloud service in their practice has created freedom. This is because you are able to work wherever you want. As mentioned above, several respondents agreed that automation makes their practices more effective and it decreases errors in their work. Which is seen as an advantage among the accountants.

However, nearly all of the respondents also propose that the implementation of new systems and technologies can be difficult in the beginning. The experiences when it comes to the implementation of new systems are associated with botherment. Respondent 3 commented on this and explained;

“It is always difficult in the beginning to get to know the system and learn, but often after a while it becomes easier.”

The openness to changes of automated processes emphasised by respondent 7 were only positive ones. The respondent described the importance of automated processes in their increase of sales in the last years. The increase of sales results in an increase of invoices and thanks to automated processes they were able to manage it without the need to employ two more employees. The respondent also expressed;

“It is crucial in order to be able to run the business as effectively as possible. The process is extremely important for us.”

5.4.4.1 Analysis

As mentioned above, the experiences of automated accounting are positive among the accountants. However, most of the respondents agreed that the implementation of new systems can be difficult in the beginning. Feelings of hassle and botherment were expressed by several of the respondents. It is difficult in the beginning to get to know the system and learn, but often it becomes easier after a while according to one respondent. Therefore, it might evoke negative attitudes during the implementation and in the beginning of automated processes. This since the accountants express difficulties and feelings of botherment when implementing new technological systems. This is in line with the statement by Ulhelyi et al. (2015) that the reasons for why users resist new technology can be due to that users need to learn new skills or how new technology works. Hence, according to Ulhelyi et al. (2015) this can evoke fears of failure or fears that one has to break old habits. Furthermore, users have in general a positive attitude if the changes in their work are smaller rather than extensive (Ulhelyi et al., 2015). Therefore, since accountants' experience difficulties in the beginning of new systems, one can argue that companies should make small changes often rather than extensive changes at once. Path dependency theory proposes that past events influence future events (Bergek & Onufrey, 2013). Hence, experiences of automated processes from the past could explain present attitudes and behaviours. Therefore, experiences of hassle and botherment connected to new systems can follow until one has been proven the opposite several times.

Even though most of the respondents expressed difficulties, they also propose that automated processes increase the effectiveness and decrease the errors. One respondent further mentioned that automated processes are crucial for their business to be able to handle increase in sales. These positive attitudes among the accountants might result in an acceptance towards changes in their working process.

5.4.5 Easy to use and understand

There are divided attitudes between the respondents regarding the use and understanding of automated processes. One respondent argued that one in the beginning has to do the exclusion method in order to learn how to use a system. Also, one pointed out that various systems work and are built very differently which leads to less understanding. Such opinions drove a negative attitude towards automated accounting. However, several respondents do not see this as something negative for themselves because at the moment when automated processes

become a part of the daily work, one thinks it is great and exciting to use, and that one always finds a solution for how to use and understand it. An additional reason behind this positive feeling was that one feels that one always has each other to ask in the firm. Also, because one is interested in and not afraid of trying new things. As Respondent 4 states:

“Overall, I do not think it is difficult if I get some time, help and knowledge from the beginning. I find it easy and fun to learn, but on the other hand, it is a problem for those who do not have the technical skills or are knowledgeable with computers. The more automated and digitised it becomes, the harder it will be to keep up with it. To understand what is happening and how one should solve the potential problems.”

5.4.5.1 Analysis

The divided attitudes that arose was derived from the factor affection in the ABC model. As the component describes, an individual's emotions and feeling towards an object determines the attitude (McLeod, 2014; Jain, 2014; Eagly & Chaiken, 1998). Whether one thinks it is easy to understand and use the technology, or vice versa, automated accounting could be perceived as either easy or identified as a problem, which expresses the variation of the attitudes. As the respondents in the beginning think it can be difficult to use and understand, the affection component thereby brings a degree of negative attitude. However, not to the extent that the respondents are not willing to change. On the other side, it was emphasised that to learn and understand a new system is interesting and perceived as easy to use when one has knowledge about it. The direction towards a positive attitude is thereby constituted from the affection component in the ABC model.

What was discovered during the study was that the affection component in the ABC model and perceived ease of use in the Technology Acceptance model was difficult to distinguish empirically. However, since these two are differentiated in theory, it was decided to separate these in the empirical part despite repeatability of information.

5.4.6 Experience

A further reason behind the positive attitude towards automated accounting derives from previous experience of implementation of automation. Many of the respondents state that it in the beginning can be challenging to adapt to but that the experience of the implementation always has been improved in terms of the changes from repetitive tasks to more varying tasks.

Henceforth, when other tasks have been automatic, several respondents felt that this enriched the experience further. It has facilitated the whole accounting process for the accountants and made it simplified and less boring for the accountants which has created a positive attitude towards implementation of automated accounting. As Respondent 5 expresses:

“I am positive towards it. However, it has of course been a threshold to get over and to get more used to it. But once it has been implemented and works, it is wonderful.”

5.4.6.1 Analysis

The positive attitude generated is derived from the behavioural component of the ABC model. The behavioural component corresponds to that previous experience of an object influences the attitude (Jain, 2014). Hence, the positive attitude that the accounting processes have been automated is based on previous experience that other tasks in the accounting process have been automated. The previous experiences involve positive feelings that the tasks have been both simplified and more efficient with automated processes. Therefore, the respondents developed a positive attitude for processes that in the future might be automated. Thus, the positive attitudes are generated from the behavioural component as the positive feelings are obtained from prior experience of automation.

5.4.7 Knowledge

Similar statements regarding the experience of automation were provided by the respondents where questions about their knowledge of automation were asked. Some respondents describe that in the beginning it can take time and be difficult to obtain knowledge about how automated processes work since the different systems used are structured in different ways. One respondent expressed that it can be hard for someone to understand automated processes due to loss of IT knowledge, which could lead to increased faults.

