



Changes in the Adoption of AI Technologies into Accounting

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Bachelor of Business Administration

Thesis

2023

Abstract

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Degree Bachelor of Business Administration
Report/Thesis Title Changes in the Adoption of AI Technologies into Accounting
Number of pages and appendix pages 40+1
<p>This research-based bachelor's thesis explored the automation of financial accounting processes through the application of artificial intelligence (AI). The primary objective was to investigate the impact of automation on accountants' work in the future. It won't discuss parts of AI that are not beneficial in accounting or any specific accounting software.</p> <p>The thesis comprised a theoretical segment and an empirical segment. The theoretical part centered on financial accounting, artificial intelligence, the effects of artificial intelligence on accounting, and accountants' competencies. The empirical part focused on the research findings.</p> <p>For this thesis, the author opted for mixed and qualitative research methods. The mixed methods research involved the examination of online articles and books. Qualitative research took the form of semi-structured interviews with accounting professionals from the Helsinki area. The mixed methods findings underwent analysis through mixed analysis, while thematic analysis was applied to the qualitative methods findings.</p> <p>In conclusion, the author's exploration of AI in financial accounting unveils a transformative trend where businesses adopt AI for heightened efficiency and accuracy. Automation technologies such as machine learning and NLP significantly reduce human errors, enabling accountants to concentrate on strategic tasks. The findings portray AI not as a disruptor but as an enabler, fostering a symbiotic relationship between human expertise and technological prowess. The study underscores the importance of continuous education and collaboration between accounting professionals and AI specialists for harmonious integration.</p>
Keywords Accounting competencies, artificial intelligence, automation, financial accounting

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1 Introduction

This is a research type of a bachelor's thesis for the Degree Programme in International Business in the major specialization of Financial Management at the Haaga-Helia University of Applied Sciences. This chapter's purpose is to introduce the thesis. It will give clarity on the background, the objectives, how it's delimited, who it benefits, and key concepts of the thesis.

1.1 Background to the Topic

Automation and artificial intelligence (AI) are already a part of our daily lives. A lot of things we use daily utilize automation and AI without us even knowing. It has also been very relevant in accounting and is being used more and more in different accounting tasks. The internet is full of articles about AI in accounting and whether AI can fully replace accountants. But is that what will happen?

With this thesis, the author aims to explain the use of AI and automation in financial accounting and what an accountant will have to adapt to in the future. This will benefit all the current and future accountants who are interested in what AI will do to accounting, what the changes will look like, and how they can adapt to them. This might also give some clarity to the accountants who are concerned about their future in accounting and whether AI will be able to replace them.

According to a survey conducted by Deloitte from November 6th, 2019, to January 6th, 2020, 75.7% of accounting processes are still manual or considered manual effort in companies. Only 3.6% of companies had implemented robotic process automation and an even lower percentile of 1.8% had implemented AI into their accounting processes. However, a lot of the respondents are planning on implementing new automation and AI-based solutions in the future. This is shown when 51.4% of the respondents to the survey said that they think automation will influence their company in the next 5 years. The survey included almost 800 finance and accounting professionals from managers to CFOs. (Gibson, Kaplan & Cutbill 2020, 6-8.)

1.2 Research Question

This thesis aims to increase the level of knowledge of what ways AI has impacted accounting and what the future will look like for accountants. The outcomes of the thesis were to provide information about the future of AI in accounting and in what ways it will change the ways accountants work.

The international aspect required by degree programmes of all these is covered by the way that this thesis can provide information to anyone in accounting that is interested in the usage of AI and automation globally.

The research question (RQ) of this thesis was “What are the changes financial accounting professionals face in adopting to AI technologies? ”. The research question was divided into four investigative questions (IQ) as follows:

IQ 1. Why are businesses adopting AI into accounting?

IQ 2. What financial accounting tasks can be automated?

IQ 3. How does AI reduce human error in accounting?

IQ 4. What skills will accountants need to adapt to the changes?

From the overlay matrix presented below you can see all the Investigative Questions and their corresponding parts in the theoretical framework, research methods, and where you can find the results.

Table 1. Overlay matrix

Investigative Question	Theoretical Framework	Research methods	Results (chapter)
IQ 1. Why are businesses adopting AI to accounting?	Financial Accounting; AI in Accounting. Chapters 2.1 & 2.3	Qualitative interview; Desktop research	Chapter 4.1
IQ 2. What financial accounting tasks can be automated?	Financial Accounting; Artificial Intelligence; AI in Accounting. Chapters 2.1, 2.2 & 2.3	Qualitative interview; Desktop research	Chapter 4.2
IQ 3 How does AI reduce human error in accounting?	Artificial Intelligence; AI in Accounting. Chapters 2.2 & 2.3	Qualitative interview; Desktop research	Chapter 4.3
IQ 4. What skills will accountants need to adapt to the changes?	Accountants Changing Skillset Chapter 2.4	Qualitative interview; Desktop research	Chapter 4.4

1.3 Demarcation

This thesis covers changes in accounting regarding automation and artificial intelligence since 2020 and speculates some changes that are going to happen or might happen in the future. The

research does not cover managerial accounting but does focus on financial accounting processes. The research only focuses on parts of AI that are beneficial in accounting. Those parts include but are not limited to machine learning, natural language processing, and expert systems. The research does not focus on any specific accounting software. The population of the interviews are people who work or have worked at accounting firms and financial or accounting departments at firms in the Helsinki area.

1.4 Benefits

This thesis is advantageous for those intrigued by the impact of AI on accounting tasks and software. It proves particularly valuable for accountants contemplating the skills necessary for the future. The author gains insights into the realm of AI in accounting, enhancing their preparation for what lies ahead.

1.5 Key Concepts

Accounting can be defined as a data processing system that uses financial terms to record and report business transactions. It serves as a language of business that provides interested parties with valuable information for performance assessment, decision-making, and control purposes. In essence, accounting helps businesses keep track of their financial activities and provides a framework for evaluating their financial health. (Pru Marriott, Edwards & Mellett 2002, 15.)

Artificial Intelligence (AI) does not have a widely accepted definition yet, despite existing for a long time. This is not a problem necessarily, as many scientific concepts only get clear definitions after they mature. However, without a clear definition, it can be difficult for policymakers to assess what AI systems will be able to do in the future and determine which types of AI systems are desirable. (Collins, Dennehy, Conboy & Mikalef 2021, 2.)

Financial statements are the primary means of conveying a company's financial performance, position, and cash flow to external parties. They include the balance sheet, income statement, cash flow statement, and statement of changes in equity. (Griffin 2014.)

Professional competencies encompass a range of knowledge, skills, and abilities essential to achieving success in the professional sphere and effectively managing one's career over the long term. (Stanford University 2023.)

2 Artificial Intelligence Impact on Financial Accounting

This chapter of the thesis describes the theoretical framework of the thesis. The theoretical framework starts with describing financial accounting, artificial intelligence, and the subfields of artificial intelligence. It will then go more in-depth on how AI affects accounting and how all of these concepts are changing the skillset that an accountant requires.

The key concepts of the theoretical framework are presented below in Figure 1. It consists of financial accounting, artificial intelligence, AI in accounting, and accountants' changing skillset.

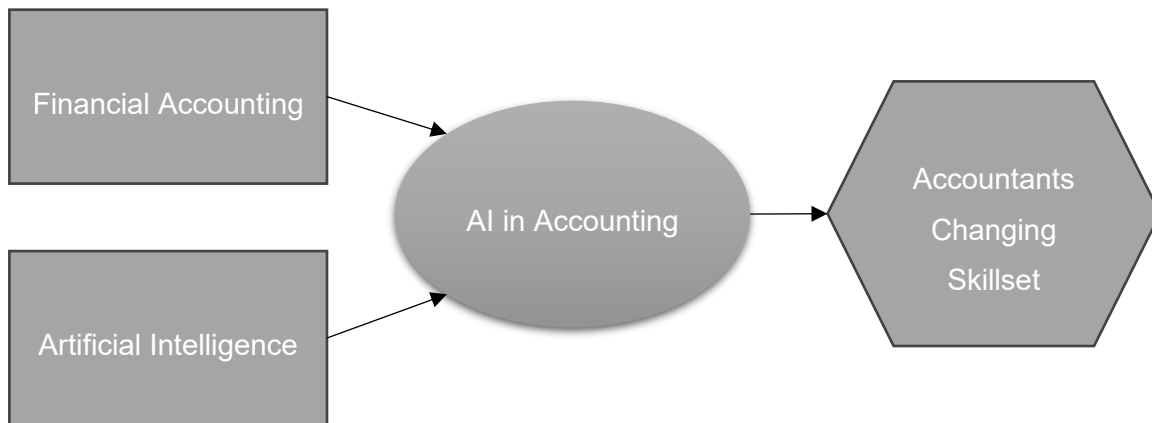


Figure 1. Key concepts for the theoretical framework

2.1 Financial Accounting

Financial accounting is one of the two main categories that accounting is usually divided into. Its main concern is to record, process, and present financial information to anyone outside the business. It also involves preparing business accounts and interpreting financial data in accordance with the regulatory framework and legal rules of accounting. Someone who works in financial accounting needs to understand financial statements and have the ability to understand the accounting adjustments that businesses will often need to apply to their financial information. Additionally, to that you will also have to understand the reason why financial statements are made, their objectives, and who is interested in them. (Skittle & Wearing 2008, 4-5.)

