Conversational AI Workforce Revolution
Exploring the Effects of Conversational AI on Work Roles and Organisations.
Abstract
Recent public artificial intelligence (AI) advancements, particularly ChatGPT, are predicted to transform whole industries, work roles and organisational structures, leading to some jobs becoming obsolete while also creating new opportunities. This qualitative research explores the effects of ChatGPT on work roles and organisations in the information technology (IT) industry, more specifically, the effects on skills, competence, and organisational processes such as the automation of routine and non-routine tasks. The aim is to fill the gap in how ChatGPT affects the IT industry and to provide recommendations for policy makers, companies, and workers to address these challenges. Two research questions were formulated: “How does the increasing adoption of ChatGPT in internal work processes of businesses in the IT industry change work roles” and “impact the organisation and what are the potential implications for changes in work roles due to ChatGPT?” To explore and answer these questions two data collection methods were used such as semi-structured interviews and qualitative questionnaires, with a combined sample size of 14 participants. The data was analysed using thematic as well as content analysis and the theoretical framework. The findings suggest that adopting ChatGPT is indeed transforming work roles and organisations by automating routine and non-routine tasks, leading to efficiency and cost savings. While some roles and skills change, others become entirely obsolete. The impact varies based on organisational factors, the nature of work and adaptability to new technologies, leading to the emergence of new opportunities in AI management and big data. Smaller companies in particular benefit from implementing ChatGPT, allowing focus on other tasks such as for example strategic development. Organisational challenges include training employees and adapting to new technology as well as concerns for job loss.

Keywords
Conversational Artificial Intelligence (CAI), Artificial intelligence (AI), ChatGPT, Work roles, Organisational impact, Future of work.
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1. Introduction

The introduction chapter provides an overview of the research problem and the research question. It includes background and problem, previous research, importance and significance of the study, research question, scope and limitations. The introduction highlights the gap in current knowledge and explains why the study is important. The research question outlines the focus and of the study, and the scope and limitations define the boundaries of the research.

1.1. Background and problem

In recent years there has been a significant increase in the use and adoption of artificial intelligence (AI) in various industries such as manufacturing, healthcare, finance and software development. This is clearly demonstrated by the significant increase in corporate investments in AI, from a total of $12.75 billion in 2015 to $93.5 billion in 2021 (Stanford University, 2022). AI is a collective term for computer systems that can sense their environment, think, learn, and take actions in response to what they sense and what goals they have (Faruk et al., 2022). It is also an academic field of study that researches how to create computer programs with intelligent behaviour. AI can be used to solve various types of tasks such as text mining, have conversations (Chatbots), develop code or be used in decision-making processes (Håkansson & Hartung, 2020). The development has reached new heights especially in the area of chatbots and conversational AIs. Conversational artificial intelligence (CAI), which is a type of AI that uses text or speech to communicate with humans, applies methods like machine learning and language technology to process language, understand what is the meaning and produce human-like responses (IBM, 2023; Deloitte Digital, 2019). CAI learns by being fed data by users, such as questions, commands, feedback, etc. This data helps CAI to improve its understanding of human language and preferences and to generate more relevant and personalised responses. CAI needs input to learn and this leads to concerns about data leakage, as lawyers on Amazon describe ChatGPT’s uncertain data privacy policies as a reason not to share confidential information and code despite a reported rise in productivity (Schwartz, 2023). Wampler (2023) describes Amazon’s Siri, Google’s Alexa, and ChatGPT as CAI technologies, each with different functionalities and focuses. Siri and Alexa are voice-activated AI assistants that provide information, set reminders, and control smart home devices through voice commands. They are designed for quick task execution and primarily function as virtual assistants. ChatGPT is a text-based AI language model aimed at engaging users in more natural-sounding, back-and-forth conversations. Its ability to provide in-depth responses and recall past interactions sets it apart from Siri and Alexa, which do not remember information from previous conversations.

ChatGPT has since its release on 30 November 2022 generated a great amount of public interest (OpenAI Inc., 2022). In the first 7 days of its launch it reached one million users (Ruby, 2022) and in the following two months it reached 100 million users (Paris, 2023). As ChatGPT became increasingly popular, it also faced competition from other companies such as Google BARD and Microsoft Bing as they launched their own advanced CAI systems, challenging ChatGPT’s capabilities (Grant & Metz, 2023). This competitive landscape has led to accelerated innovation in the field, pushing the boundaries of what CAI can achieve and offering users a variety of options to address their needs. Due to ChatGPT’s popularity, new press articles and research that show ChatGPT’s capabilities are being published daily. According to Google, ChatGPT passed Google's coding interview for a level 3 engineer, which is an entry level position, while also answering interview questions such as if it will...
replace software engineers (Dreibelbis, 2023). Professor Christian Terwiesch of Wharton University gave the chatbot an MBA exam to prove its skills which the AI passed with a grade of B (Terwiesch, 2023). One aspect of this ability, however, shows that some forms of examination such as essays need to be rethought and may even be rendered useless, as it is difficult or impossible for teachers to tell whether the text is coming from a student or a chatbot (Stokel-Walker, 2022). It should also be noted that the chatbot is not always trustworthy, as described by data scientist Teresa Kubacka, she asked the chatbot about a proven non-existent physical phenomenon and received a scientific explanation for the phenomenon with references. The explanation and the references, which came from well-known scientists, did not exist nor was true (Hayworth, 2023). ChatGPT can be used as a multiskilled tool for various tasks such as coding (Glen, 2022; Schwartz, 2023), writing emails, scripts and social media copy (Callahan, 2023) and even transforming the search-engine industry through Microsoft's implementation of ChatGPT into Bing (Bhuiyan, 2023). The possible implementations of conversational AI are wide-ranging and multifaceted, and the tasks that it can replace continue to expand with ongoing developments in technology. From automating repetitive tasks to improving decision-making processes, AI has the potential to transform various fields such as engineering and information technology (IT). The possibilities for organisations and human employment are endless, and the list of potential applications is constantly growing.

The fourth revolution (4IR) is a new industrial paradigm predicted to change work roles, with low-skilled and medium-wage jobs largely disappearing due to automation technologies (Muzdalifah et al., 2022; Rajnai & Koçsi, 2017). Noble et al. (2022) describe the fifth industrial revolution (5IR) as a revolution that builds upon the digitalisation of the fourth industrial revolution (4IR) to create personalised technology through deep, multi-level cooperation between people and machine consciousness, including artificial intelligence (AI). Many jobs will disappear or be replaced, and the new jobs that are created will leave many young people behind as these will require higher skills and knowledge. Although there are implications for the future of work for young people, Blake et al. (2021) and Caruso (2018) predict that the effects will be mainly positive for productivity, economic opportunities, and the future of work. Positive effects of transformation can also be seen in the fact that women seem to benefit more from digital transformation than men, with companies offering more opportunities to women (Aly, 2022).

With the widespread adoption of conversational AI, particularly ChatGPT, there is growing concern about the potential impact on organisations and work functions. A work role in the IT industry could be a copywriter, engineer, or a developer, and are the various tasks and responsibilities performed by an employee in an organisation, describing the skills, knowledge and skills required to successfully perform those jobs. As AI algorithms and models improve there is a concern that they will eventually be able to automate many of the tasks that were once performed by humans, potentially making some jobs obsolete (Benbya et al., 2020). AI has many obvious benefits, such as increased productivity and productivity (Håkansson & Hartung, 2020), but the potential impact of ChatGPT on work roles and organisations in the IT industry, has not been fully explored or understood. “Industry” refers to a specific group of companies or businesses that operate in a similar business domain and have similar business activity (Langager, 2023). Companies like Apple, Alphabet and Samsung electronics are grouped together as the IT industry because their products have similar usage, similar technology, and more or less similar market segments. To further break it down the term “IT industry” is referring to an economic sector made of companies that
supply IT products and services and can include computer hardware and software, networking and telecommunications equipment, and consulting and support services.

There is no research on the extent to which conversational AI like ChatGPT will change organisational processes and work roles for organisations and employees. By applying the Actor-network theory (ANT) approach to the findings, a detailed understanding of how technologies, such as conversational AI, shape relationships and interactions between different actors can be achieved together with insights into their interests, power dynamics and motivations. The results of the research can give insights into the transformative potential of ChatGPT on organisations and employees in the IT industry and help to understand the impact of ChatGPT on the future of work.

1.2. Previous research
An initial literature review of previous studies was conducted in accordance with guidelines by Levy and Ellis (2006). The guidelines consist of three stages: inputs, processing and outputs. The first step is to collect and review literature that is relevant to the research topic (Input), the second is to analyse and categorise the literature (processing) and the last is to write the literature review, combining the information collected in the previous stages (output). After reviewing the related literature, to the researcher’s knowledge there are no similar studies that address the impact of ChatGPT on work roles and organisations. As a result of ChatGPT and its technology having been recently made available to the public, only a very limited article selection is existent. On the other hand, there are studies circulating around the topic where the impact of “artificial intelligence” is discussed as presented below.

A relevant domain to the topic is to consider the potential impact of AI on human employment. Acemoglu and Restrepo (2020), Frey and Osborne (2017) and Benbya et al. (2020) describe that AI has the potential to automate a wide range of tasks such as repetitive manual work to decision-making and problem-solving, leading to concerns about job displacement and economic inequality. As AI becomes more advanced, it will likely take on more social and work roles (Formosa, 2021), but as of now it is expected that low-wage (Blake et al., 2021) and medium-wage (Rajnai & Kocsis, 2017) jobs are at high risk of replacement by AI. Introducing AI to the employees to prevent psychological barriers involves making them comfortable with the technology, educating and showing them how they can benefit from it, such as for example increasing their job performance with less effort. Abbasi et al. (2022) claim companies with a greater number of young employees were not worried about psychological barriers as they believed that younger generations are embracing technology and will adapt to change faster than older ones. This can also be seen in a study by Blake et al. (2021) which concludes that younger people have a greater trust in AI. On the other hand, if it is young people making the AI-revolution come true there might be issues with introducing AI to many workplaces as in developing countries exploiting the advantages of digital transformation, rates of unemployment among young people are already high (Aly, 2022) and more young people work in low-paid jobs (Caruso, 2018), which will directly affect young people by introducing AI-technology to organisational processes.

In terms of organisational impact, AI has the potential to change the way organisations are structured such as decentralising decision-making (Brynjolfsson & McAfee, 2014) and employee engagement with the emergence of new roles (Willcocks, 2020; Brynjolfsson & McAfee, 2014), such as data scientists and AI engineers, but can also change the nature of existing roles and their responsibilities, such as managers and supervisors (Blake et al., 2021).
Organisations may choose to upskill or reskill their employees to match the new job skills required, instead of hiring new employees (Muzdalifah et al., 2022).

AI has the potential to improve the speed and accuracy of decision-making processes, leading to increased efficiency and effectiveness in processes (Aly, 2022) combined with new abilities such as automating non-routine tasks which has previously been impossible. This allows organisations to measure their profitability and risk even more efficiently (Dirican, 2015). It is also important to consider that the use of AI in decision-making can also lead to ethical concerns such as bias and accountability (Blake et al., 2021). The increased usage of AI may also result in increased surveillance and monitoring of employees (Brynjolfsson & McAfee, 2014, Frey & Osborne, 2017; Aly, 2022). Besides training and educating on new skills and work roles when implementing AI there will also be a need for ethical training to ensure that the AI is used with good intentions (Blake et al., 2021)

1.3. Importance and significance of the research
This research aim is to fill the gap in understanding of the impact of ChatGPT on organisations and employees and to provide recommendations for policy makers, companies, and workers to address the challenge. The research findings could inform organisations on how to best manage the transition to implementing ChatGPT in the organisational processes, and how to support their employees in adapting to the changes in the work roles.

1.4. Research question
This master’s thesis explores the potential implications of implementing ChatGPT, a form of Conversational AI (CAI), within internal work processes of IT organisations. As ChatGPT continues to develop and is adopted by a growing number of organisations, concerns about its potential impact on work roles and organisational processes have developed. While the benefits of AI, such as increased productivity and efficiency, can be seen in the literature, there is a gap in understanding the specific potential impacts of ChatGPT on organisations and their work roles.