However, the general attitude is still perceived as positive and outweighs the negative attitude because previous experience of automation has led to more efficient work processes. Some respondents explain that they in connection with the automation transition have taken many internal courses from the system developers. Another respondent states that one has received information from IT-support. The majority of the respondents also express that they mostly are self-taught and that it is developing and fun to learn. Respondent 5 also add:

“Then we also noticed when we got customers in a younger generation, that there was no question that it would not be handled digitally. So we had to learn because of it.”

One respondent expressed their concern of how clients are affected because it has been noticed that elderly would like to stay where they are and still submit their documents by paper. Overall, the common conclusion among the respondents is that it works in a beneficial way which creates a positive attitude against it.

5.4.7.1 Analysis

The negative attitudes that were generated mostly evolved from the cognition component from the ABC Model. The cognitive component corresponds to that a persons’ belief and knowledge about an object affects the attitude (McLeod, 2014). In this case, it is about a persons’ knowledge of automation. At first, the respondents expressed that it is difficult to implement new technology because of their lack of knowledge, which resulted in a negative attitude towards automation. Furthermore, the cognitive component generates a positive attitude as the general perception of automation is beneficial since it brings extensive advantages (e.g. increased efficiency, flexibility and availability) when you have the knowledge. The positive attitude might also be a result of the fact that several of the respondents have been taking internal courses in the technology system used at the company.

5.4.8 Other factors

The following section includes other factors that have not been covered by earlier sections but have been shown to be important to explain the respondents’ attitudes.

Several of the respondents expressed a fear towards automated accounting, where they are concerned about effects and if the accounting profession will disappear. Some respondents expressed that extensive changes such as AI can be fearful, since one rationalises oneself as automation takes over more of the work. Also, one feels fear because then you do not know how to handle the new accounting processes. The concerns expressed are based on an uncertainty about what the working tasks will be in the future, how the future will change the accounting profession and if the accounting profession even will exist. These possible impacts on the accounting profession in the future created the most negative attitude towards more automated accounting.

However, all respondents argued that even if one feels some degree of fear and uncertainty about what impacts automation will have on the profession, one agreed upon that automation in the end is an advantage. This in a sense that it contributes to several positive changes in the work as an accountant, such as simplifying the accounting process. The majority of the respondents point out that they are not worried since it is believed that the role as accountant will remain. This is because the human contact with the customer could never be replaceable by a robot. Respondent 1 first expresses uncertainty but proposes that automation can result in positive aspects as well:

“We rationalize ourselves, maybe that may not be positive. At the same time, if it means that you can do something more value-creating, it does not have to be negative.”

Most of the respondents also expressed positive attitudes to the development of automation. The firms that the respondents were employed at differed when it comes to the degree of the implementation of automation. Two of the respondents emphasised that they aim and wish for more automated processes in their firm. The reason was that the respondents experienced extensive benefits with using such processes.

In addition, most of the respondents expressed that they only use several automated processes in their firm. Those processes were seen as positive in the sense that it made the work more effective and you have the time to focus on more value-creating working tasks. However, several of the respondents mentioned that the degree of automated processes in their work matter. This since some systems they use have to be controlled for in order to check that the transactions are correct. This was seen as a negative aspect of automated processes and hence, it created a negative attitude against automation. Respondent 2 commented on this:

“It requires some kind of control to check that everything is correct, but in the end, I believe that automation brings more right than wrong.”

Therefore, the respondents believe that some processes are harder than others to automate in the firm because you always need to check for errors. Furthermore, checking for errors is not seen as an enhancing and value-creating task according to the respondents.

5.4.8.1 Analysis

As mentioned earlier in the thesis, Lee and Tajudeen (2020) made a study where 95 percent of the accountants interviewed experience a fear of losing their jobs in the future. The fear was based on that automated processes have the possibility to replace the accounting profession (Lee & Tajudeen, 2020). The empirical findings in this study are in line with Lee and Tajudeens (2020) study, where the respondents in this study also expressed a fear towards automated accounting. The fear among the respondents was based on uncertainty about the future, e.g. how the working tasks will be in the future, how the profession will change in the future and if the profession even will exist in the future. Therefore, the fear of losing the job as an accountant leads to a relatively more negative attitude.

On the other hand, the respondents agreed that in the end, automated processes are an advantage. This since it results in several positive changes in their work, e.g. simplifying the accounting process. Therefore, it was highlighted by the respondents that they were not worried since some tasks made by an accountant could never be replaced, such as human contact with the customers. This statement is in line with the statement made by Kokina and Blanchette (2019), where it was expressed that tasks that require human judgement and human interaction to make decisions are not that likely to be replaced by automation as other tasks are (Kokina & Blanchette, 2019).

Another factor that might explain the attitude towards automated processes is the development of automated processes within the specific firm. Most of the respondents emphasised in general a positive attitude towards automation. Further, it was mentioned a noticeable difference among firms when it comes to which degree of automation that is used. Most of the respondents highlighted that they only use several automated processes in their firm. Since it is experienced that those processes make the work more effective and creates time to focus on more value-creating working tasks, it was seen as positive. However, some automated systems have to be controlled in order to check that transactions are being made correctly. Therefore, it was proposed that the degree of automated processes in their work matter. The fact that they have to control for errors in systems was not seen as an enhancing and value-creating task, which might create a negative attitude towards automated processes. However, simpler tasks in the accounting profession that have been automated were seen as positive among the respondents.

These factors have been found in the empirical findings and can not be explained by the existing TAM model. Hence, these factors might have an impact on the attitude towards automated processes among the accountants and are therefore a contribution to the TAM model.

6 Discussion

The following section includes a further discussion about the empirical findings in this study in order to find relationships between the two dependent variables (impacts, attitude).

Additionally, the section includes a discussion about the dependent variables in relation to both the previous literature and theories. Lastly, the section provides a substantiated revised model with additional factors that can explain the variation of attitudes.