There are three main types of financial statements in financial accounting (Corporate Finance Institute 2023). Those statements are:

1. Balance sheet
2. Income statement
3. Cash flow statement

In the balance sheet, you can find the assets, equity, and liabilities of a company. The name of the balance sheet comes from the fact that the amount of assets must always equal the amount of equity and liabilities combined. On the equity and liability side, we can see the origins of financial funds and resources and on the asset side, we can see how those funds and resources were allocated. (Nothhelfer 2017, 10.)

In the income statement, we can see the income and expenses of a company in a line-by-line fashion from a certain period. In that way, we can see if a period was profitable or not. Depending on that the equity will change on the balance sheet. If the period was profitable, the equity would increase and if it wasn't it would decrease. These two financial statements are mandatory, but they are usually followed by the cash flow statement as well. (Nothhelfer 2017, 11.)

The cash flow statement shows how cash and cash equivalents change. It's based on the flow of cash as the name says. It allows for an analysis of where the cash is coming from or going by calculating cash flow from operations, investments, and financing. (Nothhelfer 2017, 12.)

The International Accounting Standards Committee (IASC) was established in 1973 to create a common set of accounting rules for global companies. Its main goal was to develop and publish accounting standards that could be used worldwide. In a document called the "Framework for the Preparation and Presentation of Financial Statements", the IASC outlined four key qualities for financial information: Understandability, Relevance, Reliability, and Comparability (Murthy 2009, 17).

1. **Understandability:** This means that financial information should be easy for users to understand. Legal disclosures are required and cannot be left out. Companies should aim to make these disclosures as straightforward as possible.
2. **Relevance:** Users should be able to identify the importance of the disclosed information. While the law sets a minimum requirement for disclosures, companies may need to go beyond that to make financial statements more relevant.
3. **Reliability:** Information presented should be accurate and the result of careful application of accounting principles. Reliability is compromised if there is a biased judgment or a departure from neutrality. Companies should faithfully present complete information in a neutral and unbiased manner, giving importance to substance over form.

4. **Comparability:** This refers to consistency in how accounting information is presented and how accounting principles are applied. It's important not only for comparing information over different periods within a company but also for comparing information between different companies. Achieving inter-firm comparability is particularly challenging.

In Figure 2. we can see the key qualities visualized.

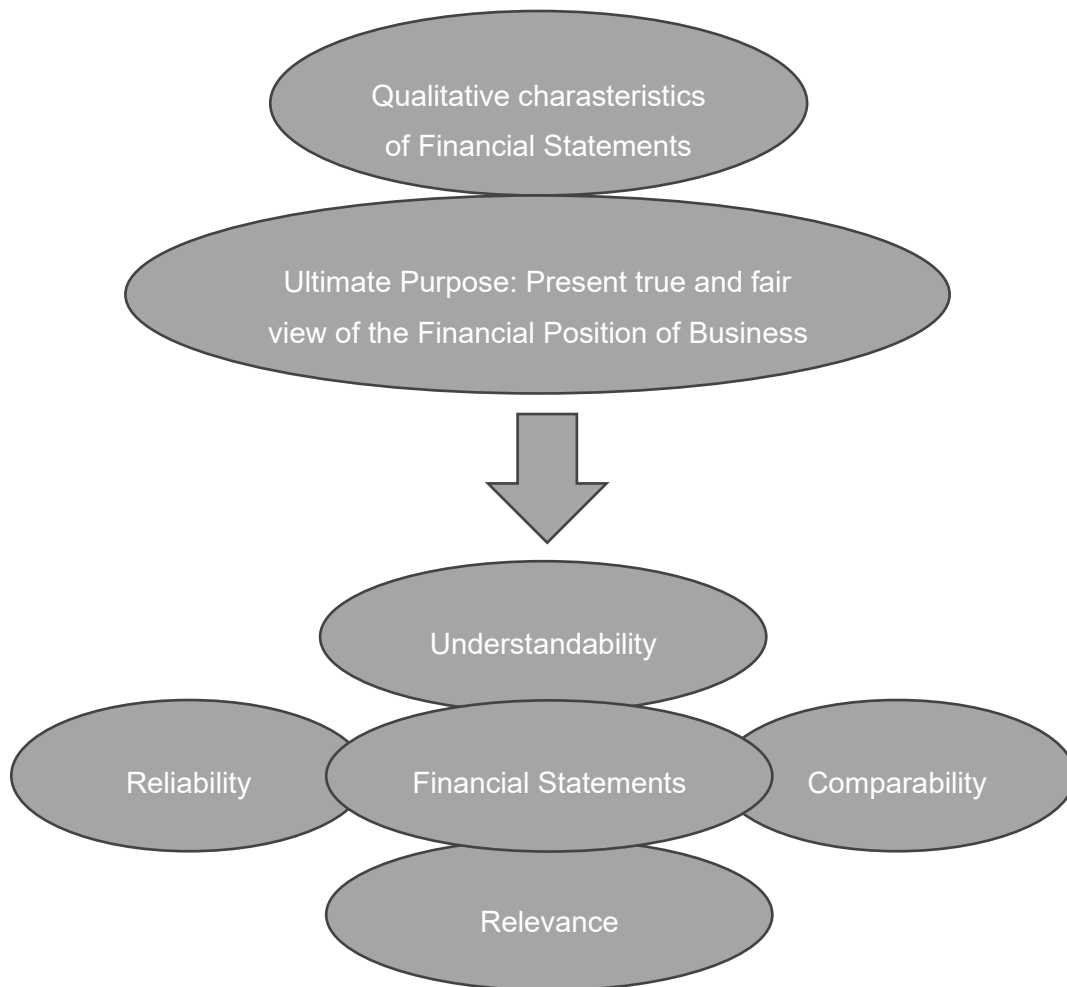


Figure 2. Key qualities of financial statements according to IASC (adapted from Murthy 2009, 16).

2.2 Artificial Intelligence (AI)

The origins of AI can be linked back to philosophy, fiction, and imagination. Early advancements in fields such as electronics, engineering, and various other disciplines have had a significant impact on the development of AI. (Buchanan 2005, 53.)

Alan Turing stands as a prominent figure in the realms of computer science and artificial intelligence, often revered as the “father of AI”. In 1936, he authored a seminal paper titled “On Computable Numbers,” introducing the foundational principles of a computing device that would later be recognized as the Turing machine. It’s worth noting that the practical realization of real computers would not materialize until over a decade later. Nevertheless, it was his subsequent work, the paper titled “Computing Machinery and Intelligence,” that would achieve historic significance within the field of AI. This work centered around a machine endowed with intelligence. (Taulli 2019, chapter 1.)

AI refers to the capability of machines to perform tasks that are both engaging and challenging for humans, while also proving useful. Contemporary AI predominantly relies on computer models to mimic intelligent behaviour and has, the potential to drive economic expansion through workforce automation, enhanced efficiency, and fostering innovation in products and services. AI possesses the capacity to elevate economic growth rates and enhance profitability on a global scale. While gaining access to AI technology is relatively accessible, the challenge lies in effectively implementing this technology within a specific business context. (Overton 2018, chapter 1.)

Taking a broader perspective on AI, Figure 3. illustrates the interconnection among the fundamental components of AI. Positioned at the pinnacle is AI, encompassing a broad spectrum of theories and technologies. It can then be further broken down into two primary categories: machine learning and deep learning. (Taulli 2019, chapter 1.)