To address this gap, the study is guided by two research questions:

- **RQ1**: How does the increasing adoption of ChatGPT in internal work processes of businesses in the IT industry change work roles and impact the organisation?

- **RQ2**: What are the potential implications for changes in work roles due to ChatGPT?

1.5. Scope and Limitations
The scope of this study is to investigate the impact of the increasing adoption of ChatGPT on work roles and organisations in the IT industry. This study will focus on the implications for employees and the organisations, as well as the potential changes to work roles within the industry. The study will be limited to employees working in the IT industry, in Sweden and Germany, and include roles such as for example project leader, manager, legal, developer, engineer and it will specifically examine the impact of ChatGPT as a CAI. Including a broad range of work titles can give a more detailed understanding of the impact of ChatGPT on the work roles in the IT industry. Different roles may have different experiences and perspectives of the technology, and including a variety of roles can help to capture the range of these experiences. It also allows for a broader examination of the implications for different aspects of the organisation, such as legal and managerial roles, which can give a more complete picture of the impact of ChatGPT implementation. The study will not examine the wider
impact of AI on employment and the future of work in the industry. There may also be limitations to the data and information available for the study as the technology of ChatGPT is new and there is therefore limited research and data on its impact.
2. Literature Review

This chapter aims to provide an overview of the current state of research on the topic. The chapter begins by presenting the search strategy followed by the themes that lay the foundation for the research. The literature review aims to identify the gaps in the current literature and provide a base for the formulation of the proposed theoretical framework.

2.1. Search strategy

To further clarify the framework and concepts of the master's thesis, a comprehensive examination of relevant literature was conducted. The review was carried out following the framework proposed by Levy and Ellis (2006) following the systematic data processing approach consisting of three key phases: 1) inputs (meaning literature gathering and screening), 2) processing (analyse, synthesise, and evaluate), and 3) outputs (writing the literature review).

A keyword search was conducted within relevant databases such as Scopus.com and OneSearch.com by Linnaeus University. In the initial phase, the journals were limited but not excluded to the basket of eight (the eight top-ranked IS journals: European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems and MIS Quarterly) as there is a lack of research on the specific topic. The keywords presented below were extracted from the initial review of the literature related to the background section and used in the searches: “Artificial intelligence”, “employment”, “Labour”, “impact”, “Jobs”, “ChatGPT”, “Organisation”, “routine task”, “non-routine task”, “manual”, “cognitive”, “4IR”, “fourth industrial revolution”, “5IR”, “fifth industrial revolution”, “Skill”, “Competence”, “Work role” and “soft and hard skills”. The keywords and the journals were used in the database search with the Boolean operators “AND” and “OR”.

The search inclusion and exclusion criteria were set to:

- Source type: Such as journal articles, books, book chapters, conference proceedings, or reports. This criterion ensures that the selected sources are diverse and suitable for the research question and objectives of the master's thesis.
- Peer-reviewed articles: This ensures that the selected articles have been reviewed by experts in the field and meet a certain level of quality.
- Language: English: This criterion ensures that all sources are in the same language as the thesis to make it easier to understand, synthesise, and analyse the content of the sources and present it in the thesis.
- Full text available: Ensures that the researcher only includes articles for which the complete text is accessible, allowing for a thorough examination of the content. These criteria help to narrow down the pool of articles and maintain a consistent and relevant selection of sources for the study.
- Publication date range: Limiting the search to articles published within a specific time frame helped focusing on the most recent and relevant research in the field.
- Subject or topic relevance: Excluding articles that are not within the scope of the study.

In case there were more than 50 articles, the search was further narrowed down by limiting the years of publication to 2020-2023. The findings were at first evaluated by the relevance of
the title, second on the relevance of the abstract, and lastly at the final selection of articles, reading them in detail. Given the lack of research on this specific topic and the innovation of ChatGPT, the literature review was continuously updated during the research process. By regularly searching the databases for new articles the understanding and overview of the field was kept up to date. Searching for articles on the topic of “"ChatGPT" AND "Work roles"” in Google Scholar returned thousands of results. As Google Scholar lacks options to filter search results based on specific criteria, such as peer-reviewed articles, it made it difficult to identify relevant sources making the database unhelpful for this literature review.

2.2. Conversational Artificial Intelligence (ChatGPT)
AI is created with the goal of using intelligent machines or software to solve problems or tasks (McCarthy, 2007). AI can be divided into different application areas as presented in Figure 1; these areas can also be combined and go into each other in the same software/machine. Conversational AI is a subset of AI that uses language processing and a deep learning model trained to generate natural language text. Conversational AI can use large volumes of data, machine learning, and natural language processing to help humans communicate with machines through natural, human-like conversations (Kulkarni et al., 2019). ChatGPT is a conversational AI model that uses language processing but is also a deep learning model trained to generate natural language text. An AI is used to solve various tasks and problems, such as decision-making, problem-solving, image processing, prediction, and language handling. These capabilities can be combined to address a specific problem (Håkansson & Hartung, 2020).

Figure 1

Artificial Intelligence application areas

![Artificial Intelligence application areas diagram]

The natural language models (NLMs) are designed to solve problems and tasks by for example understanding spoken and written words and responding to them in a natural human form with natural language processing (NLP). There are three main activities in NLP to instruct an AI: the first is to understand the written or spoken word that the user feeds it, the second is to use the information to respond, and the third is to respond to the user in a human way (Håkansson & Hartung, 2020). In addition to the three main tasks of natural language processing, there are other tasks that are necessary for a complete working model such as that the AI has to be able to handle different languages and input variations since different languages have different grammar and syntax, and each user has their language and writing style. There are linguistic challenges, such as for example to create a program in java with natural language which can be a difficult task to execute for an AI due to ambiguity, the meaning of words and phrases can have multiple meanings or the language variability, meaning that different languages have different grammatical structures, vocabularies and idiomatic expressions (Jurafsky & Martin, 2023).

2.3. Work roles, skills & competence
The term “work role” does not have a clear or consistent definition in the academic literature and different sources may use “work” interchangeably with “job”. In this thesis, the following definitions will be used to give this study's understanding of the term “work role” as well as “skill” and “competence”. A work role is according to Neal et al. (2012) a set of responsibilities and tasks assigned to an individual within an organisation, which they are expected to perform. The work role is described by the skills, knowledge and competencies required to perform tasks and responsibilities effectively and can be influenced by factors such as job characteristics, team dynamics, leadership style and feedback. It establishes a base for job descriptions and guides the employee's behaviour, performance, and development within the organisation. Work roles often include a title and a summary of the primary duties and responsibilities, for example, software developer or project manager.

According to Spencer and Spencer (1993), a skill is an ability that can be acquired through training or practice to improve the achievement in a specific area such as performing a specific task or function effectively. Skills can be categorised into hard skills (technical) which are related to specific tasks or occupations and soft skills (interpersonal) that involve communication, collaboration, and problem-solving abilities (Lyu & Liu, 2021). There is a wide range of skills that employees in the IT industry need in their roles, including both hard and soft skills where hard skills could include different programming languages, data analysis, cybersecurity and database management and Soft skills could include, for example, time management, teamwork and leadership.

Competence is an ability to apply skills and knowledge successfully in different situations and contexts in a work role (Spencer & Spencer, 1993). Competence shows how well a person can perform a task or activity using their learned abilities. A competence can be developed through education, training, experience and reflection. A competence in the IT industry, particularly in the field of AI could refer to for example algorithm design and optimisation, AI ethics, AI strategy and implementation.

2.4. Routine and non-Routine tasks
AI comes with the possibility of automating internal work processes in most industries, including software development, legal departments, and UX design. This can lead to freeing up time and resources for other activities (Caruso, 2018). Routine tasks are those that are
repetitive and can be easily automated using AI algorithms (Autor, 2015; Frey & Osborne, 2017). A bank using AI to process a large number of loan applications would for example be considered a routine task, as the steps to process each application are standardised and repeatable (Autor, 2015). Routine tasks are well suited for automation using AI, as they can be performed consistently and with a high degree of accuracy (Frey & Osborne, 2017). An example of ChatGPT’s abilities could be to generate software code or write articles based on specific parameters and guidelines (Chui et al., 2022).

Non-routine tasks can be described as complex tasks which require human understanding, creativity, decision-making, critical thinking and the ability to adapt to new and unique situations (Autor et al., 2003). These kinds of tasks are generally more difficult to automate and are typically performed by humans. The recent innovations in the field of AI and the release of ChatGPT may allow for an increased automation of non-routine tasks. For example, a doctor diagnosing a complex medical condition or a lawyer advising a client on a legal issue would be considered non-routine tasks as they require a higher level of cognitive ability and creativity (Afonso et al., 2022). Another example of AI being used in non-routine tasks is in customer service where AI bots are being used to assist with customer support. These bots use NLP and machine learning algorithms to understand and respond to customers, reducing the workload of the human customer service representatives.

Autor et al. (2003) describe that routine and non-routine tasks can be further divided into cognitive and manual, such as cognitive and manual routine which follows explicit rules and cognitive and manual non-routine which requires skills, creativity and problem-solving skills as shown below with examples:

Cognitive Routine Tasks:
- Answering frequently asked customer questions
- Checking inventory levels and reordering supplies to fill up stock
- Classifying and sorting incoming mail into different categories

Manual Routine Tasks:
- Organising physical documents at the office
- Entering data into a spreadsheet or a database
- Assembling components

Cognitive Non-Routine Tasks:
- Solving a customer complaint or problem that requires critical thinking/creativity
- Analysing trends and making business decisions
- Conducting research and writing a report on findings

Manual Non-Routine Tasks:
- Repairing a broken machine that requires troubleshooting and problem-solving skills
- Building a custom product to meet a specific customer requirement

A software developer who for example writes code for a software could be considered performing both a cognitive and manual task (with a greater emphasis on cognitive tasks). Cognitive skills when writing and testing code could be being creative, problem-solving, thinking critically and using logical reasoning. Writing code can also be seen as a manual task as it involves typing code while physically using a mouse and a keyboard. Whether a software developer's tasks are considered routine or non-routine depends on the specific task and the
context in which it is performed. Writing code to implement a commonly used feature in software, such as a login-page, may be considered a routine task while developing a new software solution to a unique problem may be a non-routine task.

AI has made significant progress in automating routine tasks, but it is still in the early stage when it comes to non-routine tasks (Frey & Osborne, 2017). With the recent introduction of ChatGPT, it has been shown that AI can be used in cognitive non-routine tasks, such as in natural language processing and computer vision which is a field of AI that trains computers to interpret and understand the visual world, where the algorithms are able to analyse large amounts of data and make predictions based on patterns and relationships in the data (Frey & Osborne, 2017).

2.5. New technology impact on jobs
The historical example of the automation of Henry Ford's factory in the early 1920 century exemplifies the societal fears that may arise when new technologies threaten to impact the workforce and disrupt the organisations. Ford automated the car-building process by building an assembly line and created other forms of automation which led to increased efficiency and productivity in the production of automobiles. The automation resulted in widespread concerns in society about job loss and economic inequality (Crowther & Ford, 2005; Du Boff, 1978). This historical example highlights the potential negative impact of new technology on jobs, or at least the fears of it, a theme that continues to be relevant in discussions about the impact of AI on work and organisations today.

With the introduction of ChatGPT it might have an impact on non-routine tasks as AI has shown potential in automating non-routine tasks, such as decision-making and problem-solving (Acemoglu & Restrepo, 2020; Frey & Osborne, 2017). The introduction of ChatGPT to the public has also raised concerns that a wider range of work processes might be at risk of automation in the very near future. It is important to mention that the effects of new technology on jobs is not only limited to eliminating work roles but also to includes the creation of new jobs and the re-skilling of the current workforce (Autor & Dorn, 2013; Brynjolfsson & McAfee, 2014). Rather than focusing only on job loss it is important to consider the net impact of new technologies on employment which means looking at the obsolete jobs compared to new jobs.

2.6. The 4IR and 5IR and how it might impact on jobs
The fourth industrial revolution (4IR), also called Industry 4.0, is described as the integration of advanced technologies such as AI, internet of things (IOT), and big data analytics into manufacturing and other industries. This integration is expected to bring about significant changes in the way work is organised and performed. 4IR comes with the potential to disrupt traditional employment models, impact organisations and how work is done in the future. According to Muzdalifah et al. (2022) 4IR has the potential to increase work productivity, improve life-quality and reduce costs. On the contrary it poses significant challenges to the workforce, as new technologies may automate certain tasks and lead to unemployment. 4IR’s impact on the manufacturing industry leads to a change in skills required for certain jobs but also that workers with higher levels of education and skills are more likely to benefit from these changes (Freddi, 2018).