6.1 Impacts of automated accounting

During the empirical findings it was identified that the respondents' practice and professional role has changed in several ways. It was emphasised that some working tasks previously made by human accountants have been replaced by automated processes. In addition, while some tasks have been replaced, others have been more efficient due to automated processes. This result can be confirmed by previous literature, where Greenman (2017) stated that automation provides the accounting profession with demanded tools for higher efficiency and effectiveness in the working processes. However, the respondents mentioned that only a few of their working tasks have been automated up until today. Therefore, several accountants asserted a belief for more automated processes in the future, since it includes extensive benefits according to the accountants. Overall, the empirical findings shows that the implementation of automated processes has been experienced as beneficial for the accountants practice. Furthermore, the professional role as an accountant has shifted to a more consulting and controlling role compared to earlier, which were also confirmed by Fernandez and Aman (2018). Most of the accountants prescribed this change as positive, since less value-creating and boring tasks have been replaced by automated processes.

As mentioned earlier, Brante (2009) in the theory of professions, emphasised several factors (e.g. higher education, autonomy, knowledge conveyance) that have to be included in order to be a profession. In section 5.3.2.2, one accountant asserted that higher education is not demanded to the same extent anymore, while Brante (2009) proposes that higher education is needed to be characterised as a profession. However, when the easiest tasks become automated, one could question if the need for higher education increases rather than decreases

since more assessment- and analytical oriented tasks remain instead. Further, due to automated processes it might be the case that humans lose their independence to make their own decisions, which decreases the accountants' control over the practice. The implementation of automation has shifted the role of an accountant to a demand for more consulting and controlling roles. Therefore, if higher education is not needed anymore, if the autonomy in the accounting profession has been affected and if the accounting profession does not meet the demand for the society, the accounting profession may lose its status as a profession (Brante, 2009). Hence, due to these factors, the implementation of automation could lead to a deprofessionalization of the accounting profession since the accounting profession might lose its status. This could in the future lead to a decrease of educated accounting students since there is an uncertainty about what the profession will develop into and an uncertainty about the competence demanded in the future. Additionally, if the accounting profession develops into more automated processes, it might result in a decrease of belief in the profession. Since human employees might not be needed to the same extent due to automation, one questions the need of accountants if the processes are automatic. Previous literature (McAfee & Brynjolfsson, 2016) believe that the rapid growth of automation in accounting would imply a threat as the development of automation replaces the human competence. However, this statement was not found in the empirical findings of this study. The respondents asserted that a robot can never replace human intervention and understanding (e.g. the relationship with the client). This finding was affirmed with what Sun and Lu (2017) stated, that computers can never replace a human since computers are not fully developed to do processes like analyses.

In summary, the empirical findings about impacts in this thesis can be related to the findings by previous literature. However, as mentioned above, small differences can be identified. Although, the findings could still be linked to some part of the literature, as with Sun and Lu (2017) above. Regarding the discussion of deprofessionalization and if higher education is demanded in the future or not, one can conclude that respondents and researchers' opinions go in different directions. This when it comes to how the competence of accountants will change and hence affect if the accounting profession will lose its status as a profession or not.

6.2 Attitude towards automated accounting

On the other hand, the empirical findings confirm that accountants in general have a positive attitude towards automated processes. The positive attitudes were mostly based on the factors perceived usefulness and perceived ease of use in the TAM model (Davis, 1989). This since it might be easier to accept changes if one can see the benefits of the change. The empirical findings further showed that the respondents believed that automated processes made their work more effective and efficient. The path dependency theory (MaHoney, 2000) also generated positive and negative attitudes, e.g. fun with changes, openness to changes, skepticism. Hence, all of the factors in TAM and PDT generated both a positive and a negative attitude. However, even though the respondents expressed a negative attitude towards automated processes, it does not exceed the positive attitude towards it. This indicates that the factors from these theories (TAM and PDT) have a higher degree of explanation in this thesis for the positive attitudes towards automated accounting. The results of this study show a surprisingly positive attitude rather than a variation of attitudes that were expected beforehand. A reason for this positive attitude could be since the respondents are in a generation that have experienced constant changes while being in the accounting profession. Whereas the respondents asserted that their senior colleagues had difficulties with new technological systems and believed that it was complex. Hence, one can argue that the respondents are used to changes and might therefore have easier to adapt to changes compared to their senior colleagues. Furthermore, a reason for this positive attitude among the respondents could also be that they have been in touch with this kind of technology in other contexts before and therefore have easier to implement it in their practice as well. Hence, it can be argued according to PDT that they may have “paths” that are not only connected to their work experiences, but also life experiences. Another assumption with PDT is that technology can be more or less path dependent, in the sense that it is based more or less on what was done manually. That one is positive may be because the way it looked manually reflects how it looks today in their accounting program on the computer (e.g. journal entries of debit and credit). This might imply that the accountants’ experience the adoption from manual to automated processes as not that extensive. Lastly regarding the sample, one can assume that the respondents who wanted to participate in the study were positive, otherwise they would not have wanted to participate. However, it is difficult beforehand to choose respondents that have a particular attitude. This would result in a non-representative sample since it requires asking questions before choosing a respondent.

The empirical findings showed a small variation regarding the impacts of automation in their practice and professional role. The respondents' working places had implemented automation almost to the same extent and therefore, the findings did not result in any remarkable differences between the firms. The impacts were rather similar in all of the firms where the respondents work. An explanation of this similar result could be that automation is under an ongoing development in all of the firms and might not have been fully established in Swedish firms yet. Due to that the implementation of automation is basically at the same level in the firms could reflect that there is no variation in the attitude towards it among the accountants.