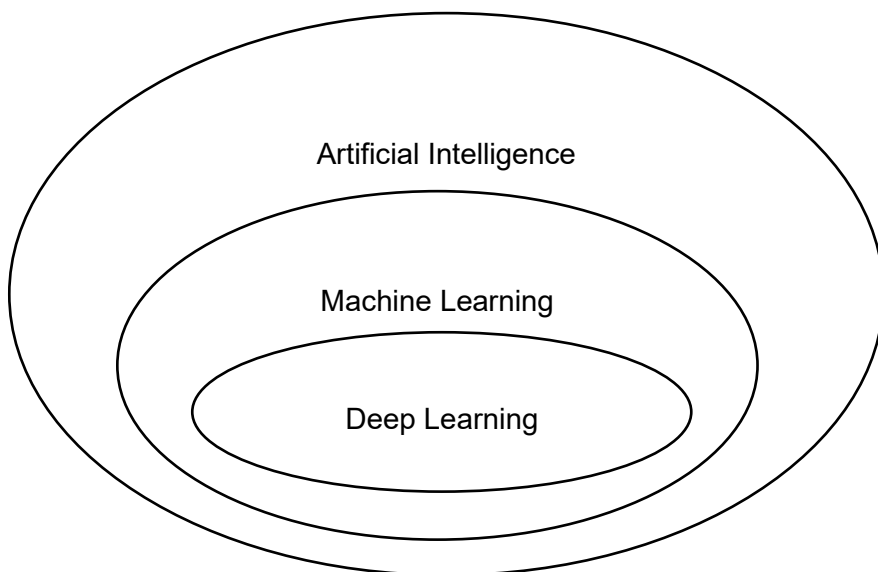


Figure 3. A broader perspective on the main components of AI (adapted from Taulli 2019, chapter 1).

Prominent technology companies like Apple, Amazon, and Google are incorporating AI into their product launches and acquiring startups that are rooted in AI. This surge of interest in AI has triggered a range of responses, from enthusiasm about how AI capabilities will enhance human work to concern about their potential to displace jobs. (Agrawal, Gans & Goldfarb 2017, 2.)

According to a survey conducted by the World Economic Forum in 2020, a considerable number of executives from 151 financial institutions in thirty-three countries foresee AI becoming a vital component of their business strategies within the next two years. While AI garners substantial attention in the corporate realm, there exists a notable disparity between business leaders who view AI as a potential source of competitive advantage and those who have already integrated it into their operations. (Ng & Alarcon 2021.)

2.2.1 Machine Learning and Deep Learning

Machine learning is a subset of AI. Tom M. Mitchell defines machine learning as

‘A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P , if its performance at tasks in T , as measured by P , improves with experience E .’

Essentially, when a machine can accumulate experience while performing a specific task and enhance its future performance in similar tasks, it is considered to be learning. Past experience in this context refers to historical task-related data provided as input to the machine from a particular source. (Chandramouli, Dutt & Das 2018, chapter 1.)

The fundamental machine-learning process can be segmented into three key phases. In the first phase, past data or information serves as the foundation for forthcoming decision-making. Next, through the application of underlying algorithms, the input data is transformed into a more comprehensive abstraction. Lastly, this abstract representation is then generalized to construct a robust framework for facilitating decision-making processes. In Figure 4. we can see a visualization of this process. (Chandramouli, Dutt & Das 2018, chapter 1.)

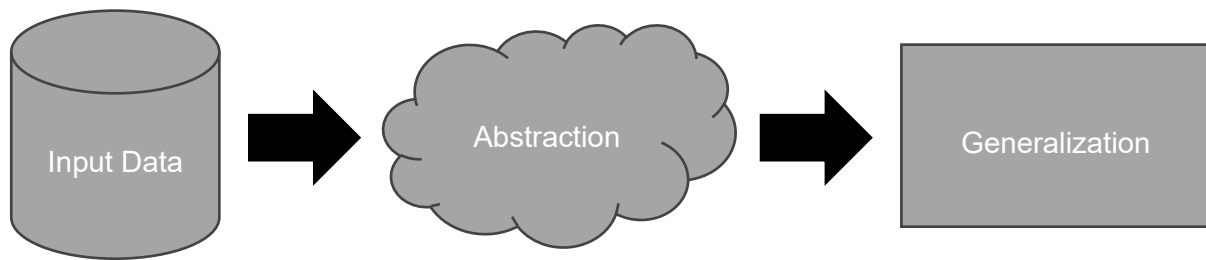


Figure 4. Machine learning process (adapted from Chandramouli, Dutt & Das 2018)

Machine learning can be divided into three main categories which are **supervised learning**, **unsupervised learning**, and **reinforcement learning**. The primary objective of **supervised learning** is to derive knowledge from historical data, specifically the information about the task that a machine needs to perform. In the context of the machine learning definition, this historical data represents the machine's prior experience. In **unsupervised learning**, there's no labelled training data to work with or predictions to make. Instead, the goal is to take an input dataset and identify natural groupings or patterns within the data elements or records. This process is often termed pattern discovery or knowledge discovery, and unsupervised learning is regarded as a descriptive model. (Chandramouli, Dutt & Das 2018, chapter 1.) **Reinforcement learning** stands apart as an online learning approach, distinguished from both supervised and unsupervised learning methods. In reinforcement learning, the learning process is dynamic, where the environment offers feedback in the form of a reinforcement signal. This signal serves as an evaluative measure of the quality of an intelligent agent's actions, rather than providing explicit guidance on generating the correct actions. As the external environment supplies limited information, intelligent agents rely on their accumulated experiences to acquire an understanding of the environment's state and adjust their action strategies accordingly. (Qiang & Zhongli 2011, 1143.)

Deep Learning, a subfield within the realm of machine learning, offers the capability to process vast volumes of data undercover correlations and patterns that are often beyond the detection abilities of humans. The term "deep" alludes to the presence of numerous concealed layers in the neural network, which significantly contribute to its learning potential. In the field of artificial intelligence, deep learning is at the forefront and garners substantial attention in the mainstream media. It is important to bear in mind, though, that deep learning is still in its early stages of advancement and commercialization. For instance, it wasn't until around 2015 that Google began incorporating this technology into its search engine. (Taulli 2019, chapter 4.)

2.2.2 Natural Language Processing

Natural Language Processing (NLP) can be defined as a collection of computationally inspired methods for scrutinizing and expressing texts that occur naturally at one or multiple linguistic analysis levels. The primary aim is to attain language processing that emulates human-like abilities, catering to various tasks and applications. (Liddy 2001, subchapter Introduction.)

According to Liddy (2001, subchapter Introduction), the aim of NLP is to achieve language processing that mimics human capabilities. The choice of the term “processing” is a deliberate one and should not be substituted with “understanding”. While, in the early stages of AI, NLP was initially referred to as Natural Language Understanding (NLU), it is now widely recognized that the ultimate objective of NLP is genuine NLU, which has yet to be fully realized. A comprehensive NLU system would possess the capacity to:

1. Rephrase an input text.
2. Translate text into another language.
3. Respond to questions about the text’s content.
4. Make inferences based on the text.

NLP constitutes a realm of both research and practical implementation, exploring the ways in which computers can comprehend and manipulate natural language in text or speech to perform valuable tasks. The foundation of NLP draws from diverse fields, including computer and information sciences, linguistics, mathematics, electrical and electronic engineering, artificial intelligence, robotics, psychology, and more. The practical application of NLP encompasses a range of domains such as machine translation, the processing and summarization of natural language text, user interfaces, multilingual and cross-language information retrieval, speech recognition, artificial intelligence, and various others. (Chowdhury 2005, 1.)

A lot of individuals first encounter NLP through virtual assistants, yet its influence extends significantly within the business sphere. In the foreseeable future, this technology will gain even greater prominence in e-commerce and customer service, delivering substantial cost reductions and allowing employees to dedicate their efforts to more value-generating tasks. (Taulli 2019, chapter 6.)

2.2.3 Expert System and Machine Reasoning

Expert systems represent an AI application that encapsulates human expertise. Over the recent years, they have gained prominence as a formidable tool within the realm of artificial intelligence. Expert systems are specifically engineered to tackle intricate decision-making challenges by mimicking the decision-making abilities of human experts. These systems can be aptly described as intelligent software programs that leverage domain-specific knowledge derived from human experts to offer solutions to problems. (Gupta & Nagpal 2020, 95.)

Within the realm of expert systems, the focus lies on resolving intricate issues. Over the past five decades, researchers in the field of artificial intelligence have made significant strides in advancing expert system technology, allowing for the resolution of complex, real-time challenges that pose difficulties when tackled through conventional means. (Gupta & Nagpal 2020, 71.)