4IR is likely leading to a reduction of low-skilled and medium-waged jobs while increasing the demand for high-skilled jobs such as data analysis and experienced software developers (Freddi, 2018; Dirican, 2015; Willcocks, 2020; Caruso, 2018). 4IR is likely to have a notable
impact on the way work is organised and performed with increased automation and decentralisation of the decision-making. Employee engagement and participation in the adoption of 4IR will be a key factor for its successful adoption. Organisations must pay attention to potential changes in the workforce and actively support employees in adapting to new technologies and work roles (Caruso, 2018; Abbasi et al., 2022; Rajnai & Kocsis, 2017).

The Fifth Industrial Revolution (5IR) also referred to as “Industry 5.0” is a term used to describe the next phase of technological advancements expected to transform the way humans live and work. The fifth industrial revolution (5IR) is an extension of 4IR that aims to maximise human and technological strengths (Noble et al., 2022). 5IR compared to 4IR, focuses on collaboration and co-creation between humans and intelligent technologies instead of viewing them as competitors or counterparts. AI, automation, and robotics are all part of 5IR and involve the use of algorithms and machine learning enabling computers to perform tasks that would typically require human intelligence (Demir et al., 2019). These technologies are according to Noble et al. (2022) expected to enable the automation of many tasks, the development of new products and services, and the creation of new industries and business models. 5IR is also expected to have a significant impact on the job market, with many jobs being replaced or becoming obsolete by automation and new jobs being created in emerging industries (Demir et al., 2019). These impacts the industrial evolutions bring are important for individuals, businesses, and governments to prepare for.

2.7. Actor-network theory
Cresswell (2019) explains that the Actor-network theory (ANT) is a social theory that can be used to analyse and explain social and technological systems, including information and communication technologies, infrastructure systems, organisations, and more. The networks which can be an idea, an organisation or a technology consist of actors and all actors, whether human or non-human, are given the same value and agency within a network. Non-human actors can include objects and concepts that have an impact on actors within the network. The relationship between the actors is more important than their features or existence (Aanestad, 2003). The use of ChatGPT as an actor within a network can be particularly relevant in contexts where ChatGPT is integrated into social or technological systems, such as in the case of implementing CAI into internal work processes. To focus on a particular network, actors can be "black-boxed," which treats the network as a distinct entity with specific inputs, outputs, and relationships within the whole network (Cresswell, 2019). The idea behind blackboxing is to simplify the analysis of complex systems by treating them as a single entity rather than examining all of their individual components.

“Translation” is a key concept in ANT and means the process in which various actors in a network are transformed to achieve a shared goal (Cresswell, 2019). A new technology is for example added into a network and does not fit, which requires an actor having to change, for example the behaviour of humans or a function of a non-human actor such as a system. After the change is accomplished the network can be considered working towards a shared goal. The concept of translation highlights the importance of non-human actors in shaping social phenomena. ANT recognises that social and technological systems are neither simple nor structured, but are made up of many interacting actors who shape and influence each other. This way of looking at these interactions between humans and non-humans can be useful when dealing with systems that are difficult to understand or where there are many stakeholders and interests.
2.8. Summary of the literature review
The literature review provided an overview of the topics that are relevant for this study.

- AI, specifically ChatGPT, uses language processing and deep learning to facilitate natural communication between humans and machines. CAI uses algorithms and a combination of different application areas to be able to respond and communicate in a human-like way, adapting to different languages, grammar, vocabularies, and users' individualities while considering linguistic challenges such as ambiguity and language variability.

- In this thesis, a work role refers to a set of responsibilities and tasks assigned to an individual within an organisation, requiring specific skills, knowledge, and competencies for effective performance. Skills are learned abilities through training or practice, which can be categorised into hard (technical) and soft (interpersonal) skills. Competence refers to the ability to successfully apply skills and knowledge in different situations and contexts within a work role.

- Automation of cognitive routine tasks: Previous technological innovations in automation have affected routine tasks, such as repetitive cognitive work which has led to concerns about changing work roles and potential unemployment.

- Automation of cognitive non-routine tasks: AI has the potential to automate cognitive non-routine tasks, such as those performed by workers in the IT industry. This change can result in a variety of work roles becoming obsolete.

- New technologies, such as AI and automation, have historically raised concerns about job loss and economic inequality. The Fourth Industrial Revolution (4IR) integrates advanced technologies into various industries, potentially disrupting traditional employment models and increasing demand for high-skilled jobs. The Fifth Industrial Revolution (5IR) emphasises collaboration and co-creation between humans and smart technologies, with AI and automation playing a major role. Both 4IR and 5IR will impact the job market, necessitating individuals, businesses, and governments to prepare for the changes they bring.

- Organisational impact: The implementation of AI in the internal work processes has the potential to impact the structure, decision-making processes and employee engagement in an organisation.

- Actor-network theory (ANT) is a social theory used to analyse social and technological systems, treating human and non-human actors equally within a network. The relationships between actors are more important than their individual features. "Black-boxing" simplifies complex systems by treating them as single entities, while the concept of translation emphasises the interconnectedness of actors in achieving a shared goal. ANT helps analyse complex systems with multiple stakeholders and interests.

Implications for workers and organisations: The literature review has highlighted the potential implications of the adoption of AI and other new technologies for both workers and organisations, such as, changes in work roles and an increased need for new knowledge and competencies.

2.9. Theoretical framework
The theoretical framework for this research is based on the literature review of what an AI/CAI is, how AI/CAI function and the possible impact of 4IR/5IR and AI on work. As the topic is how ChatGPT impacts the work roles in the IT industry the focus is around the cognitive routine/non-routine tasks. To further discuss the data through a theoretical lens
(Alvesson, 2018) the theory of ANT is chosen. The concepts referred to in the following text are also illustrated in figure 2: Visual Representation of Theoretical Framework:

**Figure 2**

*Visual Representation of the theoretical framework*

![Diagram](https://via.placeholder.com/150)

*Note.* Illustrative summary of the theoretical framework. This figure, created by the authors, highlights the relationships between the key concepts, including ChatGPT, 4IR/5IR, ANT, and the impact of automation of cognitive routine and non-routine tasks in the IT industry.

Cresswell (2019) describes that it is important to focus on the relationships and interactions between actors; by doing this with ANT, an understanding of the actors and their relationships, including technical and social aspects, can be achieved. Looking at empirical findings through theoretical approaches such as ANT can provide insight into how ChatGPT adoption shapes relationships and interactions between different actors such as organisations and employees, with their interests, power including development and motivation. The research further explores how the actors influence each other and how they shape and are shaped by the technology, organisations, and other structures. The aim of this study is to explore the impact of the introduction of ChatGPT to organisations and employees investigating effects such as job displacement, new job creation, and potential need for new skills. The concept of 4IR is used to explore the potential impacts of ChatGPT on jobs and the organisation while 5IR will be used to explore the potential collaborations between humans and intelligent technologies, focusing on collaboration and co-creation. 4IR and 5IR will further be used to explore the potential impacts on work roles, the possible creation of new industries and business models, and the potential need for individuals and businesses to adapt to these changes. The concept of automation of cognitive routine and non-routine tasks will be used to analyse the potential effects of ChatGPT on different types of tasks, from routine cognitive tasks to non-routine tasks such as decision-making and problem-solving. The research will also highlight strategies for both employees and organisations, to minimise potential negative impacts and increase the potential benefits of AI adoption.
3. Methodology

In this chapter, an overview of the research design, explaining the chosen paradigm, approach, methodology, presentation of data collection methods, and data analysis techniques used in this study. Following a discussion on the procedures for ensuring the trustworthiness of the findings, including strategies to establish validity and reliability.

3.1. Research design

The term "Qualitative" refers to a type of research or analysis that focuses on exploring, understanding, and interpreting non-numerical data, such as textual, visual, or auditory information (Clarke & Braun, 2013). This research is qualitative as it seeks to explore and understand the potential implications of ChatGPT on work roles and organisations within the IT industry. This is done by examining the subjective experiences, perceptions, and opinions of employees in the IT industry (Clarke & Braun, 2013). Common qualitative research methods (see figure 3) include interviews, focus groups, observations, and content or thematic analysis of textual or visual materials (Creswell & Creswell, 2018). Interviews, and questionnaires were employed to gather data, while thematic analysis and content analysis were used to analyse and interpret the collected data. These qualitative methods allowed for a detailed exploration of experiences, opinions and insights of the participants affected by the implementation of ChatGPT in the industry. The qualitative approach according to Clarke and Braun (2013) is useful for studying complex social processes, cultural contexts, and individual experiences that cannot be easily quantified or measured.

A paradigm is a set of assumptions, concepts, values, and practices, shared by a research community, that form a way of viewing reality and understanding how it works (Clarke & Braun, 2013). Further Creswell (2019) describes paradigms as “worldviews” or “a basic set of beliefs that guide action”. A paradigm provides a framework or lens through which individuals understand and interpret the world around them and it shapes their approach to solving problems and making decisions.

Epistemology is a branch of philosophy that studies the theory of knowledge, exploring the nature, sources, and limits of knowledge (Clarke & Braun, 2013). It tries to answer questions like, "What is possible to know?" and "How do we know what we know?" Epistemology is addressing the assumptions researchers make about the nature of knowledge and how it can be acquired. Epistemology is a broader philosophical concept dealing with the theory of knowledge, while interpretivism is a specific epistemological viewpoint that focuses on the subjective nature of knowledge and the importance of interpreting human experiences within social and cultural contexts (Orlikowski & Baroudi, 1991). According to Creswell and Creswell (2018) the interpretivism paradigm describes reality as a social construct, and that understanding it requires interpreting the meanings and experiences that individuals attribute to it. The interpretive research approach aims to understand the perspectives and experiences of participants using qualitative methods such as interviews, observations, and questionnaires (Creswell & Creswell, 2018). This approach is well-suited for exploring the impact of conversational AI on organisations and work roles, as it enables the examination of participants subjective experiences and perceptions.
Note. In this figure, the research strategy framework is presented, outlining various research paradigms, approaches, methodologies, and data collection methods. The double circles indicate the specific elements used in this study: the interpretivism paradigm, a combination of inductive and deductive approaches, the case study methodology, and data collection through interviews and questionnaires. This selection reflects the researchers’ focus on understanding the subjective meanings and experiences of the participants within their social context. Adapted from “Research Strategy Development for Dummies: Define a Framework of Research Options and then Use It” by K. Nogeste, 2007. Modifications have been made to the original figure to align with the present study.

A potential disadvantage of using an interpretive approach for research is that the findings may not be easily generalisable to a larger population (Orlikowski & Baroudi, 1991). The research focus is on exploring subjective experiences and perceptions which could mean that the results may be more specific to the participants and the context of the study leading to making it challenging to draw broader conclusions that apply to other settings or groups. Interpretive research may also be more time-consuming and resource-intensive compared to other research methods, as it involves a more in-depth and detailed analysis of data (Creswell & Creswell, 2018).

Denzin and Lincoln (2018) define descriptive research as a form of qualitative research that attempts to provide detailed descriptions of experiences or behaviours without attempting to explain underlying causes or relationships. Descriptive research can benefit the research when little is known about some phenomena and any evidence gathered would give credibility (Gregor, 2006). The primary aim of descriptive analysis is to identify similarities and patterns in the data, rather than trying to explain underlying causality or relationships. Descriptive
research is applied to this thesis by providing a detailed description of the phenomena, the implementation and impact of ChatGPT in the IT industry and on the work roles, as little is known about the specific topic.

Figure 4

*Inductive vs. deductive reasoning*

![Diagram of Inductive vs. Deductive Reasoning](image)

*Note.* In this figure, the steps of inductive and deductive reasoning are visualised. Adapted from “*Inductive vs. Deductive Research Approach | Steps & Examples*” by R. Streefkerk, 2023. Modifications have been made to the original figure to better align with the present study.