The new institutional theory in this thesis was used to explain if behaviours and actions by organisations are affected by social structures, norms and routines. Hence, this theory could not be used to explain the accountants' attitude towards automated processes. Therefore, the new institutional theory did not generate an explanation for either a positive or negative attitude among the accountants. The reason for that was because the theory focuses on organisations' behaviour and actions rather than individuals. The authors believed that the organisations' behaviours and actions might reflect the accountants' behaviour and actions. However, the empirical findings did not show that organisations' behaviour and actions could explain the accountants' attitudes. Hence, the model in this thesis showed to be more valuable for understanding why automation is implemented in accountants' practice. One reason for that automation is implemented in the accountants' firm is mainly to follow what other firms do which is in line with what the institutional theory states.

However, due to more efficient and effective working processes, the respondents developed a fear against the future of the profession. This was based on the uncertainty about what the profession will change into and if the profession will still exist in the future, which also could be linked to the risk of deprofessionalization. Deprofessionalization refers to the fact that the accounting profession will no longer be defined as a profession according to Brante (2009). Therefore, the fear of losing their jobs created a negative attitude towards automated processes. This could further develop a resistance to change the way of working because one has a fear of being rationalised. These factors resulted in the greatest negative attitude among the accountants in this study. However, these factors are perhaps not adequately stressed in previous theories and were therefore developed in this thesis under a new category (other factors) of what explain the attitude. As a result of that, these factors are not covered in the

prior model (figure 2) but are included in the revised theoretical model of this thesis (figure 3).

6.3 Practice and professional role in relation to attitude

The reason for studying both the impacts of automation on the practice and the professional role as well as the attitude towards automated processes is because individuals adapt differently to changes (Hunton, 2002). Furthermore, the attitude in relation to practice is of importance to study in order for the automated processes to fulfill its capacity (Murtagh et al., 2015). Along with this, the degree of how much automation that has been implemented in the firm determines the attitude towards it. The respondents asserted that they only use several automated processes in their work today. Those processes have made their work more efficient and have created time to focus on more value-creating tasks. However, the respondents propose that some automated systems have to be controlled in order to identify errors. Therefore, several respondents mentioned that the degree of automated processes matter, where simpler processes make the work more beneficial while others harm the work. This created a negative attitude towards a high degree of automated processes. This implies that the reason for expressing a positive attitude could be because automated accounting processes have not been fully implemented within the firms yet.

Through this, it has been shown that the impacts and changes in the practice and professional role drive the attitude towards automated accounting. This is in line with TAM which states that the factors perceived usefulness and perceived ease of use drives the attitude towards new technology (Davis, 1989; Davis et al., 1989). However, it can be argued that the attitude among the accountants towards automated accounting drives the impacts and changes in the practice and professional role. Depending on if one accepts or resists new technology, the firm might implement automation to a different degree. Hence, the impacts and changes due to the implementation of automation might differ. If accountants resist new technology, it might be difficult to implement automated processes since the acceptance towards those processes is crucial in order to get its full capacity (Ulhelyi et al., 2015). Thereof, the acceptance towards automation might be crucial to implement automation in the firm. Regarding the empirical findings in this thesis, most of the respondents expressed a positive attitude and acceptance towards the implementation of automated processes. Hence, due to the positive attitude, several automated systems had been integrated in their system today.

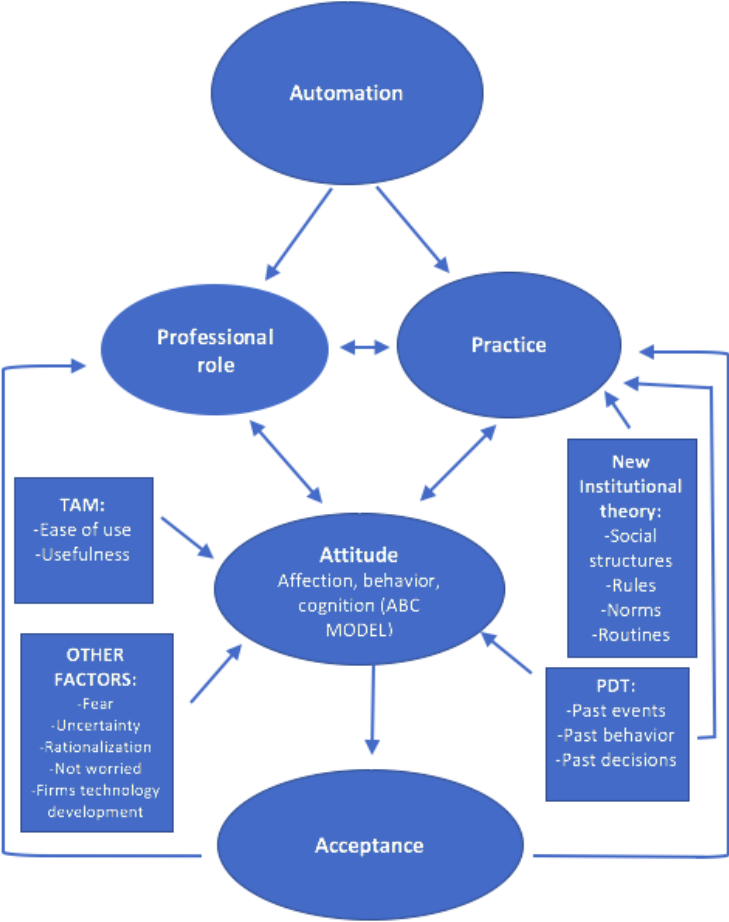
Therefore, it could be the case that the positive attitude among the accountants drives the integration of new automated processes in the firm. However, as mentioned earlier, the findings in this thesis showed that the degree of automated processes matters. This since several systems require a control for errors and therefore, those processes were not seen as enhancing which in turn resulted in a negative attitude. This might show that if the respondents' firms had implemented more automated processes than it has today, the attitude might have been different among the accountants. It might be the case that the accountants had expressed a more negative attitude and resistance towards automated processes if the implementation had been more extensive than it has been today. Therefore, one can argue that the impacts and changes in the accountants' practice drives the attitude towards automation. As mentioned, it could also be the other way around as well, where the attitude drives to what degree automation is implemented in the firm. One can argue that these findings may have emerged due to the sample in this study. This since the respondents expressed a surprisingly positive attitude and several of the respondents asserted that they were dedicated in implementing automated accounting processes in their firm. One can conclude that their positive attitude towards those processes drives the integration of automation in their practice and professional role. The findings about that attitude drives how integrated automation becomes in accountants' practice and professional role are not emphasised in previous theories or literature. Therefore, these findings are new and a contribution to this research field.