Expert systems have emerged from a unique facet of AI technology known as the rule-based system. Crafting an expert system necessitates the expertise of a knowledge engineer, a professional who delves into the decision-making processes of a human expert and translates these principles into a format that a computer can comprehend. (Gupta & Nagpal 2020, 71.)

Machine reasoning refers to a computer's capacity to utilize automated inference methods for deriving conclusions from a knowledge base, mimicking human reasoning processes like deduction and induction. Expert systems served as an early iteration of machine reasoning. In contemporary machine reasoning systems, the capabilities have evolved beyond rules-based Expert Systems. Modern AI-driven machine reasoning systems can acquire knowledge through machine learning algorithms and artificial neural networks, allowing them to make inferences based on data analysis. (Ng & Alarcon 2021.)

2.3 AI in Financial Accounting

AI technology today offers a significant leap beyond the conventional technological tools accountants typically employ, such as electronic spreadsheets or general ledger software. This is particularly evident when AI is harnessed alongside advanced data analytics. AI boasts three primary applications within the realm of business: enhancing customer understanding and engagement, delivering smarter products and services, and streamlining and enhancing business operations. Given that accounting heavily relies on structured processes, many current applications focus on automating traditional accounting tasks. Accountants who familiarize themselves with the practical

applications of AI are well-equipped to propose innovative AI-driven solutions to address their specific business challenges. (Ng & Alarcon 2021.)

AI can prove beneficial in various financial accounting domains, including but not limited to cash and account reconciliations, receivables and sales, inventory, and accounts payable (Ng & Alarcon 2021).

2.3.1 Cash and Account Reconciliations

Accountants are aware of the significance of conducting bank reconciliations as a crucial measure for cash protection and the enhancement of accounting data precision. Nevertheless, the traditional approach to carrying out bank reconciliations can be notably time-consuming, particularly for medium to large-sized businesses managing multiple accounts across various financial institutions. Frequently encountered issues in the bank reconciliation process involve the occurrence of duplicate entries, discrepancies in data formats between systems, and data input errors arising from human factors, such as typographical errors and irregular character spacing. The implementation of artificial intelligence to automate the bank reconciliation process holds the promise of time-saving and heightened accuracy for accounting departments. (Ng & Alarcon 2021.)

Expert Systems is a well-suited solution for bank reconciliation due to the simplicity and stability of the rules governing this process. A global firm, Nolan Business Solutions, has integrated an Expert System known as Advance Bank Reconciliation (ABR) into its operations. This system imports bank transactions, automates the matching of these transactions based on user-defined rules, and ultimately generates reports detailing unreconciled transactions. The interface of the ABR system allows users to classify any remaining unmatched transactions, which significantly reduces the manual effort required for reconciliation. (Ng & Alarcon 2021.)

2.3.2 Receivables and Sales

The procedure for handling cash transactions necessitates accounts receivable personnel to align incoming payments with unpaid invoices. This task is not only time-intensive but also costly, and it is susceptible to errors, particularly when managing numerous customers and a high volume of transactions. The complexity of the process has been exacerbated by the array of payment methods available. AI has enabled companies to automate the payment matching and remittance process at significantly faster rates compared to manual efforts. This automation effectively reduces

both the number of staff hours required and the cost associated with this task. Additionally, expert systems can be utilized for tasks such as validating customer orders, extending credit based on predetermined criteria, automating the invoicing process, and recording post-sales entries in subsidiary ledgers. (Ng & Alarcon 2021.)

Recent advancements in AI and machine learning technologies have led to additional enhancements in efficiency and cost reduction. An example of this is Fifth Third Bank's offering, known as Expert AR Receivables Matching, which seamlessly integrates with ERP systems to streamline and mitigate the expenses and risks associated with the manual matching and posting of receivables. This service operates by consolidating all incoming payments into a central repository and then utilizes machine learning to identify and post accounts receivable transactions. Once a payment exception originating from a customer is manually verified, the system adapts to recognize subsequent payments in the same format, thereby increasing the likelihood of seamless processing without exceptions. Any unmatched payments can be reconciled with a single click using a matching algorithm. (Ng & Alarcon 2021.)

Another instance involves HighRadius Corporation, which offers AI software for optimizing accounts receivables processes, including A/R automation, predictive tools, and analytics. HighRadius reports that its cloud-based platform is used by over two hundred Fortune 1,000 companies, including global firms like Starbucks and 3M. One of their success stories centers around Express Employment Professionals, a North American staffing and recruiting company. Before adopting HighRadius, Express Employment grappled with challenges in their A/R operations, including monthly lockbox fees exceeding 7,000 USD. They managed 25 000 invoices weekly with 4,500-line items processed daily and 3 000 daily payments manually. Implementing HighRadius' AI platform resulted in an 85% automation rate for checks and ACH transactions, saving Express Employment 84,000 USD annually in lockbox fees. (Ng & Alarcon 2021.)

2.3.3 Inventory

Effective inventory management plays a vital role in the prosperity of both merchandising and manufacturing enterprises. The primary dilemma faced by managers lies in achieving the optimal equilibrium between ensuring an adequate stock to fulfill demand and preventing the accumulation of excessive inventory. The latter can deplete financial resources and escalate expenses related to storage and maintenance. Regrettably, inventory management demands are marked by continual change, including fluctuations in demand, seasonal shifts, and instances of stock-outs. In certain instances, relying on an outdated or manual inventory management system can render managers

unaware of real-time inventory levels, leading to the potential misallocation of inventory space and human resources. (Ng & Alarcon 2021.)

AI plays a pivotal role in enhancing inventory management systems through two key approaches (Ng & Alarcon 2021):

1. **Demand Forecasting:** This first approach revolves around the creation of a time series model capable of predicting the demand for all items in the inventory. It achieves this by integrating external data sources, including factors like weather, to enhance its forecasting accuracy.
2. **Reinforcement Learning for Inventory Management:** The second approach, reinforcement learning, represents a more sophisticated method. In this scenario, the AI system not only predicts inventory levels but also proactively acts to automatically reorder inventory, making it a more dynamic and responsive system.

Amazon has emerged as a trailblazer in harnessing AI to optimize diverse facets of its operations. The company has executed AI solutions for inventory management on an unprecedented scale. In particular, Amazon leverages AI for predicting consumer demand, managing supplier backorders, fine-tuning warehouse operations, and optimizing stock levels. The integration of AI-powered robots has not only enhanced efficiency and safety at Amazon's fulfillment centers but also facilitated the storage of a remarkable 40% more inventory. Consequently, Amazon is better equipped to meet the demands of Amazon Prime services and other deliveries, reducing the likelihood of inventory shortages, and ensuring a quicker, more consistent customer experience. (Ng & Alarcon 2021.)

2.3.4 Accounts Payable

The accounts payable (A/P) process entails the critical task of aligning invoices with supporting documentation like purchase orders and contracts. This matching process is essential to ensure that payments are both authorized for the correct amounts in accordance with purchasing agreements and accurately recorded in the general ledger. Many companies still rely on outdated analog systems that involve manually matching paper invoices with other paper source documents. According to Gartner, a research firm, just a meager 10% of businesses worldwide receive electronic invoices, indicating a significant untapped potential in A/P for enhancing efficiency and effectiveness through the targeted application of AI solutions. More specifically, by combining invoice automation with an AI-driven matching engine, the A/P process can experience substantial reductions

in manual labor, improvements in process cycle times, and a boost in return on investment. (Ng & Alarcon 2021.)

By combining machine learning algorithms with optical character recognition (OCR), A/P processes can be automated to extract and categorize expense data from receipts and invoices in the general ledger. However, current accounts payable invoice automation (APIA) often focuses solely on digitalization, overlooking critical matching aspects. Gartner outlines common invoice discrepancies that automation can address, including price differences, unidentified suppliers, and quantity mismatches with purchase orders. Enhancing invoice automation with a machine learning engine significantly boosts match rates, outperforming standard rules-based systems. AI-enabled APIA excels at intricate matching, even when no initial match is apparent. (Ng & Alarcon 2021.)

Gartner offers a selection of APIA vendors in the market, which includes companies like Medius and Basware. As an example, Medius has introduced MediusFlow AP, an APIA solution. This system employs OCR and Intelligent Data Capture (IDC) to capture essential information like purchase order numbers, amounts, and dates. Subsequently, it utilizes templates to input data into the A/P system for streamlined processing automatically. According to Medius, organizations implementing their solutions can achieve up to 97% of their invoice processing through a fully automated and touch-free workflow. (Ng & Alarcon 2021.)