Streefkerk (2023) describes the main difference between inductive and deductive reasoning as: “...inductive reasoning aims at developing a theory while deductive reasoning aims at testing an existing theory.” (see figure 4 inductive vs deductive). An inductive reasoning means that the researchers start from a specific observation with the aim to draw a broad general conclusion. This thesis follows a **deductive reasoning** in exploring the impact of CAI on organisations and work roles, as guided by existing theories related to the research topic (Creswell & Creswell, 2018). Qualitative research has often been described as a methodology that is inductive and demonstrates an absence of theory in the early phase of the research process (Nguyen et al., 2022). This observation is also supported by the findings presented in the book by Cresswell and Creswell (2018) in which the deductive approach is discussed in relation to a quantitative approach: “In quantitative studies, one uses theory deductively and places it toward the beginning of the proposed study.” Examples of deductive application of theory in qualitative research are rare and are often limited to the context of data analysis (Nguyen et al., 2022). Further Nguyen et al. (2022) explain that qualitative research emphasises understanding of a phenomenon by exploring the varied experience of people or communities. Some qualitative researchers have been cautious about using theory in the research process, believing that theory imposes meaning and later changes the understanding of the phenomenon being explored. Further descriptions indicate that researchers argue that if qualitative research is to understand the multiple meanings that people construct about the world, it is reasonable to start with an absence of predetermined theory. The deductive reasoning in this qualitative study involves testing theories on the collected data to confirm, refute, or modify them. This approach is chosen due to the aim of understanding the phenomenon of conversational AI in organisations and work roles, based on the current
understanding and relevant theories. The deductive reasoning helps to structure the research process and analysis, ensuring that the findings are grounded in the existing literature and contribute to the advancement of knowledge in the field. Graneheim et al. (2017) explain that when using a deductive approach, one challenge is to decide what to do with data that does not fit the selected theory. The amount and type of leftover data may vary depending on the researcher’s intentions when selecting the theoretical model. If the goal is to verify a model, leftover data may raise concerns about the suitability of the chosen model. On the other hand, if the goal is to develop or expand the model, leftover data may provide valuable contributions.

3.2. The researcher’s role

The researcher's role in the research process is complex, involving the design, execution, and interpretation of the study. Researchers are responsible for formulating research questions or hypotheses, designing appropriate research methodologies, and making decisions about research design, sample selection, data collection methods, and data analysis techniques (Clarke & Braun, 2013). In this interpretive research study, the role of the researchers involved the following steps such as: finding participants, gathering data through interviews, questionnaires, and analysing the data using relevant qualitative techniques such as thematic analysis and content analysis as described by Clarke and Braun, (2013) and Creswell and Creswell (2018).

An important aspect of the researcher’s role is qualitative sensibility, which is described by Clarke and Braun (2013) as a personal trait with aspects such as a critical approach to knowledge, reflexivity, and good interactional skills, plays a crucial role in the research process. An essential aspect of their role is reflexivity, where researchers continuously reflect on their own biases, assumptions, and the potential impact of their presence on the research process and findings (Clarke & Braun, 2013). The strategies used in this thesis to practise reflexivity have been peer debriefing, member checking and triangulation as described below (Clarke & Braun, 2013):

- **Peer debriefing**: Researchers discuss their research experiences, insights, and challenges with peers (such as the writing partner, supervisor and other colleagues and friends), who can provide alternative perspectives and help to identify potential biases.
- **Member checking**: Researchers share their interpretations and conclusions with participants, allowing them to provide feedback and correct any potential misinterpretations.
- **Triangulation**: Researchers can use multiple methods or data sources (such as interviews and questionnaires) to validate their findings and interpretations, helping to minimise the impact of their own biases.

Further, researchers interpret and distribute research findings, draw conclusions based on the gathered evidence, identify limitations and implications, and present the results.

Reflexivity, which is closely related to bias, helps researchers to identify and deal with potential biases that might have an impact on their research. Clarke and Braun (2013) describe **bias** as the idea that the researcher might, without awareness, have influenced the results so that they cannot be trusted. Bias in research can result from poor sample selection, poor research tools (such as questionnaires, surveys, or interview guides), or poor researcher practice. Bias in research is about how the researcher designs the methods of data collection rather than the methods themselves. Poor instrument design can lead to biased results if the
questions are not clear, accurate, or appropriate to the research objectives. Which is why this study applied an iterative approach in developing the questions for the interviews and questionnaires. Further, Clarke and Braun (2013) argue that in qualitative research, the question of bias does not make sense as all research is seen as influenced, and the researcher's influence is just one of many.

3.3. Sampling
Sampling is an important element to consider in qualitative research as sampling is the process where the researcher selects a variety of individuals from a larger population to participate in a study. The purpose of sampling is to obtain a representative sample of the population that accurately reflects the characteristics there (Clarke & Braun, 2013). This sampling process can use, in qualitative research, several different approaches, each approach with advantages and disadvantages. This section will discuss the sampling techniques used in this thesis, including purposive sampling, convenience sampling, snowball sampling, the concept of saturation and diversity of perspectives.

In **purposive sampling**, the researcher intentionally selects participants who fit certain characteristics relevant to the study, this process is not based on randomness, as explained by Clarke and Braun (2013). The advantage of using purposive sampling as a sampling technique is that it allows the researcher to obtain detailed information from the participants about the research topic; this allowed the researcher to find only participants who had knowledge or experience relevant to the study. The disadvantage is that the results may not be generalisable to the wider population due to the non-random selection of participants.

According to Clarke and Braun (2013) **convenience sampling** is a method where individuals are selected based on their availability or accessibility and is often used when researchers have limited time or resources. The participants in this study were recruited through the researcher’s personal network using purposive sampling rather than using a random selection process. Using the personal network made it easier to evaluate which participants were accessible and available for interviews [Convenience sampling], as their response to the invitation was, if not immediate, at least received on the same day. Convenience sampling can lead to snowballing, where existing participants help the researcher to identify and recruit additional participants. Snowballing can be useful when studying populations that can be hard to reach. The main advantage of convenience sampling is its ease and low cost while the disadvantage is that the sample may not be representative of the broader population, limiting the generalisability of the findings (Clarke & Braun, 2013).

**Snowball sampling** (or friendship pyramiding) is a cost-effective and practically useful technique. Clarke and Braun (2013) argues that it is a sampling technique often used in qualitative research, when the population of interest is hard to reach. This sampling method relied on the researcher’s social networks and connections of the initial participants found through purposive and convenience sampling, who then referred the researcher to other potential participants in the IT industry. As the process continues, the sample size grows like a snowball which is why it is called "snowball sampling." This approach was used for two reasons:

- **Accessibility:** Snowball sampling, as described by Marcus et al. (2017) has the advantage to reach individuals who might be tough to reach using other sampling techniques. It was especially useful in this study because the IT industry and work roles made direct access to the target population challenging.
• Trust: As participants get referred to by their peers or colleagues, they could be more likely to trust the researcher and be willing to participate in the study (Cohen & Arieli, 2011). The established trust in the research could also encourage the referred participants to share more detailed information during the interviews.

To begin the snowball sampling process, a small number of individuals who met the study's criteria (experience with CAI & working in the IT industry) and were willing to participate were contacted. These initial participants were then asked if they could recommend others who might be interested in participating and met the criteria for inclusion to be contacted. This process of referral and recruitment was continued until a sufficient and diverse sample was obtained, or until no new insights appeared from the data, indicating theoretical saturation. Snowball sampling may introduce potential biases in the sample, as individuals with similar characteristics or social connections may be more likely to be referred to the study. Efforts were made to reduce these limitations and to increase the diversity of the sample by connecting with various networks and actively recruiting individuals with a range of experiences and perspectives.

Saturation is a concept in qualitative research that refers to the point at which no new information is identified from the data (USC Libraries, 2023). Researchers aim of saturation is to accumulate data to the point where additional data cannot contribute to new knowledge or understanding of the phenomenon under study. Deciding when researchers have enough data can be difficult, as it can be subjective and vary from researcher to researcher.

Determining the appropriate sample size is crucial for a qualitative study, as Creswell and Creswell (2018) suggest, a good sample size in qualitative research is typically between 3 and 10 participants. However, Morse (2000) explains that estimating the number of participants needed to reach saturation depends on factors such as data quality, study scope, nature of the topic, information obtained per participant, interview frequency, and qualitative method and study design. Taking these factors into account may not significantly help in predicting the exact number; a smaller sample size, such as the 3-10 participants suggested by Creswell, offers the advantage of conducting more thorough and detailed interviews. A smaller sample size is more manageable for a Master's thesis and can lead to a deeper understanding of participants' perspectives and experiences, as it requires less time and resources for data collection and analysis. A potential disadvantage is the limited generalisability of the findings (Clarke & Braun, 2013). With fewer participants, it is more difficult to draw broad conclusions that can be applied to a larger population. A smaller sample size may also not capture the full diversity of perspectives and experiences within the population being studied, which could limit the scope of the study.

In qualitative research it is crucial to consider the diversity of perspectives among the participants. By combining different sampling techniques as in this research the aim was at including participants with a wide range of experiences, backgrounds, and characteristics related to the research topic (Clarke & Braun, 2013). This approach could provide a deeper level to the details of the data and the credibility of the study by obtaining several viewpoints giving a detailed understanding of the phenomenon being studied. The disadvantage is that it can be time-consuming and challenging to manage and analyse the data due to the variation of perspectives. In the context of this master thesis it should be noted that there were no limitations to the work roles of the participants. This decision was made based on the fact that the IT industry has a diverse range of work roles and experiences which can provide valuable insights into the research topic.
3.4. Data collection

This study applied a small-N research design, focusing on companies in the IT industry in Sweden and Germany that have already adopted or are planning to adopt conversational AI solutions in their internal work operations. The research method involved a case study approach, using a combination of two data collection methods: semi-structured interviews and qualitative questionnaires (Creswell & Creswell, 2018; Clarke & Braun, 2017). This allowed for an in-depth examination of the research topic within the context of real-world organisations, and provided valuable insights into the practical challenges and opportunities associated with adopting conversational AI in the internal work processes. A case study involves an in-depth analysis of a particular issue (Denzin & Lincoln, 2018), whereas a small-N study is a research design that selects only a small number of cases or groups to study a particular phenomenon (Jacobsen, 2017). For example, the "case" of a case study in a particular company, would be that particular company. In a small-N study the "units" could be several different companies which are within a particular industry, or a group of individuals with a shared characteristic, such as working in the IT industry. Both types of study aim to develop an in-depth understanding of the chosen "units" or "cases", through a detailed examination and analysis. The main difference between a case study and a small-N-study, is that a case study focuses on an in-depth investigation of a single case, whereas a small-N-study involves the comparative analysis of a limited number of cases. Denzin and Lincoln (2018) describe comparative analysis, as a research method, that focuses on examining and comparing two or more subjects, cases, or phenomena in order to identify patterns, similarities, differences, and connections among them. The primary goal of a comparative analysis is to improve understanding of the subjects being compared, draw conclusions about their attributes, and uncover the underlying processes or causal mechanisms.

Jacobsen (2017) describes small-N studies where a limited number of units are selected to study a particular phenomenon. The focus of the design is on the phenomenon rather than the context, and informants and respondents often come from different contexts. This type of research design can provide a rich and detailed description of a phenomenon and is appropriate when a broad perspective on a particular phenomenon is preferred. In the context of the thesis a small-N-study was a suitable research design to study the impact of ChatGPT on a limited number of organisations and employees as it provides a detailed and nuanced analysis. The choice of Selecting a diverse range of informants and respondents from different contexts, such as various work roles and organisations was beneficial to obtain multiple perspectives on the same phenomenon.

The terms “informant” and “respondent” are often used interchangeably in the literature. This study uses the term “informant” to describe the participants as it might reflect the approach and terminology commonly used in qualitative research. The term “informant”, which is used in this research, originates from social science and is used in qualitative research to indicate that the investigator may require guidance and instruction on cultural practices, norms, and other complex phenomena of the setting being studied (Morse, 1991). As described by Open Education Sociology Dictionary (2023) the key informant is a person who is chosen as the link between the researcher and the group being studied.