6.4 Summary of theoretical model

Since additional factors have been found in the study (fear, uncertainty, rationalisation, not worried, firms technology development), a substantiated revised model has been developed. Hence, these other factors could be included in the existing TAM model in order to develop the theoretical picture of the model of what explains the acceptance towards new technology. In addition, compared to the prior model (figure 2), it was shown that the new institutional theory had no explanation for that an organisation's behaviour and actions reflect the attitudes among the accountants. This theory could only be used to explain why organisations implement and strive for automated processes. Therefore, the arrow from new institutional theory to attitude is removed in the revised model. Furthermore, the theories (ABC, TAM, PDT) and dependent variables (impacts e.g. practice and professional role, attitude) have

shown to be consistent with the prior theoretical model (figure 2).

Figure 3: Revised theoretical model



7 Conclusion

This chapter presents the overall conclusion of the study. The section further includes the practical and theoretical implications as well as the limitations of the study. Lastly, suggestions for future research are presented.

Considering the ongoing development that automation is taking within the accounting industry, there is nascent research of what effects automation has had on accountants' practice and professional role. In addition, how automation has affected the attitude and the explanation behind the variation of possible attitudes. The purpose of this study was therefore to investigate how automation has been integrated in the accountants' practices and in their professional role. Further, to examine the accountant's attitude towards automation and the explanation behind the attitude. The research question that first was investigated to fulfill the purpose of the study was:

- What are the effects of automated accounting in accountants' practice and in the professional role?

The research question generated answers that the accountants' professional role and practice will change in the future due to automation. The significant impacts that were found on accountants' profession and in their practice was divided into seven categories; change in tasks, increased efficiency, IT problems, change in role, competence and education, client relations and job opportunities. The most highlighted impacts by the accountants from the categories were that the tasks developed into more analytical tasks, which also has shifted to a demand for more consulting and controlling roles. Furthermore, the accounting process has been more efficient and beneficial in terms of time and availability due to automated processes. However, the automated processes could lead to increased risks of faults and loss of control. Automation has created an increased demand for IT knowledge and higher qualifications compared to earlier. In addition, the accountants experienced an increased relationship with the clients and the capacity to serve more clients due to time-saving automated processes. Moreover, regarding the job opportunities, the accountants on one hand believe that they will disappear if human employees are not needed to the same extent

anymore. On the other hand, the accountants also believe that there will be a higher demand for consulting services since human interaction can never be replaced by a computer.

The second research question is connected to the accountants' attitude towards automated accounting processes, and was constructed as follows:

- What are the attitudes of the accountants towards automated accounting? What explains the variation of the attitudes?

All of the respondents expressed both a positive and a negative attitude towards automated accounting in the findings. However, the accountants asserted that the advantages with automation outweigh the disadvantages, which may be a reason for the positive attitude in general. The most positive attitudes among the accountants were based on its perceived usefulness, perceived ease of use and understanding. Further, the positive attitude was generated from the impacts such as increased efficiency, the shift from monotonous tasks to more value-creating work and the increased relationship with their clients. Although the accountants expressed a positive attitude towards automated accounting, some concerns were found. The negative attitude derived from the additional factors found in this thesis where that some conveyed a fear of losing one's job due to rationalisation of the profession. This fear could be connected to their uncertainty about the future that were expressed by several accountants. Some respondents also mentioned that their attitude was dependent on the degree of automated processes that have been implemented within the firm. Where the negative attitude was due to that a high degree of automation leads to a loss of control. Further, a negative attitude could not be found in accordance with previous theories. Therefore, the additional factors found in this thesis in relation to the negative attitudes is a contribution to the development of TAM.

In conclusion, despite some negative attitudes, most of the accountants have a positive attitude towards automated accounting. This since the accountants believe that the extensive benefits with automated accounting processes exceeds the disadvantages with it.

7.1 Implications

This study has resulted in both practical and theoretical implications which are presented below.

7.1.1 Practical Implications

From this thesis, there has emerged several practical implications since the objective of the study was to investigate the impacts of automation but also the attitudes among the accountants towards automation. The findings resulted in impacts that could be of interest for managers in accounting firms, universities and future accountants. This since the respondents experienced a shift in demand to a more consulting and controlling role than previously, but also that it is required more IT knowledge today. Hence, these findings might be of interest for managers to know when hiring new employees to be able to demand the right competence for the employment. Further, it might be of interest for universities that have an accounting programme. This since it could require a shift in the course syllabus to meet the demand for more consulting and controlling roles but also to meet the demand for IT knowledge. It might also be of interest for future accountants in order to know what is expected from them as an accountant in order to perform their tasks correctly. Additionally, the study has highlighted the accountants' thoughts about possible future impacts in the profession. These possible impacts could be of interest for many parties in the accounting process (e.g. managers, accountants themselves, accounting students, society).

Moreover, the findings have further highlighted the attitudes among the accountants towards automated accounting. Where it is shown a surprisingly positive attitude among the respondents when it comes to automated processes. However, some negative aspects were found as well. These findings could be of interest for several parties (e.g. firms, society, clients). It might be of interest for the firms since it was stated in chapter two that if the user resists new technology, the firm might not be able to develop full capacity of the process (Ulhelyi et al., 2015). The society, in a sense that a variation of attitudes towards automated accounting could create a debate about the implications automation might have for both students, accountants and clients in the future. In addition, lessons can be drawn from this study on how to implement new technology in the accounting industry as well.