2.3.5 Other Accounting Tasks

Artificial Intelligence can also be used in other types of accounting tasks as well. Here are five examples of accounting tasks where AI can be used by Kaczorowski (11 February 2021):

1. **Frauds:** Computers have the capacity to assist in detecting and preventing fraudulent activities by analyzing patterns and scrutinizing every document within the company. They can assess compliance with accounting regulations and legal requirements, allowing AI to highlight any irregularities for human verification.
2. **Hidden Insights:** Generally, AI has the potential to unearth concealed patterns, trends, and valuable insights, affording your company a competitive advantage. Furthermore, these insights are not only superior but can also be promptly delivered to facilitate quick data-driven decision-making.
3. **Better Audits:** AI offers the capability to examine 100% of an organization's records, as opposed to the sample-based approach employed by human auditors. This leads to heightened accuracy and efficiency in the auditing process. Consider the prospect of having precise, rather than statistically estimated, insights into your company's operations.

4. **Data Input Automation:** A substantial number of accounting personnel are engaged in data input and review tasks. Nevertheless, AI is adept at comprehending, assessing, and managing all documentation without error. What is more, it can request additional data when necessary and highlight potential issues for subsequent examination.
5. **Better Forecasts:** Forecasts play a crucial role in strategic operational planning. By harnessing more robust and profound insights in tandem with Machine Learning algorithms, the potential for improved and trustworthy predictions is significantly amplified. The ability to anticipate future events with greater precision is undeniably invaluable.

2.4 Accountants Changing Skillsets

As the landscape of accounting undergoes transformation, the skill set of accountants is evolving to meet the demands of a dynamic professional environment. It's essential to understand the current competencies that accountants possess. Across various industries, regardless of business operations, sector types, years of experience, or hierarchical positions, accountants consistently demonstrate core competencies in knowledge, skills, and values. Their expertise is particularly pronounced in the domains of accounting and finance, focusing on the meticulous preparation of financial statements in alignment with established accounting standards. Moreover, organizational and business knowledge serves as a cornerstone in their daily endeavours. Decision modelling, adept problem identification, and the evaluation of potential solutions are integral components of their skill set, as are diverse measurement approaches employed in assessing business processes. However, in the face of technological advancements and the increasing influence of the global market, the integration of general knowledge and information technology skills into the professional accountant's toolkit remains intermittent, underscoring a notable aspect of their existing skill profile. (Rufino, Payabyab & Lim 2018, 119-121.)

The accounting landscape is currently experiencing a significant shift, thanks to the continuous advancement of emerging technologies. This transformation is not confined to a specific niche but is a global phenomenon that impacts the professional lives of millions worldwide. The rapid pace of technological innovation plays a crucial role in making these changes increasingly noticeable. Various factors contribute to this paradigm shift, including the swift evolution of technology, the heightened global interconnectedness facilitated by the internet, and ongoing legislative and regulatory modifications. Recent scrutiny has focused on technological changes within the accounting realm, revealing challenges that await future technological solutions. At the same time, there is a surge in studies exploring the evolving role and requisite skills of accountants, with a notable emphasis on the burgeoning field of blockchain technology. As we anticipate the rise of blockchain, it becomes

evident that a new breed of accounting professionals is on the horizon, equipped with the specialized skills necessary to navigate and thrive in this novel blockchain environment. (Kroon, Alves & Martins 2021, 1-2.)

Accountants have long welcomed technological advancements, but the transformative potential of accounting technologies requires a concurrent shift in underlying mindsets. While emerging technologies promise to reshape the work of accountants and researchers, their true impact hinges on the parallel development of new thought processes and paradigms. In response to these challenges, professional accounting bodies are proactively crafting competency frameworks and future career reports. These initiatives aim to navigate anticipated difficulties, seize potential opportunities, and prepare for the imminent changes in the accounting landscape. As the industry braces for disruptions and embraces emerging opportunities, the central concern remains how careers in accounting will adapt and how skillsets will evolve in the face of these technological shifts. It's not just about mastering new tools; it's about cultivating cognitive frameworks to fully exploit the potential of these advancements. (Kroon, Alves & Martins 2021, 2.)

3 Research Methods

This chapter of the thesis contains the research framework. The author will discuss the research methods used and why those methods were chosen. The research aims to identify the essential skills accountants must harness to maximize their potential in utilizing AI technology.

Misconceptions about research commonly arise, portraying it merely as a task of gathering information or documenting facts. However, research is more accurately characterized as a methodical procedure that encompasses the collection, analysis, and interpretation of data to gain an understanding of a specific phenomenon. This systematic approach adheres to established frameworks and abides by existing guidelines, navigating through pivotal stages that involve defining the research objective, handling data, and presenting findings. Additionally, researchers commonly opt for one of three prevalent approaches: quantitative, qualitative, or mixed methods, selecting the most fitting method based on the research goals and questions at hand. (Williams 2007, 65.)

3.1 Research Design

This research was conducted as a multi-phase research containing two separate phases. It used a mixed methods approach for the first phase and a qualitative methods approach for the second phase.

Establishing the connection between the research question and design represents one of the most intellectually demanding aspects of the entire research endeavor. It is seldom a straightforward matter of prescribing a specific method for a given question. In cases where such advice is provided, it often oversimplifies the complexity of the task. A well-constructed research design should align with and be justified by the research question. In essence, the researcher should provide a compelling argument for why the chosen design is the most suitable for addressing the research question at hand. (Vogt, Gardner & Haeffele 2012, 9.)

Qualitative research is characterized by its holistic and discovery-oriented approach, often described as an unfolding model occurring within a natural setting. This methodology allows researchers to immerse themselves in the actual experiences of participants, thus achieving an elevated level of detail. Notably, a defining feature of qualitative research is its focus on examining social phenomena from the participant's perspective. There exists a variety of research designs that incorporate qualitative techniques to shape the research approach, lending to diverse and impactful research strategies. In essence, qualitative research thrives on inductive reasoning, driven by

the observations that provoke questions, which the researchers try to explain. This approach effectively unfolds in a natural setting, fostering a deep engagement with the subject matter. (Williams 2007, 67.)

The mixed methods approach to research serves as an extension rather than a replacement for traditional quantitative and qualitative research methodologies. Researchers employing the mixed methods approach aim to leverage the strengths of both quantitative and qualitative approaches while mitigating their respective weaknesses. This flexible approach allows researchers to design studies that incorporate data collection and analysis methods from both quantitative and qualitative research, facilitating the testing and development of theories. Moreover, it enables the use of both deductive and inductive analysis within the same study. By embracing the mixed methods approach, researchers gain the capacity to design a single study that addresses questions about the complex nature of phenomena from the participant's perspective and explores the relationships between measurable variables. The compatibility and complementarity of quantitative and qualitative research underpins the need for further exploration through mixed-methods research studies. (Williams 2007, 70.)

The first phase of the research design will use articles and books as its data source and the second phase will use interview answers from accounting professionals as its data source. The data collection methods used are primary data collection and secondary data collection. The data in the first phase was analyzed using mixed methods and in the second phase using qualitative methods. Information from both phases was used to answer all of the investigative questions. Below you can see the visualization of this process as shown in Figure 5.