3.4.1. Interviews

The first type of data collection in this thesis was conducted using semi-structured interviews, a qualitative research method, with informants as participants. Denzin and
Lincoln (2018) emphasised that to gather information about participants’ experiences, beliefs, and attitudes about a research topic, the researcher should engage in dialogue rather than simply ask questions on the topic. One advantage of interviews is that they allow for in-depth exploration of participants experiences and perceptions on ChatGPT, providing rich and detailed data about how the IT industry adopts it, which might have been difficult to obtain through other data collection methods (Clarke & Braun, 2013).

Interviews can be divided into three types according to Clark and Braun (2013): **structured** interviews, unstructured interviews, and semi-structured interviews. Structured interviews require a predetermined set of questions asked in a fixed order, ensuring that each informant is asked the same questions in the same way, which is intended to help maintain consistency and accuracy of the data collected. As the order of the questions have to be followed in the structured method it can be inflexible and may not allow for exploration of deeper insights. **Unstructured** interviews, on the other hand, have open-ended conversations without a fixed set of questions allowing for more spontaneity and flexibility and encourages exploration of unexpected topics but can lead to inconsistencies in data collection. **Semi-structured** interviews involve a set of predetermined questions but do also allow for follow-up questions based on the informant's answers. The flexibility of semi-structured interviews allows the researcher to explore new areas as they emerge during the interview process, encouraging deeper understanding and uncovering unexpected insights (Creswell & Creswell, 2018). The choice of semi-structured interviews for this study was made because of the balance between structured and unstructured methods. The semi-structured interview approach enabled the collection of rich and detailed data about the informant’s experiences, perceptions, and attitudes towards the adoption of CAI in the organisations and could also lead to new insights.

There are also some limitations to interviews as a data collection method such as they can be time-consuming and resource-intensive, particularly when participants are difficult to recruit or have limited availability but also pose a risk of bias and subjectivity as the interviewer's characteristics, perspectives, and experiences can influence the data collected (Clarke & Braun, 2013). To address this risk, researchers should aim to be aware of their own biases and take steps to minimise their impact as explained previously in the role of the researcher. Interviews can be conducted in person, over the phone, or virtually (Clarke & Braun, 2013) using video conferencing tools such as Microsoft Teams, Google Meet, or Zoom. The interviews in this study were conducted virtually via the Zoom platform, which allowed for **remote data collection** while ensuring a high level of participant comfort and accessibility.

Conducting remote interviews may have made it easier to access the informants as geographical location was no longer a barrier to participation in the interview process. Conducting interviews online helped maintain neutrality as researchers could engage with participants in a neutral environment free from potential biases introduced by the physical setting. To ensure that no data was lost, the interviews were recorded using both Zoom's built-in recording function and additional recording software tools to ensure there were multiple sources if one would technically fail. Remote interviews also presented some potential challenges such as network troubles and other technical problems where issues such as poor sound quality or microphone problems, as experienced with one informant, could disrupt the interview process or potentially impact the quality of the collected data. Remote interviews give less control over the interview environment as there was no guarantee that participants would be free from distractions or interruptions during the interview. The benefits of conducting remote interviews, such as flexibility, accessibility, and neutrality outweighed the potential challenges. By acknowledging and addressing these challenges through proper
planning and troubleshooting, the aim was to ensure a high level of data quality and participant satisfaction throughout the interview process. “Good preparation is the key to the successful use of interviews in qualitative research” (Clarke & Braun, 2013). For this study, semi-structured interviews were employed, allowing the interviewer to follow a flexible guide while also enabling spontaneous exploration of topics of interest that arise during the conversation. This approach ensured consistency across interviews while also allowing for emergent themes to be explored in greater detail.

Denzin and Lincoln (2018) describe content analysis as something that allows measuring, counting, and comparing of qualitative data in scalable, quantitative forms where variables can be inductive, evolving from open coding, or deductive, evolving from prior knowledge. To create the interview guide, a deductive content analysis approach was used. This involved doing a literature review, where existing studies, articles and other sources of information were identified and reviewed in relation to the research topic. Identifying key topics, themes and concepts in the theoretical framework. The concepts identified in the theoretical framework consisted of 4IR, 5IR, Automation of tasks and ANT. Based on this review, a list of open-ended questions was developed, designed to encourage informants to share their experiences, perspectives, and opinions. An iterative process was used in the development of the interview guide. After the initial draft, pilot interviews were conducted with two participants to evaluate the clarity and effectiveness of the questions. Feedback from these pilot interviews was used to improve the guide, ensuring that questions were well-structured, encouraged open, informative responses and covered all relevant topics. The finalised interview guide (See Appendix A Interview guide) consisted of a combination of main themes with questions and potential follow-up questions, which allowed follow up on specific topics when necessary and suitable. The interview guide also included general instructions, such as reminders to establish rapport, maintain neutrality, and ensure confidentiality.

To achieve a detailed understanding, researchers may follow an abductive approach that integrates both deductive and inductive approaches (Graneheim et al., 2017). Relying solely on deductive content analysis, which is to interpret data by applying an existing theoretical framework or a set of concepts, to create an interview guide may not be enough. In creating the interview guide, an inductive approach was used which involved identifying themes or categories from the data collected during the first two interviews. By moving back and forth between the two approaches, a detailed understanding of the findings and identifying new patterns could reveal previously unnoticed patterns and insights. The abductive approach was used in creating the interview guide as it allowed the guide to be a more robust and comprehensive guide that successfully addressed the research question and provided a clear understanding of the phenomenon being studied. The data gathered through the interviews was then used to develop and create a qualitative questionnaire (See Appendix B Questionnaire). As described by Clarke and Braun (2017) questionnaires as a method can be used to enrich data collected through interviews, which was the intention of using questionnaire as a data collection method.

3.4.2. Questionnaire
Unlike a survey, which usually consists of closed-ended questions with a fixed set of response options, a qualitative questionnaire allows participants to respond in their own words, providing more detailed and personalised information about their experiences, attitudes, and beliefs. Bradburn et al. (2004) describe a qualitative questionnaire as a data collection method that consists of a set of open-ended questions designed to collect qualitative data from participants. Using questionnaires as a data collection method after the interviews offered
several advantages that strengthened and enriched the data gathered during the interview process. A key benefit was the concept of triangulation which involved using multiple data collection methods to support and enrich findings from the interviews. Using triangulation could improve the validity and reliability of the results, potentially reducing bias and enabling a deeper understanding. Some participants might feel more comfortable sharing information through questionnaires on sensitive topics such as concerns of job loss which might have been withheld when using interviews as a data collection method. Questionnaires provide a higher level of anonymity than interviews because participants don't have to meet with the researchers. The questions were created to be open-ended and exploratory, with a clear link to the aims of the study allowing participants to provide detailed responses that gathers their perspectives and experiences.

Questionnaires can be sent via social media, email, post or face-to-face, depending on factors such as study demographics, availability of resources and purpose of the study. In this research the questionnaire was administered online through various channels such as Facebook Messenger, WhatsApp messenger or through email. The choice of questionnaire platform was based on several key factors. SoSci Survey (2023) was selected as it provides a professional, white-label solution that is compliant with the requirements of German [European] data privacy laws. A white-label solution refers to a software or service that can be branded and customised by the end-user to appear as if it is their own product or service which can provide a more professional appearance to the questionnaire. In addition, the platform features an accessible survey interface design which was important to ensure that participants could easily navigate the questionnaire. The privacy features of SoSci Survey were also a major consideration as privacy and confidentiality is an important topic in research and of this study. To ensure the quality and functionality of the questionnaire, several pre-tests were conducted that allowed testers to provide individual feedback on each section of the questionnaire. This process involved iterative improvement and creative thinking, such as phrasing questions and deciding whether to place them separately or on a single page to maximise participant engagement. Bradburn et al. (2004) recommends that “In computer-assisted interviewing, the standard procedure is to put only one question at a time on the screen”. Contrary to the recommendation, and given the small number of questions, the decision was to place all six questions (see Appendix B – 5. Questions page) on a single page to provide them with a visual overview of the whole questioning process. This could allow the participants to see the amount of information required and possibly reduce the likelihood of them stopping halfway through the questionnaire.

During the development of the questionnaire, the guidelines established by the Ethical Advisory Board in South East Sweden (2021) and research practice guidelines were followed. An ethical concern that was encountered in creating the questionnaire was the risk of placing informants in a difficult situation if the use of ChatGPT was prohibited at their company, and they were asked about their usage. This could be considered the collection of sensitive data. Although anonymity and data anonymisation was ensured, there could be a risk that their employer might become aware of their responses. To avoid this issue, a screening question was introduced (see Appendix B – 2. Screening page) on a separate page right before the main questions, asking if the use of ChatGPT is prohibited at their workplace. If the answer was "No", they could proceed further, if the answer was "Yes", they were directed to a page that thanked them for their participation and the questionnaire ended (see Appendix B – 3. Ending page (Screening page)). On the last page of the questionnaire after the questions were completed, a final question was asked: "Would you like to comment on this questionnaire, or add any information to help us better understand your answers?" This allowed the informants
to provide any valuable information regarding the questionnaire or the questions (see Appendix B – 6. Comments page).

Questionnaires as a method of data collection have the potential to reach more participants than interviews as they can be distributed to a large number of people simultaneously and completed in a timeframe convenient to the informants where interviews are typically conducted one-to-one or in small groups, and are more time-consuming and resource-intensive. Questionnaires can also be distributed through different channels to reach participants who cannot be reached through other channels and they can be designed to include both closed-ended and open-ended questions which can provide a range of quantitative and qualitative data on the research topic. While questionnaires may have advantages in terms of their potential reach and efficiency they also have limitations such as informants not answering all questions, may skip questions or provide incomplete answers, or may not fully understand the questions. Bradburn et al. (2004) explains that the interviewer's skills generally don't affect the data in the questionnaire data collection process. This can be viewed as both positive and negative where on the positive side, this means that the researcher's biases don't affect the results while on the negative side, it means that the questions need to be well-formulated and there is no direct control over the interview situation where no follow-up questions can be made based on the different answers provided. Interviews allow for a more in-depth exploration of the research topic, can provide richer qualitative data, and can allow for clarification or follow-up questions. As such the questionnaire was used to support and validate the findings from the interview and provided a more detailed picture of the collected data as described by Clarke and Braun (2017). With the help of using the two qualitative data collection methods it made it possible to gather rich and detailed data about the adoption of ChatGPT in organisations and the impact it has on the organisation itself as well as on the different work roles and employees.

3.5. Data analysis

Good skills when analysing data can be to analyse it critically and have a curious mindset rather than just following rules. Analytical sensibility is a term used in qualitative research to describe the ability to think critically and analytically about data (Clarke & Braun, 2013). It refers to the researcher's capability to identify patterns and themes in the data, to see connections between different pieces of information, and to interpret these findings in a meaningful way. Analytical sensibility requires skills such as open-mindedness, reflective thinking, and self-awareness as well as the ability to apply relevant theoretical frameworks and concepts to data.

The theoretical framework, which consists of concepts such as AI and job displacement, organisational impact, employee engagement and adaptation, and ethical concerns, played a significant role in guiding the deductive content analysis. When coding the data, the initial categories were guided by the key themes identified within the framework. By integrating the theoretical framework into the deductive content analysis process, as explained in detail in the following sections, the study could effectively explore the implications of ChatGPT on work roles in the IT industry and understand the complex relationships between the technology, the humans and the organisation involved in the process. The use of the theoretical framework in the interpretation of results allowed for a comprehensive and detailed understanding of the empirical findings and enabled the critical evaluation of existing theories and the identification of new insights based on the data.
**Thematic Analysis** is a qualitative research method used to identify and uncover patterns of meaning, or "themes," within data. It is a flexible approach that can be used across different theoretical frameworks and research paradigms (Clarke & Braun, 2017). Thematic analysis involves creating codes which are the smallest parts of the analysis that highlight interesting details of the data related to the research question, and themes, which are broader patterns of meaning tied together by a main idea. Thematic analysis is useful in research because it can be applied to various types of qualitative data regardless of research questions, sample sizes and types, data collection methods, and the researcher's chosen approach to generating meaning from the data.