Societal implications have also been pointed out in the findings of this thesis that have to be considered in the society. Previous literature shows that the automation in the future could

lead to a decrease of accounting jobs due to automated processes, which also are in line with what several accountants indicated. This implication has to be examined by the society, where one has to take into consideration that the implementation of automated processes could lead to unemployment in the society. Lastly, automation could lead to a change in the structure of the labor market, which might result in a requirement of other types of educational systems (e.g. courses in IT knowledge, more practical knowledge due to more consulting towards customers).

7.1.2 Theoretical Implications

This thesis has brought several theoretical contributions regarding the impacts of automation in the accounting industry. Impacts of automation have previously been studied within the auditing field. This study has therefore been carried out in a new field, the accounting industry, where there is a lack of previous research. Along with this, new effects have been discovered, such as accountants' need for higher education than before, which have not been found in the literature review.

In this study, the focus has further been on investigating what explains and shapes the variation of attitude against new technology. With the support of existing theories, Technology Acceptance Model (TAM), ABC Model, Path Dependency Theory (PDT) and New institutional theory, it has to a large extent been possible to corroborate the findings to the theoretical framework. However, the findings of the thesis also contribute to new insights into the existing theory Technology Acceptance Model. As discussed in the problematization, the model has been questioned for being too narrowed as other underlying factors that could influence the user's acceptance are not included in the model (Legris, Ingham & Colette, 2003). It was argued that the two factors: *perceived usefulness* and *perceived ease of use* were not enough explanations for what creates an attitude towards an object. The interpretation of the findings implied that there are additional factors that could affect an individuals' attitude towards implementation of new technology (e.g. fear of losing one's job, uncertainty about the future, technology development in the firm). The findings thereby show that TAM cannot be used in all fields and that further research is needed to provide a detailed set of factors that explains attitudes. However, the findings within the accounting industry contribute to research of the TAM as additional factors identified are not covered in previous research, which fills the research gap in the literature. These are the development areas of TAM that have been identified in this study.

Previous research (Kairos Future, 2016; Swedish Foundation for Strategic Research, 2014, p.7; SCB, 2020) asserts that the development of automated processes will result in a disappearance of human accountants. However, this thesis shows that the accountants believe that the work will still exist in the future, but will develop into a more consulting role. Therefore, this study has developed an additional insight into the effects of automated processes that has not been found previously.

7.2 Limitations

There are several limitations that need to be considered in this thesis. Firstly, there is a possibility that the concept of automation could have been misunderstood by the interviewees. This since the authors noticed that the interviewees were not familiar with the concept automation. The authors described the concept for the participants before the interview. However, the authors still noticed that the respondents confused the concept of automation with the concept of digitalisation. A consequence of this could be that the information and knowledge that was given by the interviewees were limited. Therefore, the definition of automation could have been presented even more in detailed beforehand. Further, it could be a risk when translating and interpreting the empirical data from the interviews from Swedish to English. This is because a different word in Swedish was used that corresponds to bookkeeping (e.g. löpande redovisning) since these concepts are very similar. However, this could affect the findings and analysis of the findings.

The area of the conducted research has been limited to accountants that are working in the Jönköping region. Therefore, the findings of impacts and attitudes among accountants may be limited to this particular region. Due to this, the findings might not be applicable for the whole accounting industry in Sweden. On the other hand, since some of the accountants work at a firm that is established in several cities in Sweden, the impacts of automation on accountants' practice and professional role may be similar in Sweden. Furthermore, the authors did not manage to get a wide spread between ages among the accountants which could limit the perception of impacts and could also limit the different attitudes towards automation. Additionally, younger individuals tend to have another view of technology than older individuals. Younger individuals may express positive attitudes towards automation since they are used to and more familiar with technology. On the other hand, older individuals may express a negative attitude toward automation since they tend to be locked into older techniques and not open to new solutions because of their difficulty to understand new

techniques. However, such conclusions could not be drawn since the ages were not sufficiently widespread.

Lastly, the developing stage of automated accounting could be a limitation. The interviewees expressed a limited degree of automated processes in their work and the answers thereby mostly covered their thoughts of possible effects in the future and their attitude against it.

7.3 Future research

The study has created an understanding of what effects automation has on accountants' practice and how the professional role as an accountant has changed. Automation has been shown to have an exponential development curve, which is an argument for why a study in the subject has been considered significant. The study is also a contribution to the TAM model where additional factors have been recognised which could explain the attitude and acceptance towards new technology. The accountants' attitude towards new technology are of interest to understand their stance to these changes.

Due to the limited sample size in this thesis, future research should therefore include a sample of more accountants with different ages. Additionally, during the thesis, the authors have noticed a difference between different types and sizes of companies when it comes to automated processes. Future studies could therefore focus on a variety of firms to be able to highlight any differences in impacts and attitudes. This could be done by using a quantitative study to be able to capture a larger sample, with a variety of ages among the accountants and also different types of accounting firms.

The accountants expressed in the study that higher competence and IT knowledge is needed as the demand of accountants who only work with manual accounting is believed to decrease. Therefore, a study may be needed that sheds light on the type of competence that will be demanded in the accounting industry. In addition, to study what will happen to the competence gap is considered to be an interesting subject for future research.

This thesis was carried out when automation was not fully implemented in the accounting firms, where the accountants' tasks are only automated to a certain extent. Since full automation is not implemented yet, the effects found in this thesis only represent the effects at

the respondents' workplace and their thoughts and assumptions about what effects automation will have in the future. Therefore, there is an opportunity for future studies to be conducted when more processes have become automated and more visible effects could be discovered. Further, it might be possible that attitudes change over time due to that more automation being implemented. Thereby, future research can confirm our results or provide new insights that have not been discovered yet.