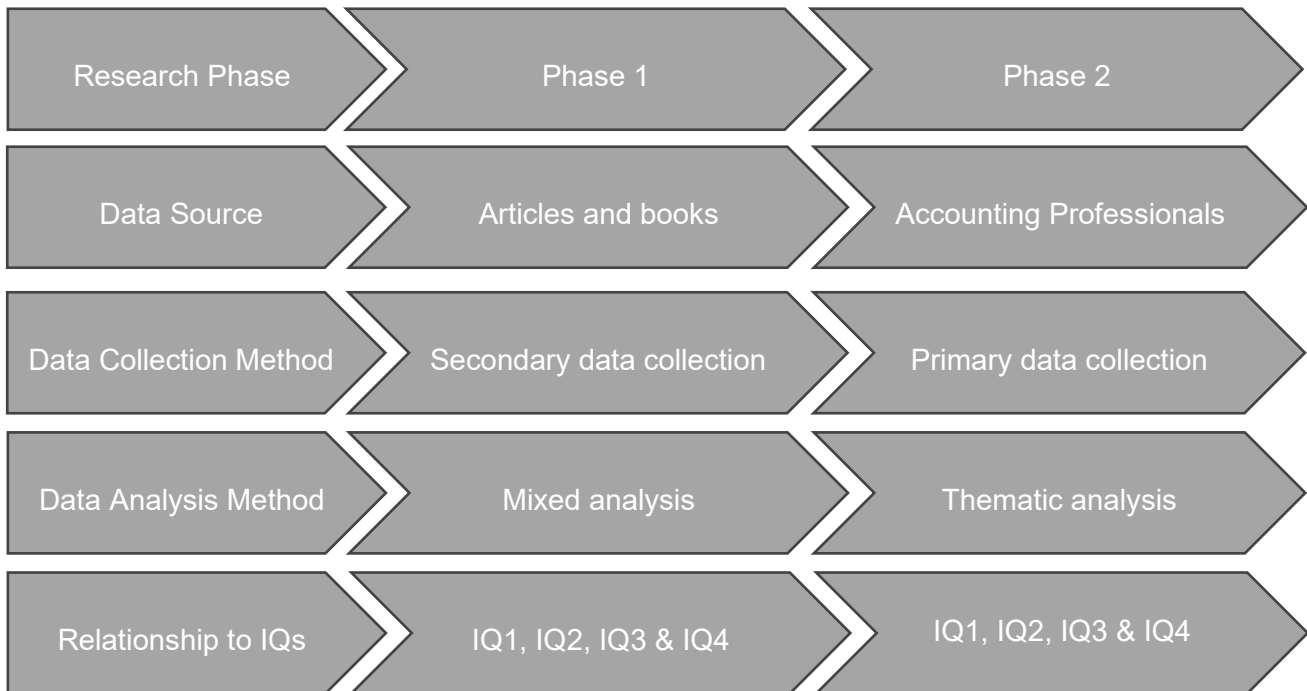


Figure 5. Research design

3.2 Data Collection

The first phase of the research primarily employs a secondary data collection method, mainly sourcing information from online platforms, including journal articles and books.

Secondary data, predating the current researchers' efforts and curated by prior scholars, serves as a foundational resource for contemporary investigations. Researchers gather these preexisting data, which can encompass numerical records, written documents, and visual artifacts like web content. The critical divergence in research design activities hinges on whether data is collected from available sources or generated through actions such as interviews, surveys, observations, or experiments. The difference lies in collecting secondary data versus producing primary data. Secondary data researchers, in their pursuit, primarily accumulate data they did not initiate themselves. (Vogt, Gardner & Haeffle 2012, 86-87.)

Secondary data can be sourced from various locations, encompassing published textual materials like books, scholarly journals, magazines, and newspapers, as well as records from sources like schools, hospitals, police departments, and various other organizations. Internet-based resources,

including web pages and blogs, also contribute to the wealth of secondary data available for research. (Vogt, Gardner & Haeffele 2012, 88.)

The second stage of data collection involved semi-structured interviews with an accounting professional that is currently employed in the accounting department of a medium-sized firm in Helsinki. Since there were so few interviews due to the time constraints the author had set for themselves, this phase is primarily aimed at enhancing the credibility of the findings obtained in the initial phase and identifying potential variations.

Semi-structured interviews are widely employed in qualitative research as a favored data collection method due to their adaptability and versatility. They seamlessly fit into both individual and group interview contexts, and their level of structural rigidity can be tailored to the specific research objectives. One of the primary merits of the semi-structured interview approach lies in its capacity to foster interaction and reciprocity between interviewers and participants. This dynamic exchange enables interviewers to pose follow-up questions based on the participant's responses, promoting a deeper exploration of the subject matter, and providing room for individualized expressions. (Kallio, Pietilä, Johnson & Kangasniemi 2016.)

However, it is important to note that conducting semi-structured interviews necessitates a solid foundation in the research topic. The interview questions are informed by prior knowledge and are typically outlined in advance using an interview guide that covers the study's core topics. While the guide offers a structured framework for the interviews, it should not be strictly adhered to. Instead, the intent is to explore the research area by collecting consistent information from each participant while affording them guidance on relevant areas of discussion. (Kallio, Pietilä, Johnson & Kangasniemi 2016.)

Table 2 displays all of the investigative questions along with the corresponding interview queries. The interviewer exclusively posed the interview questions to the interviewee without mentioning the investigative question behind it.

Table 2: Investigative Questions and interview questions related to them.

Investigative Question	Interview Questions
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<p>Why are businesses adopting AI into accounting?</p>	<ol style="list-style-type: none"> 1. Can you share your perspective on the primary motivations that drive businesses to incorporate AI technologies in their accounting processes? 2. What do you think are the specific goals or benefits that businesses expect to achieve by adopting AI in accounting, and how have you seen these manifest in practice?
<p>What financial accounting tasks can be automated?</p>	<ol style="list-style-type: none"> 3. Could you provide examples of financial accounting tasks that you've witnessed being successfully automated in your organization using AI technology? 4. How do you see the automation of these tasks impacting the role of financial accountants, and are there tasks that you believe will remain less suitable for automation?
<p>How does AI reduce human error in accounting?</p>	<ol style="list-style-type: none"> 5. From your experience, how does AI technology contribute to reducing human errors in financial accounting processes, and can you give specific examples of error reduction? 6. Are there any challenges or limitations associated with relying on AI to reduce errors, and how are these challenges typically addressed in your organization?

<p>What skills will accountants need to adapt to the changes?</p>	<p>7. In light of the evolving role of AI in accounting, what new skills or competencies do you believe financial accountants will need to adapt effectively to these changes?</p> <p>8. Can you share insights into any training programs or professional development initiatives that have been implemented to help accountants acquire these necessary skills in your organization?</p>
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3.3 Data Analysis Methods

The term "mixed analysis" refers to the examination of data in mixed research. This approach combines both quantitative and qualitative analytical techniques within a unified framework. The analysis can involve one or both data types, occurring either concurrently or sequentially in two phases. The strands of analysis may not interact until the data interpretation stage, resulting in a basic parallel mixed analysis. In mixed analyses, priority may be given to either qualitative or quantitative strands, or they may be given approximately equal priority based on prior decisions or emerging decisions during the study. The data analysis in mixed methods research includes applying quantitative methods to analyze quantitative data and qualitative methods to analyze qualitative data. (Onwuegbuzie & Combs 2011, 2-4.)

Thematic analysis serves as a systematic approach to identifying, organizing, and providing insights into patterns of meaning (themes) across a dataset. By concentrating on the collective or shared meanings evident in the dataset, researchers can gain a comprehensive understanding. This method enables the exploration of what is commonly expressed or written about a particular topic, shedding light on those shared elements. The recognized patterns of meaning in thematic analysis hold significance concerning the specific topic and research question under consideration. (Braun & Clarke 2012, 2-3.)

In essence, thematic analysis functions as a means of responding to a question, even if the exact question being addressed only becomes evident through the analysis, as is often the case in qualitative research. Notably flexible, thematic analysis allows researchers to approach the data in various ways. It provides the option to analyze meaning across the entire dataset or delve deeply into

a specific aspect of a phenomenon. The versatility of thematic analysis makes it suitable for a broad range of research questions and topics. (Braun & Clarke 2012.)

3.4 Reliability and Relevance

Describing anything as reliable and valid implies a positive assessment, a quality that extends to various assessments such as tests, experiments, and measuring procedures. Attaining scientific acceptance hinges on the dual criteria of reliability and validity. Reliability pertains to the consistency of results over repeated measurements, marking a significant step in the scientific acknowledgment of a method. However, achieving scientific acceptance is only halfway accomplished with reliability; the additional requirement is validity, ensuring that the method is suitable for its intended purpose. While reliability is primarily an empirical concern, focusing on the consistent performance of measures, validity introduces a more theoretical dimension by prompting the question of suitability for a specific purpose. (Carmines & Zeller 1979, 11.)

4 Results

In this chapter, the author presents the results of the research. It will mostly use the data found from the first phase of the research and use the data from the second phase to enhance the validity of the findings or identify the differences. The chapter is structured in a way that each subchapter will answer the corresponding investigative question. For example, chapter 4.1 will answer the first investigative question, and so on.

4.1 Why are businesses adopting AI into accounting?

Businesses are increasingly embracing AI in accounting, motivated by various compelling factors. A key catalyst is the enhanced efficiency and accuracy that AI introduces. Through the automation of laborious and time-intensive tasks such as data entry and transaction processing, AI enables accountants to redirect their attention towards more strategic and value-added endeavors. (Hyams 12 June 2023.)

Another crucial aspect is the enhanced capability of AI in data analysis and reporting. Its ability to process vast volumes of financial data enables the identification of patterns and anomalies that may escape human detection. This, in turn, contributes to more comprehensive and accurate financial reporting. (Hyams 12 June 2023.)