Graneheim et al. (2017) describe **content analysis** as a research method used to systematically analyse textual data, such as interviews or documents. It involves identifying, coding, and interpreting patterns in the text, making it a valuable tool for qualitative and quantitative research. The method can be used to describe or explain a phenomenon, test hypotheses, or make assumptions about the data. Content analysis can be applied using both inductive and deductive approaches. In the inductive approach, researchers do not start with predefined categories or codes; instead, they allow categories to emerge from the data itself. This approach is valuable when exploring a new research area or when the data is complex and challenging to categorise. The deductive approach, on the other hand, involves using existing theories or hypotheses to guide the data analysis. Researchers begin with a predefined set of categories or codes they believe are relevant to their research question and use those categories to analyse the data. Further Graneheim et al. (2017) argue that the basic beliefs about the nature of reality (ontological assumptions) for this method can change depending on the researcher's perspective. The predefined categories in this thesis were 4IR, 5IR, Automation of tasks and ANT, which were used to structure and organise the analysis, also referred to as inductive content analysis. The method's underlying principle (epistemology) is that understanding the text is a shared process between the researchers and the text itself. The method also has difficulties in maintaining the same level of simplification and understanding throughout the analysis and sharing of results. Orlikowski and Baroudi (1991) describe **ontological assumptions** as the fundamental beliefs about what is considered real or true. They are the basic ideas about the nature of reality that guide a researcher's understanding of the world. These assumptions are often influenced by broader philosophical and theoretical perspectives that guide how researchers approach their research questions and methods. Both thematic analysis and content analysis involve identifying patterns and themes within the interview and questionnaire data. Thematic analysis may be more appropriate when the goal is to identify patterns of meaning or themes in the data using a bottom-up approach, while content analysis may be more appropriate as it focuses on identifying patterns and themes within the content, using either a deductive or inductive approach.

**Inductive content analysis** does not start with predefined categories or codes, the categories emerge from the data itself (Elo & Kyngäs, 2008). Researchers carefully look at the data for patterns and themes that arise naturally and create categories based on those patterns. This approach assumes that the data contains the relevant concepts and theories, and the researcher's task is to discover them. Further Elo and Kyngäs (2008) explains that **deductive content analysis** is a method in which researchers apply existing theories or hypotheses to guide their data analysis. They begin with a predefined set of categories or codes they believe are relevant to their research question and use those categories to analyse the data. This approach assumes that the researcher has an understanding of the relevant concepts and theories in the field and can apply those concepts and theories to the data. Deductive content analysis can be useful when the researcher has a clear idea of the concepts and theories.
relevant to their research question. Inductive content analysis is valuable when the researcher aims to explore a new research area or when the data is complex and challenging to categorise. By combining these approaches and including the theoretical framework it ensures a broad understanding of the collected data, identifying patterns, themes, and relationships relevant to the research questions and objectives while also allowing for a critical evaluation of the existing theoretical framework and the potential identification of new insights and updates based on the empirical data.

Clarke and Braun (2013) highlight organising and coding data from interviews and questionnaires as a crucial step in the qualitative data analysis process. These steps help researchers systematically categorise, interpret, and extract insights from the collected data. The following steps were taken in the data analysis process and applied to both the interviews and questionnaires, as described by Creswell and Creswell (2018):

1. **Data Preparation**: In this step, the collected data is organised, which involves transcribing interviews and creating a database for the data.

   - **Transcription**: The first step in organising interview data is to transcribe the audio recordings into text format. This process involved converting spoken words into written text, word-for-word. For this task, the Microsoft Word Online transcription tool was used. This tool increased efficiency in the data analysis process, as it was highly accurate in transcribing the audio. Minor adjustments had to be made while reviewing the transcription due to some informants speaking too quietly, too quickly, or unclearly.
   - **Data management**: The collected data, including interview transcripts and questionnaire responses, was organised in a structured format. This involved creating a database with folders and subfolders in Google Drive, as well as securely storing the data in two separate offline backup folders.

2. **Reading all the data**: Since data was collected from several informants, the goal was to gain a general understanding of the collected data and gather overall impressions from the interviews and questionnaires.

   - **Familiarisation**: The interview transcripts and questionnaire responses were thoroughly reviewed to gain a general understanding of the content and identify any initial patterns or themes. Thoughts and comments were recorded during this process to provide an overview, as this step involved actively, analytically, and critically reading the text and starting to think about what the data means (Clarke & Braun, 2013).

3. **Coding the Data**: In this stage, different paragraphs of the transcripts were labelled to categorise and organise the data in a meaningful and useful way for the research topic. Coding is a process of identifying aspects of the data that relate to your research question. The focus in this study was on the two methods used, such as complete (open coding & axial coding) and selective coding which is also described in how coding the data was conducted. In general, the steps below were followed regardless of the coding method used:

   1. Data from each interview and questionnaire was coded by interpreting the sentences and assigning a representative code summarising the information, this was made with the research question and objectives in mind.
2. Every paragraph was assigned one or more codes, depending on the length of the paragraphs, the information in the sentences and the interpretation.
3. All the codes were collected in a sheet and categorised into main and subcategories.
4. The sheet provided an overview and the possibility to organise and structure the codes and categories, in this step the categories and codes were combined into broader themes.
5. Finally in this step the categories and themes were refined by focusing on those that are most relevant to the research questions or objectives. Step 1-5 were iterated until the key findings were presented in the empirical findings.

Clarke and Braun (2013) describe complete coding as a process that involves identifying all data relevant to the research question and assigning codes to it. The process is an inclusive process where a sentence can be coded in multiple ways. The process of becoming more selective takes place later in the analytic process. Clarke and Braun (2013) explain that selective coding is the process of refining and focusing on the most significant or relevant codes and categories identified through complete coding, in order to create a structured and clear framework for understanding the data. Below is a description of the iterative process combining complete and selective coding in this thesis, as described by Creswell and Creswell (2018):

- **Open coding**: The coding process starts by assigning codes or labels to parts of the interview transcripts and questionnaire responses that capture the central idea of the content. When creating codes, they should describe what is observed in the data, and not be influenced by any assumptions or theories.
- **Axial coding**: After the initial coding, identify connections between codes and group them into broader categories or themes. This step involves examining and mapping the relationships between codes and deciding how they relate to one another, forming a hierarchical structure of categories and subcategories.
- **Selective coding**: Refine the categories and themes by focusing on those that are most relevant to the research question or objectives. This step may involve merging, splitting, or excluding categories to develop a clear structure for understanding the data.
- **Iterative process**: The coding process is typically iterative which means that researchers revisit and edit the codes and categories as they go through the data analysis. This ensures a detailed understanding of the data and allows for new insights and patterns to emerge.

4. **Data Reduction**: Based on the coding of the paragraphs, general themes and descriptions were generated from the empirical data. This step involved reviewing and summarising coded data, analysing patterns and relationships, and eliminating redundant or irrelevant information in regard to the research topic.

5. **Data Interpretation**: During the data interpretation stage the themes and descriptions were examined to reach conclusions and gather insights related to the research questions. This process involved finding patterns, connections, and themes in the coded data and then organising the information to create conclusions based on the observed patterns and themes. While data interpretation is an essential step in the qualitative data analysis process, it is not necessarily the last step. After data interpretation, researchers may need to refine their analysis, draw additional conclusions, or identify further questions for future research.
3.6. Ethical considerations
This study was conducted in accordance with the ethical guidelines set by the Ethical Advisory Board in South East Sweden and was following good research practices guidelines. An information letter was sent to the participants beforehand (See Appendix C), following the guidelines of the advisory board (Ethical Advisory Board in South East Sweden, 2021), to inform the participants of procedures such as how the study will be carried out and how the material will be treated. Informed consent was obtained from all participants with a recorded consent as the interviews were conducted in a digital form, following the ethical advisory board guidelines (Ethical Advisory Board in South East Sweden, 2022). The basic premise of informed consent is according to Creswell and Creswell (2018) that the person being studied voluntarily participates in the study in order to respect the privacy and anonymity of participants and organisations. The participants were informed right before the interview started that they could withdraw their consent at any time during the study. Data that can lead to identities will be eliminated and a low data detail will be applied such as using aliases or pseudonyms instead of real names or places (Creswell & Creswell, 2018).

3.7. Validity and reliability
Creswell and Creswell (2018) describe reliability and validity as important concepts for evaluating the quality of research. In qualitative studies, validity refers to the correctness of the findings from the perspective of the researcher, the participant, or the readers, while reliability focuses on the consistency and repeatability of the measures and results. To ensure the trustworthiness of this thesis, the described strategies presented below have been applied throughout the research process:

Researchers can use different strategies to ensure qualitative validity as previously explained in the researcher's role. Triangulating different data sources to validate findings and interpretations in themes. If themes are established based on combining data or participants' perspectives, the study's validity is strengthened. To further strengthen the validity, a “member check” with specific descriptions or the final report is presented to the participants to give feedback and correct possible misinterpretations. Researchers need to be self-reflective and spell out any biases they may have, because recognising their own biases is essential to creating an honest and clear report. Peer debriefing, which involves having another individual, such as a supervisor or a teacher, review and ask questions about the study, can also improve the accuracy and validity of the findings.

Qualitative reliability is centred around whether the study answers the research question and to ensure reliability researchers should document their procedures as thoroughly as possible. Several qualitative reliability procedures can be employed, including:

1. Reviewing transcripts for errors made during transcription.
2. To make sure that the interpretation of the codes remains the same, the data should keep on being compared to the codes. The researchers should take notes on the codes and what they mean.
3. In team research: Coordinating communication among researchers by holding regular meetings and sharing the notes.

Researchers can improve the reliability and validity of qualitative research by following the described procedures ensuring that their findings are accurate and consistent.
4. Empirical Findings

In this chapter, the empirical findings of this study are presented, beginning with a description of the data collected through the interviews and the questionnaire, what adjustments have been made and the justification for them. Followed by listing the key themes based on the codes from the data collected and finally presenting the empirical data.

This study, focused on the adoption of conversational AI in organisations and its impact on work roles and employees, used a combination of semi-structured interviews and qualitative questionnaires as data collection methods. These methods were chosen to provide a comprehensive understanding of the phenomenon while enabling a broader range of participants to contribute to the research (Clarke & Braun, 2017). Semi-structured interviews were conducted virtually via the Zoom platform, applying a balance between structured and unstructured methods, and allowing for flexibility in exploring new areas of interest during the interview process (Creswell & Creswell, 2018). Together with interviews, qualitative questionnaires were sent out through various online channels used to further deepen the understanding and validate the collected data, ensuring a more detailed picture of the phenomenon (Clarke & Braun, 2017).

The process of going through the empirical data combined deductive and inductive content analysis approaches, guided by the theoretical framework, as described by Clarke and Braun (2013) which included the concepts 4IR, 5IR, automation and ANT. This approach allowed for a detailed understanding of the collected data and an iterative critical evaluation of the existing theoretical framework, while identifying new insights based on empirical data. This process involved preparing data, getting familiar with the data, coding (complete and selective), reducing, and interpreting the data. Through these steps the data was systematically categorised, interpreted, and extracted insights from the collected data, identifying codes, categories, and themes that added to the study's conclusions. By using this combination of data collection methods and analysis approaches, the study aimed to provide a rich and detailed understanding of the adoption of conversational AI in companies and its effects on different work roles and employees, remaining grounded in the relevant theoretical context.

The following chapter presents the findings, divided into two main sections that describe the themes discovered during the research. Section 4.1 focuses on the findings from the interviews, exploring the themes such as CAI application areas, benefits and challenges of CAI as a work tool, organisational changes due to CAI, future prospects of CAI, and Changes to work roles. Section 4.2 is focusing on interpreting the results obtained from the questionnaires, exploring themes such as CAI application areas, benefits and challenges of CAI as a work tool, experiences with CAI as a work tool, organisational guidelines and procedures, and Changes to work roles. Through this structure, the aim is to provide a detailed understanding of the adoption of conversational AI in organisations and its various implications.

4.1. Interviews

The data collected for this study is from five in-depth interviews conducted across four companies located in Germany and Sweden. The sample includes one small company and three large companies, representing a diverse range of organisational sizes and structures (see Table 1 - Interview participants). The participants were selected based on their roles and experience within these organisations, providing valuable insights into the research topic.
Table 1 presents an overview of the informants and key information about their position in the company, how long they have been employed in the company and the classification of the company size is as follows: small 0-50 employees, medium 50-250 employees and large 250+ employees.