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Appendices

Appendix 1: Interview guide

Background questions

1. What is your role in the company (title) and what types of tasks do you have?
2. How long have you worked as an accounting consultant? How long have you worked at this company? Have you worked with something else than accounting before?
3. Would you like to describe the company?
 - Which services do the company offer?
 - How many employees (totally and that work with accounting)?
 - Which type of customers do you have? (large/small, company form etc.)
 - What computer systems do you work with today and how do they work?

Automated accounting

4. Do you have experience of working with automation in accounting?
Examples:
 - Input data (e.g. reading of data, e-invoices, etc.)
 - Bookkeeping (e.g. automated account distribution, reconciliations, etc.)
 - Final accounting (e.g. assessments, accruals, controls, etc.)
 - Reporting (e.g. income-tax return and other reports, consignments to authorities, etc.)
5. *If you have experience working with automatic processes:* how long have you worked with it?
If you are not experienced working with automatic processes: do you recognize the availability of working with it?

6. Tell us about an ordinary/normal working day in your life? Describe in what way the automation was involved in it.
7. Tell us about the changes in the accounting process/work that you have experienced during the time you have been working as an accountant. How do you experience changes in the way you work, as positive or negative?
8. Do you recognize **or** use any of the concepts (or their function) cloud accounting, AI, big data or blockchain?
If yes: From what do you recognize it? How/For what do you use it in your work? Pros and cons with using it?
If no: What is your opinion of these concepts?
9. Tell us about your knowledge when it comes to the automation process and how you have gathered this knowledge.
10. What is still done manually in your work? (What do you think about it?)
11. What parts of your work have partly or fully been automated?
 - What are the greatest changes at your company?
 - What impacts has it had for your company?
 - What is your opinion about this? Positive/negative?

Impacts & the attitudes towards it

12. Tell us about your opinion when it comes to the implementation of automation in your profession?
 - What do you think are the pros/cons and possibilities/risks with it?
 - Are you positive, neutral or negative to this? Why?
13. Has automation impacted your work?
If yes: How? Have any tasks been added, replaced or diminished? Or, in what way have the tasks changed? What do you think about this? Are you positive, neutral or negative to this? Why?

If not: Why has no change taken place in your company? Are you worried about such impacts? In what way?

14. Has the accuracy and quality of your accounting work been affected due to more automated accounting processes? In what way?

If not: Do you think the accuracy and quality of your accounting work will be affected in the future due to more automated accounting processes?

15. What do you think are the greatest challenges or threats with more automated accounting?

16. Do you think that the use of new technological systems are easy or hard to use and understand?

17. Have you experienced any shift in demand to new, other, or more specific qualities or qualifications by the accounting consultant today compared to when you started to work as an accounting consultant? Is it required more or less of you? (For example, new skill requirement, level of education, IT-knowledge).

If yes: Why do you think that is the case?

If no: Do you think it will be a shift in the future? In what way?

If any of the above: What do you think about this? Are you positive, neutral or negative? Why?

18. Have you experienced any changes in demand of services in the accounting profession during the later years? (For example, has automation led to more consulting or advisory services?).

If yes: What do you think is the reason for this change?

If no: Do you think it will change in the future? In what way?

If any of the above: What do you think about this? Are you positive, neutral or negative? Why?

19. What do you think is the reason for striving for a more automated accounting in your company? (Is it for example, a requirement from the management team, pressure from your clients or to follow society's digital development?).

20. What do you know about automation in other accounting companies or in the accounting industry? (If they use the same or other processes as well).

- Is there any accounting firm that is on the leading edge when it comes to automated accounting?

If yes: Do you think this company / these companies have inspired your company?
In what way?

If not: Do you think that companies in the accounting industry inspire each other to strive for more automated processes? In what way?

Future

21. What do you think the future tasks at accounting firms will look like compared to today?

22. Which accounting processes/tasks do you think have the possibilities to be automated in the future? Why is that?

- Which accounting processes cannot and why is that?
- What do you think about this? Are you positive, neutral or negative? Why?

23. In the future (in 20 years or so), do you think that the accounting profession will disappear or will be replaced? In what way do you think the role as accountant will change?

If yes: How?

If no: Why not?

Are you positive or negative towards this? Why?

24. Do you want to add something? Is there anything about the automated accounting that we have not brought up?

Appendix 2: Interview guide in Swedish

Bakgrundsfrågor

1. Vad är din roll på företaget (titel) och vilken typ av arbetsuppgifter har du?
2. Hur länge har du arbetat som redovisningskonsult/ekonom? Hur länge har du arbetat på just detta företaget? Har du tidigare arbetat med någonting annat än redovisning?
3. Skulle du kunna beskriva företaget:
 - Vilka tjänster erbjuder företaget?
 - Hur många anställda är ni på företaget? (totalt och/eller antalet som arbetar med redovisning)
 - Vilken typ av kunder tar ni emot? (stora/små, företagsform, osv)
 - Vilka datasystem arbetar ni med idag och hur fungerar dem?

Automatiserad redovisning

4. Har du erfarenhet från att arbeta med automatisering i redovisning?
Exempel inom:
 1. Ingångsdata (T.ex. läsning av data, e-fakturor)
 2. Bokföring (T.ex. automatisk distribution av konton, avstämningar)
 3. Slutlig redovisning (T.ex. bedömningar av periodiseringar, kontroller)
 4. Rapportering (T.ex. inkomstdeklaration och andra rapporter, sändningar till myndigheter)
5. *Om du har erfarenhet av att arbeta med automatiserade processer: hur länge har du arbetat med det? Är dina erfarenheter positiva eller negativa av detta? På vilket sätt?*

Om du inte har erfarenhet att arbeta med automatiserade processer: känner du igen tillgängligheten att arbeta med det?
6. Berätta om hur en vanlig arbetsdag ser ut för dig? Beskriv på vilket sätt automatisering är involverad i den.