Cost savings represent a tangible benefit of integrating AI into accounting practices. The automation of routine tasks and the streamlining of processes result in significant cost reductions. Beyond just minimizing the need for additional manual labor as data volumes increase, AI also helps in reducing errors and rework, thereby lowering operational costs associated with accounting functions. (Hyams 12 June 2023.)

Real-time access to financial insights is a notable advantage of incorporating AI in accounting. The ability to process financial data in real-time provides businesses with up-to-date information and insights. This empowers timely decision-making, facilitates proactive financial management, and allows businesses to respond promptly to changing market conditions or evolving business needs. (Hyams 12 June 2023.)

Furthermore, AI plays a crucial role in improving compliance and risk management. Given the constant changes in accounting standards, tax regulations, and financial reporting requirements, AI's automation capabilities have become invaluable. It automates compliance checks, and detects

errors, inconsistencies, or potential risks, thereby reducing the likelihood of non-compliance and mitigating financial and reputational risks for businesses. (Hyams 12 June 2023.)

In summary, the integration of AI into accounting practices signifies a transformative shift. It not only improves efficiency and accuracy but also provides valuable insights, ultimately enhancing decision-making processes and contributing to more effective financial management for businesses. (Hyams 12 June 2023.)

In a one-on-one interview conducted by the author, a revealing insight emerged regarding the integration of artificial intelligence (AI) into accounting practices within businesses. The individual interviewed emphasized a noticeable trend among companies towards the adoption of AI in accounting, citing its capacity to significantly elevate efficiency, accuracy, and cost-effectiveness. The interviewee highlighted how AI-powered tools are being strategically implemented to automate routine accounting processes, thereby allowing professionals to redirect their focus towards more strategic and value-added activities. The singular perspective gleaned from the interview painted a picture of businesses recognizing AI not just as a technological innovation but as a practical solution to the evolving challenges within financial management.

4.2 Automation in Financial Accounting

Within financial accounting, the integration of machine learning algorithms serves as a transformative force, automating critical tasks and enhancing the accuracy of predictions through the analysis of extensive financial data. These algorithms excel at recognizing patterns, trends, and relationships within datasets, providing accountants with valuable insights into market trends, investment opportunities, risk assessment, and portfolio management. (Hyams 12 June 2023.)

A notable breakthrough facilitated by NLP is the evolution of financial reporting. NLP technology enables the automatic analysis and processing of unstructured textual data sourced from financial reports, news articles, earnings transcripts, and regulatory filings. This capability allows for the extraction of essential information such as company performance, market sentiment, and emerging trends. Furthermore, NLP proves invaluable in tasks like lease accounting and revenue recognition by extracting key information from contracts. (Hyams 12 June 2023.)

The emergence of Robotic Process Automation (RPA) marks a profound shift in the realm of automated accounting activities. RPA technology enables the development of software robots, known as "bots," which replicate human actions to proficiently carry out rule-based and repetitive accounting tasks with remarkable efficiency and accuracy. These bots seamlessly handle processes such

as data entry, invoice processing, reconciliations, and the preparation of financial statements. Through the automation of these mundane tasks, RPA not only reduces the risk of errors but also allows human accountants to redirect their attention toward more meaningful and innovative endeavors. (Hyams 12 June 2023.)

In summary, the incorporation of machine learning algorithms, Natural Language Processing, and Robotic Process Automation within financial accounting paves the way for the automation of diverse tasks. This not only bolsters efficiency but also empowers accountants to engage in more strategic and impactful endeavors, reshaping the landscape of financial accounting practices (Hyams 12 June 2023).

One area where automation plays a pivotal role is in internal auditing. RPA presents significant opportunities by taking over tasks such as the testing of controls. This automation not only streamlines internal audit processes but also enhances their capacity, enabling auditors to redirect their efforts toward more value-creating activities. As a result, human expertise is utilized in a more strategic and impactful manner. (Gotthardt & al. 2020, 99.)

Moreover, the automation facilitated by RPA in auditing extends to the testing of controls, allowing for the examination of entire populations of data rather than relying on sampling methods. This shift from sampling to testing full data sets significantly boosts the accuracy of auditing processes. The use of RPA in this context represents a paradigm shift in auditing methodologies, offering a more comprehensive and precise approach to ensuring financial compliance. (Gotthardt & al. 2020, 99.)

In essence, the financial accounting tasks that can be automated through AI and RPA include routine, repetitive functions typically performed by junior staff. This automation liberates human professionals to engage in higher-order decision-making, particularly in areas that demand nuanced judgment. Internal auditing stands out as a prime beneficiary of this automation, with RPA efficiently handling tasks such as control testing, thereby optimizing resources and elevating the overall accuracy of auditing processes. (Gotthardt & al. 2020, 99.)

Businesses are increasingly leveraging automation to streamline intricate processes such as managing the general ledger and generating financial statements. The interviewee underscored the transformative power of automation in enhancing efficiency and reducing errors in these critical financial tasks. However, a notable point of reflection emerged during our conversation—the interviewee expressed uncertainty about the limits of automation, questioning whether there are aspects that resist seamless mechanization. Moreover, they raised a thought-provoking concern regarding the legal implications of automating every facet of business operations. This inquiry delved into the intricate balance between technological innovation and the legal frameworks that govern

corporate activities, shedding light on the need for a nuanced approach to the widespread adoption of automation in the business landscape.

4.3 Mitigating Human Errors in Accounting

In recent years, one of the focal points in the realm of accounting technology has been the exploration of blockchain technologies. This cutting-edge technology took center stage in research conducted in 2019 and 2020, comprising 33.3% of the papers during these periods. Numerous scholars delved into the potential impacts of blockchain on accounting and auditing services, meticulously examining its prospects and limitations. The primary focus was on unraveling the implications of blockchain for professionals in the accounting and auditing domains. (Kroon, Alves & Martins 2021, 10.)

A prevailing viewpoint suggests that public blockchains hold the potential to serve as platforms for companies to voluntarily disclose information in the short term. Looking ahead, proponents argue that the sustained application of blockchain technology could be instrumental in effectively reducing errors in disclosure and earnings management. This extended usage is anticipated to elevate the overall quality of accounting information and, importantly, alleviate information asymmetry in the long run. The integration of blockchain technology emerges as a promising avenue to enhance the accuracy and reliability of financial information in the field of accounting, ultimately contributing to a reduction in human errors. (Kroon, Alves & Martins 2021, 10.)

The extensive integration of emerging technologies like big data, ML, AI, and blockchain has brought about substantial transformations in the realm of accounting. This comprehensive adoption of cutting-edge tools has triggered a significant restructuring of conventional accounting procedures, marking a pivotal evolution in the profession. A noteworthy consequence of this integration is the tangible reduction in errors associated with accounting information. (Zhang, Xiong, Xie, Fan & Gu 2020, 110462.)

Through the utilization of big data, ML, AI, and blockchain, accountants now have access to sophisticated tools and methodologies that enhance the precision and efficiency of their work. These technologies play a pivotal role in streamlining and reengineering accounting procedures, introducing automation and intelligent data processing. The outcome is a more resilient and error-resistant accounting framework, where the likelihood of inaccuracies in financial information is significantly diminished. The synergistic interplay between emerging technologies and the accounting field exemplifies a forward-thinking transformation that not only reshapes traditional practices but also

markedly minimizes the occurrence of errors in accounting information. (Zhang, Xiong, Xie, Fan & Gu 2020, 110462.)

The interviewee highlighted the profound impact of AI in the realm of payroll accounting. According to the interviewee, AI technology proves invaluable by allowing for the systematic comparison of current payrolls with their historical counterparts. This process not only expedites the overall auditing process but significantly mitigates the risk of human errors. By leveraging AI to scrutinize intricate details and cross-reference data, discrepancies that might elude human detection become readily apparent. The example provided underscores the transformative potential of AI in streamlining complex tasks and fortifying accuracy, thereby exemplifying its capacity to enhance operational efficiency across diverse domains.

4.4 The Evolution of Accountancy in the Age of Artificial Intelligence

In response to emerging trends, professional bodies within the accounting field are actively incorporating AI and other technological advancements into their publications. Concurrently, they are implementing educational initiatives aimed at providing their members with opportunities to adapt to and integrate these new technologies into their professional practices. However, the upskilling endeavors for accountants extend beyond merely acquiring knowledge about these technologies; they must also focus on cultivating the skills necessary to excel in their evolving roles as accountants empowered by AI. (Ng & Alarcon 2021.)