Table 1

Interview participants

<table>
<thead>
<tr>
<th>Role</th>
<th>Time on company</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informant 1</td>
<td>Legal counsellor</td>
<td>1 year</td>
</tr>
<tr>
<td>Company B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informant 2</td>
<td>Treasury Specialist - Global Lead Developer</td>
<td>3 years</td>
</tr>
<tr>
<td>Company C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informant 3</td>
<td>Senior portfolio manager</td>
<td>4 years</td>
</tr>
<tr>
<td>Company D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informant 4</td>
<td>Chief Executive Officer</td>
<td>7 years</td>
</tr>
<tr>
<td>Informant 5</td>
<td>Chief Product Owner</td>
<td>7 years</td>
</tr>
</tbody>
</table>

Note. Overview of the interviewed participants.

The interview process was carefully planned and structured, following a pre-prepared interview guide. Each interview started with welcoming the participant, followed by an explanation of the process, including obtaining their recorded consent for recording the interview. To guarantee the quality of the recordings, several separate recording sources were used, including the built-in Zoom recorder, reducing the risk of data loss. The duration of the interviews ranged between 25 to 50 minutes, with 60 minutes reserved in the schedule for participants to respond to the questions. The data obtained from the interviews was carefully managed to ensure both accuracy and privacy. The Microsoft Word web version's transcription tool was used to convert the recorded audio files into text format. To maintain confidentiality, all personal and company information was anonymised. A thorough manual review of the transcripts was then performed, with the objective of verifying the accuracy of the transcriptions and sorting out any errors. To store the recordings securely, the files were uploaded to the Linnaeus University Students Google Drive account. Backups were also kept, limiting the access to the authors, in compliance with the Ethical Advisory Board in South East Sweden (n.d.). Throughout the duration of the master thesis writing process, the data will be stored upon completion and grading of the thesis. After completion the data will be deleted, showing a commitment to the ethical handling of sensitive information.

No additional relevant comments were expressed after the final question, indicating that the participants felt they might have shared their perspectives completely. Two interviews were conducted in German and translated to English to ensure consistency and enable the analysis to be comparable. The interviews provided valuable insights into the research topic, with participants actively engaging in the discussion within a comfortable online setting. Even though the methods were planned carefully, a few challenges during the data collection process were encountered. One such challenge was the translation of German interviews into English, as accurately translating the meaning of certain words and expressions proved to be difficult. Another encountered challenge was that participants occasionally moved away from
the topic, discussing other aspects, for example other types of non-CAI tools. In such cases, the questions had to be rephrased or the informants had to be gently guided back to the topic.

From the interviews, a total of six different themes emerged with the help of the theoretical framework, various codes, categories and subcategories. Some individual codes could not be assigned to the six themes because they did not match the theoretical framework or the research topic. These codes emerged, for example, when an informant moved away from the topic. Below is a sample of such codes that did not fit into any theme:

- “Schools have to adapt”
- “Inconvenient to use on mobile devices”
- “Home usage”
- “Other interesting AI products”

The six main themes were created from the categories application areas, benefits, challenges, changes, future prospects and work roles. The first theme “CAI application areas” emerged from the category “application areas”, which presents different areas where CAI is used and potential areas where it could be used. The second theme “Benefits of CAI as a work tool” describes the category of “benefits” to the organisations implementing ChatGPT. The third theme “Challenges with CAI as a work tool” from the category “challenges”, with implementing CAI as a work tool describes various difficulties encountered. This theme had four subcategories such as “ethical considerations”, “guidelines and regulations”, “privacy and data protection”, and “quality concerns”. The fourth theme “Organisational changes due to CAI”, derived from category “changes”, describes various changes which were an effect of implementing ChatGPT. The fifth category “future prospects” which led to the theme “Future prospects of CAI” The sixth and last category “work roles” which emerged from the theme “Changes to work roles”. Having identified and presented the six main themes, this section presents the empirical findings from the data collections sorted under the main themes. These findings illustrate the diverse perspectives and experiences of the informants as they discuss the potential and existing application areas, benefits, challenges, and the overall impact of CAI on the IT industry.

4.1.1. CAI application areas
All informants discussed potential and existing application areas of CAI for text processing. For example, Informants 3C and 5D use it to automate repetitive tasks like summarising meeting notes, while Informant 4D use it as a work tool to create better and more professional emails. Informant 1A provided an example of using ChatGPT for copywriting: "... because copywriting is basically what ChatGPT does, you tell it to make it sound more professional, or make it sound more academic."

Coding and code reviewing were also identified as application areas by Informants 2B, 3C, and 4D. The informants noted that ChatGPT can be used to understand code pieces, write code, or review it for errors, bugs, or improvements. Informant 4D described ChatGPT's ability to improve a given piece of code: "...to have code explained, but also to ask questions about code improvements within the context of the code." Informant 3C shared that ChatGPT can generate code in different programming languages with just a few simple prompts written in plain text. Informant 2B provided an example where ChatGPT writes code for software: "I want to have a piece of code that transfers a file from this directory to this. Then it gives you a piece of code."
Other areas of application that were mentioned, as described by informant 3C and 4D are the customer service department, which processes questions from customers and which often represents a bottleneck in the organisation. The help of ChatGPT and its capabilities of creating unique and customer related answers can be a very helpful solution. Informant 4D suggests that ChatGPT could be used in marketing for creative support, such as generating slogans or catchy headlines, and as a search engine optimizer, determining keyword density and optimising websites for improved search engine rankings. Lastly, Informant 3C visions CAI being used in the hiring process, with for example, ChatGPT automating CV analysis to identify suitable candidates for job vacancies.

4.1.2. Benefits of CAI as a work tool
All informants described different ways in how using CAI can increase productivity, as argued by informants 2B, 4D and 5D the use of the technology leads to various benefits such as increased efficiency. Informant 5D highlighted that the speed is increased for gathering information compared to a manual search with Google. Informant 2B demonstrated ChatGPT capabilities as a working tool assisting in building a Lego House. Where working without ChatGPT would be like working without instructions or a guide on how to assemble it:

I'm trying to build a Lego House let's say with. Without having the instructions but you on the other hand, you have. You don't only have the instructions, you have the video showing you how to do every step. So, you're going to complete the work, like in a more productive and effective way.

As expressed by informants 1A, 2B, 4D, and 5D, the completion of certain tasks becomes much easier and quicker when using work tools like ChatGPT for support. Informant 4D highlighted that there are already IT companies that use AI to develop code in a short time and that this efficient code creation process will be more broadly available with the help of ChatGPT. Informant 4D explained that software can be written with fewer errors and can improve the quality of the code. Further the informant explored a benefit in implementing ChatGPT in customer service, to increase the quality of the answers:

It shouldn't be a standard text snippet, but an answer should always have a bit of a personal reference, and I see a huge opportunity when you are able to individualise texts in customer service with conversational AI and they don't sound like a standard text block to the recipient.

Informants 1A, 3C, 4D, and 5D highlight the potential benefits of implementing and using CAI to save resources like money and labour. Informant 3C illustrates how the IT support process at a company can be improved and optimised to save time and money through CAI integration. By allowing CAI to manage IT support tickets first, issues can be resolved, and if necessary, a detailed ticket can be created for human support employees to investigate further. As informant 3C points out, this approach effectively outsources expensive technical support employees, potentially leading to significant labour cost savings.

Informant 3C explained that in many companies, customer service can be a bottleneck, with employees struggling to keep up with service requests. Automating service tickets with ChatGPT can save labour costs and improve customer satisfaction. Informant 4D shared how using ChatGPT has already saved considerable time by automating processes that were previously done manually. Informant 5D emphasised that the need for assistance has
significantly decreased, as explaining a case to an assistant takes more time than solving it directly with ChatGPT. The benefits of ChatGPT further described by informant 5D:

I was positively surprised by ChatGPT, how quickly ChatGPT can help me in my daily work, especially when composing emails or messages, protocols, and that flashed me very strongly and so I'm actually using it and I would say almost every day.

Informant 1A summarises all the benefits of using ChatGPT in one sentence: "So, it's basically avoiding the legwork and focusing only on things that matter for the organisation. For its growth."

4.1.3. Challenges with CAI as a work tool
All informants described challenges with guidelines and regulations that are or will be used to define the use of CAI and ChatGPT, or which in the worst-case scenario, to prohibit access to and the use of CAI completely. Further all informants had concerns about privacy and data protection. Concerns were expressed by all informants on the use of ChatGPT in relation to privacy, as described by informant 1A: "...we don't really know what is going to happen, with the data that's going to end up in ChatGPT…We should absolutely avoid feeding ChatGPT with any sort of personal data". In contrast, informant 4D argued that ChatGPT works better or can give better and more accurate answers, the more specific data is entered. This approach leads to more data being given than may be desired, which leads to a conflict of privacy and quality in the use of ChatGPT, as stated by the informants 3C, 4D and 5D. The Ethical Considerations such as the transparency of ChatGPT's output was critiqued and described to be an issue. Informants 1A, 4D and 5D explain that it is hardly possible to determine whether a text was written by an AI or a human and that it is not possible to prove or trace the origin or basis of the text. As highlighted by informant 1A: "Right now, ChatGPT is like a black box. We know nothing. There is no auditability or traceability."

Informants 1A, 2B, 4D and 5D expressed doubts about the quality of the answers given by ChatGPT. Informant 1A further described concerns about the correctness of the answers: "There is an issue, a challenge about correctness, as conversational AI is, so they can produce great answers. But sometimes they can be wrong and this is something that we cannot make." The same concerns were also described by Informant 4D as he experienced answers from ChatGPT being misinformation: “You can't take it one to one, you actually, always have to do your own research and try to validate the information again…” As motivated by 1A and 4D a challenge in handling and validating the answers arises.

Informant 1A argues that there is a race in advancement of technology, policies and the companies:

I think that the biggest challenge is going to be the chase game that is going to be played between the developers of these kinds of tools, the legislators and the company that is trying to keep up with both.

Another challenge that organisations will face involves the varying interests and skills of employees concerning technology, as described by Informant 3C. The informant explains that while some employees are interested in technology like ChatGPT and experiment with it, others are not as engaged with this kind of technology. Organisations must consider and address the needs of these employees, as highlighted by Informant 3C. Informant 2B
emphasises that adapting to new technology instead of rejecting it will be a challenge, as those who fail to adopt it risk being left behind. The informant further describes that the changes happening to the workplace because of ChatGPT will be massive: “The change in the workplace is going to be massive and it's going to be. It's going to happen like. In months. If you are not prepared. You're going to be…like you very soon get left [behind]...”. Since the changes and effects because of ChatGPT are going to be massive and fast, as for example informant 4D describes, the potential benefits for smaller companies but also the risks of not being prepared could be significant:

A company with 3 people can act like a company with 30 people and that means the challenges that I see right now is that, and that is happening so fast. If you don't deal with the issue now, that tomorrow, you'll already be a tech dinosaur and have actually completely lost touch.

4.1.4. Organisational changes due to CAI
The informants highlighted various changes in the organisations, such as shifts in day-to-day work, as described by Informant 1A: "The day-to-day work is going to change, change focus and instead of spending a lot of time building processes, building tools, building systems is going to be spent now into thinking about new ways to advance." Informants 1A and 3C both mentioned that every organisational area would undergo changes, with CAI having a disruptive impact on all organisational aspects. Informants 1A and 4D emphasised that these changes would particularly benefit small organisations, as many functions and processes managed by different departments in larger companies could be automated with CAI. Informant 1A further elaborated: "If it is implemented properly, [the organisations achieve] quality results and this is going to help organisations, even smaller organisations, and the level of startups to scale way faster than it was happening before." However, Informant 2B expressed concerns regarding the rapid changes:

...Because in the first like minutes or two, realise what this is and what kind of bot, it's kind of not only straight, but it's terrifying. If you go deep into this, the only way to avoid these feelings is to accept what is good for and try to be, like a friend of it.

In the customer service department, Informant 3C explained that the right use of ChatGPT could lead to improved customer satisfaction and labour cost savings. Informant 4D referenced a discussion from a Microsoft keynote event: where call centre automation, employing speech-to-text technology and AI summarisation, saved up to 500 working hours per week.