7. Berätta om förändringarna inom redovisningsarbetet som du har upplevt under tiden du varit verksam som redovisningskonsult/ekonom. Hur ser du på förändringar i arbetssättet, som positiva eller negativa?
8. Känner du igen eller använder några av koncepten/funktionerna molnbaserad redovisning, AI, big data eller blockchain?
Om ja: Från vad känner du igen det? Hur/för vad använder du det i ditt arbete?
Fördelar och nackdelar med att använda det?
Om nej: Vad är din åsikt om dessa koncept/funktioner?
9. Berätta om din kunskap när det kommer till automatiserade processer och hur du har skaffat dig denna kunskap.
10. Vad görs fortfarande manuellt i ditt arbete? Vad tycker du om detta?
11. Vilka delar av ditt arbete har delvis eller fullt blivit automatiserade?
 - Vad är de största förändringarna på detta företag?
 - Vilka effekter har det fått för ert företag?
 - Vad är din åsikt om detta? Positivt/negativt?

Påverkan av automatisering och attityden till det

12. Berätta om din åsikt när det kommer till implementerandet av automatisering i ditt yrke?
 - Vad tycker du är fördelar/nackdelar och möjligheter/risker med detta?
 - Är du positiv, negativ eller neutral till detta? Varför?
13. Har automatiseringen påverkat ditt jobb/arbete?
Om ja: Hur? Har dina arbetsuppgifter blivit fler, blivit ersatta eller minskat? Eller, på vilket sätt har dina arbetsuppgifter förändrats? Vad tycker du om detta? Är du positiv, negativ eller neutral? Varför?
Om nej: Hur kommer det sig att inga förändringar har gjorts på ditt företag? Är du orolig för sådana förändringar? På vilket sätt?

14. Har noggrannheten och kvaliteten av ditt redovisningsarbete påverkats i och med automatiserade redovisnings processer? På vilket sätt?
Om nej: Tror du att noggrannheten och kvaliteten av redovisningsarbetet kommer påverkas i framtiden i och med mer automatiserade redovisnings processer?
15. Vilka tror du är de största utmaningarna och hoten med en mer automatiserad redovisning?
16. Tycker du att det är lätt eller svårt att förstå och använda sig utav nya teknologiska system?
17. Har du upplevt några ändringar i efterfrågan till nya, andra eller mer specifika kvaliteter eller kvalifikationer av redovisningskonsulter/ekonomer idag jämfört med när du började arbeta som redovisningskonsult/ekonom? Krävs det mer eller mindre av dig idag? (Exempel: nya kompetenskrav, utbildningsnivå, IT-kunskap)
Om ja: Varför tror du så är fallet?
Om nej: Tror du att det kommer bli en förändring i framtiden? På vilket sätt?
Om inget av ovanstående: Vad tycker du om detta? Är du positiv, neutral eller negativ? Varför?
18. Har du upplevt några förändringar i efterfrågan på tjänster inom redovisningsyrket under de senare åren? (Har till exempel automatisering lett till mer konsult- eller rådgivningstjänster?)
Om ja: Vad tror du är orsaken till denna förändring?
Om nej: Tror du att det kommer att förändras i framtiden? På vilket sätt?
Om inget av ovanstående: Vad tycker du om detta? Är du positiv, neutral eller negativ? Varför?
19. Vilka tror du är de främsta anledningarna till att man går mot mer automatiserade processer i ditt företag? (Är det till exempel, krav från företagsledningen, press från kunder eller helt enkelt att man vill följa med i samhällets digitala utveckling?)
20. Vad vet du om automatiseringen i andra redovisningsföretag eller inom redovisnings yrket? (Om de använder samma processer eller andra processer också)

- Är det något redovisningsföretag som är i framkant jämfört med andra när det kommer till automatiserade redovisningssystem?

Om ja: Tror du att detta/dessa företag har inspirerat ditt företag? På vilket sätt?

Om nej: Tror du att företag inom redovisningsbranschen inspirerar varandra att sträva mot mer automatiserade processer? På vilket sätt?

Framtiden

21. Hur tror du att framtidens arbetsuppgifter kommer se ut för en redovisningskonsult/ekonom jämfört med idag?

22. Vilka redovisnings processer tror du har möjligheten att bli automatiserade i framtiden? Varför är det så?

- Vilka redovisnings processer kan inte bli automatiserade? Varför?
- Vad tycker du om detta? Är du positiv, negativ eller neutral? Varför?

23. I framtiden (om cirka 20 år), tror du att redovisningsyrket kommer försvinna, bli ersatt eller utvecklas till en mer avancerad yrkesroll? På vilket sätt tror du att rollen som redovisningsekonom/konsult kommer att förändras?

Om ja: Hur?

Om nej: Varför inte?

Är du positiv, negativ eller neutral till detta? Varför?

24. Vill du tillägga något? Är det något om automatiseringen inom redovisning som vi inte har nämnt?

Appendix 3 – Informed consent

GDPR CONSENT FORM FOR PARTICIPATION

Research:

Automation in accountants' practice

Researchers:

Julia Gustafsson & Paulina Jerkinger

Taking part in the study

I consent to JIBS processing my personal data in accordance with current data protection legislation and the data delivered.

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

I understand that any information recorded in the study will remain confidential and no information that identifies me will be made publicly available.

I consent to being audio/video/interviews being recorded as part of the study.

I consent that sound recording and transcripts of the interview are kept locked to ensure that no one except the researchers in the project has access to the material.

I confirm that I have the opportunity to ask questions and the researchers will answer any questions about the study to my satisfaction.

As a participant in the study, you will receive information on where the completed reporting can be found and downloaded.

My signature below indicates that I choose to take part in the thesis study and consent to JIBS treating my personal data in accordance with current data protection legislation and the data delivered.

Name of Participant

Signature

Date

Please retain one copy of the GDPR-Consent for the Participant and one for the Researchers:

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