Addressing the impact of AI on audits and the role of auditors, CPA Canada and the AICPA elaborate on the changing skill sets required. While advanced technologies furnish auditors with a wealth of information, allowing for informed judgments, the human element remains paramount. Technology functions as a powerful tool in identifying correlations among datasets, yet it is human insight and experience that are crucial in comprehending the contextual nuances and causation underlying the output in relation to the provided inputs. (Ng & Alarcon 2021.)

Hence, CPAs must transcend conventional expertise in accounting and auditing statutes, delving deeper into the foundational principles of accounting, auditing, and business processes. The evolving landscape necessitates audit and assurance professionals to augment their knowledge in data science, data management, and machine learning techniques, encompassing both their functionalities and limitations. Additionally, an enhanced understanding of IT, data analysis, data capture, and enterprise resource planning is imperative. Moreover, cultivating skills such as critical thinking, analysis, and creativity will be essential in navigating the dynamic intersection of technology and accounting practices. (Ng & Alarcon 2021.)

The modern accountant is responsible for understanding new tools, navigating reporting methods, and interpreting reports to respond to inquiries from regulatory authorities. A report conducted by the Association of Chartered Certified Accountants in the United Kingdom delineates the crucial duties and skills required of accountants in today's professional landscape. (Zhang, Xiong, Xie, Fan & Gu 2020, 110471.)

In the realm of auditing, the advent of RPA technology enables real-time and continuous audits, necessitating auditors to exhibit flexibility and adaptability in the face of evolving audit procedures. Proficiency in processing real-time risk information becomes paramount. In the domain of risk management, the utilization of AI accounting software for a substantial portion of accounting tasks and decision-making places a premium on professionals ensuring the accuracy of algorithmic design, particularly concerning fraud detection. This intricate process demands vigilant monitoring by seasoned accounting professionals. (Zhang, Xiong, Xie, Fan & Gu 2020, 110471.)

The integration of advanced technology into the accounting profession is poised to reshape the employment landscape, favoring individuals with programming and analysis skills. Consequently, there is a potential reduction in opportunities for accountants lacking these skills. Recognizing this shift, companies may find it both necessary and beneficial to offer comprehensive re-training programs for existing staff to meet the evolving demands of the profession. (Zhang, Xiong, Xie, Fan & Gu 2020, 110471.)

The interviewee expressed a keen awareness of the evolving landscape in the field but seemed hesitant when asked to pinpoint specific skills. Their response indicated a general consensus on the importance of adaptability, emphasizing the need to adjust to emerging methodologies and embrace technological advancements. The interviewee highlighted the significance of being open to learning and utilizing new software, acknowledging the transformative impact of technology on the accounting profession. Additionally, they stressed the importance of proactivity, suggesting that future accountants should take the initiative in staying abreast of industry changes and proactively seeking opportunities to enhance their skill set. This insight underscores the dynamic nature of the accounting profession, where agility and a forward-thinking mindset are increasingly becoming key attributes for success.

5 Conclusions

This is the conclusion chapter of the thesis. In this chapter the author will discuss the key findings of the thesis, recommendations, and further research. It will also have the authors' reflections on this learning journey.

5.1 Key Findings

In this chapter, we delve into the discoveries that emerged from our exploration of the changing landscape financial accounting professionals navigate in the age of AI technologies. Our quest aimed to unravel the motivations prompting businesses to integrate AI into accounting practices, the specific technologies driving this shift, and the subsequent impact on the roles and skillsets of financial accounting professionals.

A compelling trend emerged as organizations, spanning diverse sectors, increasingly adopted AI technologies in financial accounting. The allure was clear – the promise of heightened efficiency, enhanced accuracy, cost savings, and the coveted real-time access to critical financial insights. Businesses, it seems, are recognizing AI as the key to not only streamlining their accounting processes but also as a gateway to more informed decision-making.

At the heart of this transformation lies the sophisticated automation technologies at play. Machine learning, with its ability to analyze extensive datasets and predict patterns, emerged as a crucial player in refining forecasting and risk management. Natural Language Processing (NLP) surfaced as the linguistic virtuoso, unraveling insights from unstructured data, while Robotic Process Automation (RPA) demonstrated prowess in automating routine and rule-based tasks.

An intriguing outcome of this integration was the marked reduction in human error within financial accounting processes. The precision exhibited by these AI tools not only bolstered the reliability of financial data but also fortified the overall integrity of accounting records. Contrary to fears of displacement, AI proved to be more of a collaborator, enabling financial accounting professionals to refocus on higher-value tasks, such as data analysis, strategic planning, and decision support.

As the curtain falls on our findings, it becomes evident that this isn't just a technological revolution; it's a call for accountants to adapt and embrace the symbiotic relationship with AI. The study advocates for continuous education and training programs, ensuring financial professionals stay abreast of evolving technologies. It also underscores the importance of collaboration between accounting

professionals and AI specialists, cementing the path toward a harmonious integration of human expertise and artificial intelligence.

In essence, the key findings underscore a transformative era for financial accounting. AI is not a disruptor; it's an enabler. The future lies in the synergy of human acumen and technological prowess, where financial accounting professionals, armed with newfound skills, navigate the evolving landscape with confidence and precision.

5.2 Recommendations and Further Research

It is essential to acknowledge the limitations of the research, particularly the small sample size, which consisted of only one participant. While this participant offered valuable perspectives, the generalizability of the results may be limited. Therefore, it is recommended that future studies seek to expand the sample size to enhance the robustness and external validity of the findings.

Furthermore, given the dynamic nature of the AI, it is imperative to recognize that the landscape is continually evolving. Therefore, it is recommended that researchers conduct follow-up studies to capture the evolving nature of the phenomenon. This longitudinal approach will provide a more comprehensive understanding of the subject matter, acknowledging its fluidity and adaptability over time.

Additionally, as the field of AI in financial accounting is expected to experience rapid developments, it is suggested that researchers explore emerging trends, innovations, and challenges that may arise in the near future. Keeping abreast of the latest developments will contribute to a more nuanced understanding of the subject and ensure that research remains relevant and up to date.

5.3 Reflection on Learning

The journey of crafting this thesis has been transformative, offering the author profound insights into both financial accounting and AI. From the outset, the author's comprehension of financial accounting has deepened significantly. Exploring the intricacies of financial reporting standards, delving into practical applications through case studies, and grasping the dynamic nature of financial statements have collectively fortified the author's foundation in financial accounting.

Simultaneously, the author's journey into AI subfields has been equally enlightening. Immersing in machine learning, natural language processing, and expert systems has unravelled the potential of

AI in financial accounting. Machine learning's role in predictive modelling, natural language processing's ability to automate data extraction from textual sources, and the application of expert systems in decision-making processes have collectively expanded the author's understanding of how AI can revolutionize traditional accounting practices.

The synthesis of deepened financial accounting knowledge and a nuanced grasp of AI subfields positions the author at the intersection of these two domains. This newfound synergy between traditional accounting principles and cutting-edge AI applications marks not only the conclusion of an academic endeavour but also signifies a potential contribution to the evolving landscape of financial accounting. As the thesis concludes, the author emerges with a holistic perspective, poised to navigate the dynamic interplay between financial accounting and the transformative power of artificial intelligence.

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Appendices

Appendix 1. Interview questions based on investigative questions.

Investigative Question 1 (Why are businesses adopting AI into accounting?):

1. Can you share your perspective on the primary motivations that drive businesses to incorporate AI technologies in their accounting processes?
2. What do you think are the specific goals or benefits that businesses expect to achieve by adopting AI in accounting, and how have you seen these manifest in practice?

Investigative Question 2 (What financial accounting tasks can be automated?):

3. Could you provide examples of financial accounting tasks that you've witnessed being successfully automated in your organization using AI technology?
4. How do you see the automation of these tasks impacting the role of financial accountants, and are there tasks that you believe will remain less suitable for automation?

Investigative Question 3 (How does AI reduce human error in accounting?):

5. From your experience, how does AI technology contribute to reducing human errors in financial accounting processes, and can you give specific examples of error reduction?
6. Are there any challenges or limitations associated with relying on AI to reduce errors, and how are these challenges typically addressed in your organization?

Investigative Question 4 (What skills will accountants need to adapt to the changes?):

7. In light of the evolving role of AI in accounting, what new skills or competencies do you believe financial accountants will need to adapt effectively to these changes?
8. Can you share insights into any training programs or professional development initiatives that have been implemented to help accountants acquire these necessary skills in your organization?