Changes in the human resource department are also expected, as Informant 3C mentioned that processes such as recruiting could be automated to save time. As highlighted earlier in the application area section, Informant 4D noted that the marketing department will undergo changes as well, with jobs like SEO and content creation for headlines, slogans, or presentations potentially being replaced by tools like ChatGPT for increased cost saving. Informant 1A further described the organisational changes as legal departments being replaced by CAI, summarising that every organisational aspect could be influenced by AI.

4.1.5. Future prospects of CAI
Informant 5D expressed concerns about the future of ChatGPT in the IT industry, noting that caution is needed in its development: "I'm not entirely sure whether I think it's good or bad..." Informant 4D added that as other work tools similar to ChatGPT emerge, it is essential to
carefully evaluate and implement them. Informant 3C shared that their company closely monitors CAI's development, keeping track of its possibilities and risks by discussing the topic daily. The informants also discussed the potential benefits of using tools like ChatGPT for various automations. For example, Informant 3C suggested automated summarization of meeting notes, while Informant 5D described that such advantages would enable smaller companies to become more competitive. Informant 1A emphasised that changes resulting from the use of tools like ChatGPT could happen in every sector, and further noted that the impact will be significant:

I really believe that the impact is going to be extremely big. I think that a lot of things are going to change. The IT and tech industry is not going to be the same anymore, as I said some roles are going to Disappear. Some new roles are going to be created.

Informant 4D discussed the creation of new roles, such as ChatGPT experts, while acknowledging that some work roles may disappear. This claim is also supported by Informant 5D, who describes the future changes in the labour market as substantial.

4.1.6. Changes to work roles
Informants 1A, 2B, 4D elaborate on the importance of developing skills related to effectively using conversational AI technologies. They mention the need to write good prompts and learn how to use the AI tools optimally. Informant 4D described the process of using ChatGPT: “That you are able to describe something to this language model and enter it in such a way that you also get the result. So, the better the prompt, the more you understand, the better the result.” This results in the need for adapting this new technology, as Informant 1A states: “People, as always, have to adapt. I have to be ahead of the curve and try to embrace it as a new tool and not fight it as a danger.” Furthermore, the informant 2B suggested that embracing the new technology and making it a “friend” is crucial, as there should be no room for reluctance in adopting these innovations. The informants 2B and 5D acknowledge that work roles and tasks are likely to change as conversational AI becomes more common.

Informants 2B, 4D and 5D recognised that certain job responsibilities may evolve or shift due to the influence of AI technologies in the workplace. Informant 3C argued that for some areas, even though the technology could be better or cheaper, the process of implementing and fine tuning the program to be perfect, would sometimes be too expensive: “So sometimes it's actually more expensive to build, to train to deploy this [CAI] instead of just hiring low income on the other side of the ocean and make it do the work.”

All informants expressed concerns about employee reduction, as conversational AI may lead to the replacement of certain work roles, such as copywriters, customer service agents, developers, recruiter, search engine optimiser (SEO) and marketing content creators. Informant 4D also mentioned that for example customer service or other teams could get their work done with a lot fewer workers with the help of CAI. They also noted the potential of some jobs getting obsolete due to the growing capabilities of AI, like for example, as stated by informant 3C, expensive developers could be replaced with a program like ChatGPT. Despite the potential for job loss, the informants highlighted the emergence of new roles and opportunities related to conversational AI. Informants 1A, 2B, 4D and 5D mentioned the growing demand for CAI/ChatGPT experts to operate such systems and language models and the increased need for engineers. Informant 2B also argued for more people working with big data and AI, and that these areas will create new branches like an AI engineer.
4.2. Questionnaire

The questionnaire was used to support the findings from the interviews as previously described. An overview of the data collected shows that a total of nine questionnaires were completed (fully answered), one participant could not proceed with the questionnaire because the use of Conversational AI was not permitted within their company, making them ineligible to answer further questions. An additional questionnaire remained incomplete, as it was closed before fully completed, and could not be analysed due to the lack of information. The informants in the sample were employed across various company sizes (as seen in Table 2), with six informants belonging to large companies, one from a medium sized company, and two from small companies. The classification of the company size is as follows also see Appendix B – 3. Personal information page: small 0-50 employees, medium 50-250 employees and large 250+ employees.

Table 2

<table>
<thead>
<tr>
<th>Role</th>
<th>Time on company</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informant 6 Application Management and Support</td>
<td>1 year</td>
<td>Medium</td>
</tr>
<tr>
<td>Informant 7 Legal counsel</td>
<td>1 year</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 8 Head of Customer Success</td>
<td>4 years</td>
<td>Small</td>
</tr>
<tr>
<td>Informant 9 Software developer</td>
<td>0 years</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 10 Senior Software Engineer</td>
<td>15 years</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 11 IT Project Manager</td>
<td>12 years</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 12 Employed student - Business Informatics</td>
<td>7 years</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 13 Consulting/ System Engineer</td>
<td>10 years</td>
<td>Large</td>
</tr>
<tr>
<td>Informant 14 System administrator</td>
<td>1 year</td>
<td>Small</td>
</tr>
</tbody>
</table>

Note. Overview of the questionnaire participants.

The questionnaire process involved sending out the survey to individuals within the IT industry. It remained open for 16 days, during which one informant reached out to the researchers for clarification regarding the definition of CAI and the meaning of "prohibited". No further comments or questions were submitted in the comment section regarding the questionnaire itself, but two informants left a comment to add more information to their answers on the previous main questions page.

In terms of data quality and completeness, it was observed that some informants provided short responses while others were more descriptive. Informants did not always provide detailed descriptions in their responses; therefore, the term "mentioned" is used in the empirical findings to indicate when they briefly referred to a word or term. The quality of the data can be influenced by various factors, such as the informant's setting and mindset while answering the questionnaire, as well as the format of the questionnaire itself (Sanchez, 1992). The questionnaire was made available only in English despite being distributed to individuals in Sweden and Germany. The choice to use only English as a language was made for a few reasons. First, having to manage just one language made the analysis easier, as it removed the need to translate and lowered the chance of misunderstanding the informants' answers because of language issues. Second, English is commonly spoken and understood in both Sweden and Germany, so it works well as a shared language for reaching a varied group of people. Finally,
using English as the main language helped keep the data collection consistent and made it easier to compare with other research done in English.

During the analysis of the questionnaires, several irregularities were identified in the responses: Informant 7 reported their role as “Lego counsel”, which was determined to be neither a technical nor industry-specific term in the IT industry. As a result, it was concluded that this was an error or typo, and the role was corrected to “Legal counsel” as shown in Table 2, to accurately represent their position. Informant 12 described their role as a "Dual student - Business Informatics", a term commonly used in the German education system referring to students who are employed and studying for a related academic degree at the same time. Although this concept is not unusual in other countries or education systems, the term "dual student" is not widely used. To maintain clarity and consistency, the role was adjusted to “Employed student - Business Informatics”, which is a more widely recognised term in the English language and accurately reflects their position (See Table 2 - Questionnaire participants). There were also grammatical errors and misspelt words in the answers. When informants are quoted in the empirical findings, they might have been grammatically corrected for readability, for example:

- “A lot of "prompt experts" appeared  
Companies ask for skillsets that only few people actually have, which can be counter productive at the bend of the day”

Which after analysing the text, was modified to:

- “A lot of “prompt experts” appeared. Companies ask for skill sets that only few people actually have, which can be counter productive at the end of the day.”

From the interviews, a total of six different themes emerged with the help of the theoretical framework, various codes, categories (application areas, benefits, challenges, changes, future prospects and work roles) and subcategories. These initial themes and categories were used to start the process of structuring the data collected from the questionnaires. The categories that emerged from the previously described theoretical framework and categories were combined with the data collected in the questionnaire, resulting in the following categories: application area, benefits, challenges, experience, guidelines and work roles. Which resulted in the categories being presented with the findings in the next section.

4.2.1. CAI application areas
Informants 7, 8, 9, 10 and 14 mentioned several potential application areas that CAI can be used in such as automation of tasks or routines at their work. Informant 10 also described potentials in tasks that are day-to-day related and involve a lot of repetitive tasks. Informant 9 mentioned the use of CAI in automation of software development which also was described by informant 6, who described the use of ChatGPT when coding: "...when I need basic template code for some rest API call for example." ChatGPT can also be well suited to use for creating user-stories, testing code (e.g. user stories or code-check), or looking for bugs, as described by informant 8.

Furthermore, informant 12 described CAI being used for text processing, in use cases, assisting in summarising of texts or websites, and in the creation of texts. Informants 12 and 14 also highlighted the use of CAI to simplify text or to use it to understand concepts or texts. Informant 8 used, after initial testing, ChatGPT for new tasks and to ask more complex
questions, for example for the strategic development of the informant’s department. Another application area described by informant 11 was the use of ChatGPT for generating ideas. Further informant 12 outlined the use of ChatGPT as a tool for finding inspiration: “I use it as a tool for coaching, a source of inspiration or a stimulus for thoughts.” And informant 13 as well shared that view by explaining “It's very useful for creative stuff like a script for a video.”

4.2.2. Benefits of CAI as a work tool
Informants 6, 7, 8, 9 and 10 describe that their work gets done much faster which allows them to use their time more efficiently. As an effect of the raised efficiency informant 9 stated: “It will make software development become more automatic and demand less developers probably.” The efficiency is also further explained by informant 12 as ChatGPT helps finding information about certain topics much faster and simpler than searching manually on different websites. Another benefit is increased quality for tasks and texts, as stated by informant 14: “...it helps a lot by writing important emails and texts to sound more professional and more accurate.” Informant 8 also stated that through ChatGPT the answer to complex questions result in better quality which informant 10 also describes as the “reduction of error” in the day-to-day tasks. Further it was stated by informant 12 that “in general it helps to ease the work, if you want to rewrite texts or collect information/ideas.” Informant 7 on the other hand argued that it does not really affect their work processes as of now: “Not really yet. And I don't expect it to do so except in certain edge scenarios.”

4.2.3. Challenges with CAI as a work tool
Informant 7 and 12 stated that they can use CAI tools with restrictions, since feeding ChatGPT confidential or internal data is not allowed and therefore the text input into ChatGPT needs to be carefully considered. Informant 12 describes this issue which also leads to privacy concerns in the use of ChatGPT: “…and data protection also plays a big role. Which is why it can never be used 100% (you can't use it for everything work related)”. This is also described by informant 9: “data security, don't know how well the AI system could protect my privacy.”

Another challenge as stated by informant 12 and 13 was the liability of the received answers. As informant 12 suggested: “One can use it to help with many things, but we should always question it and not simply believe in it.” Another concern described by informant 13, were with critique against using ChatGPT: “I think that using ChatGPT is dangerous because it tempts people not to think for themselves or to question certain things.” Informant 6 on the other hand has not seen any challenges with using ChatGPT so far.

4.2.4. Experience with CAI as a work tool
All informants had some experience with using ChatGPT as a work tool. It was stated by informants 6, 7, 8 and 14 that they had to learn more about the tool, what it is able to do and what not, and therefore gaining experience with how to handle the tool. In addition to their work experience with the tool, informant 6 described that privat experiments were also conducted to figure out what the tool is capable of. Even though not all the informants are fully working with the tool, informants 7 and 9 want to look further into it even though not yet. Informant 12 also highlighted that their co-workers do not familiarise themselves with the tool or don't know about it at all: “Most of my co-workers don't use it or are just getting familiar with it. Most of the older generation, (50+) are less familiar with it or don't even know much when I talk about it.”
4.2.5. Organisational guidelines and procedures
Since informants were terminated from answering further questions if the use of programs like ChatGPT were prohibited at their workplace. All informants that answered the questionnaire were allowed to use or test the tool at work. Nonetheless there were some restrictions highlighted by informants 6 and 12. The Informants mentioned guidelines that are established. Informant 12 described the organisational guidelines that ChatGPT is prohibited to use for certain activities, such as reverse engineering or web scraping. Informant 6 highlighted that confidential information is prohibited to feed to ChatGPT. Further informant 12 describes that the organisation has created training courses for the employees, where they teach them about AI software, including ChatGPT: “…our training portfolio now includes some training courses on the topic of AI in general. (Also, in regard to ChatGPT)”.

4.2.6. Changes to work roles
Informants 7, 8, 12 and 14 suggest that new skills need to be learned for the future. These skills are on how to use tools like ChatGPT in general and how to use them efficiently, as well as skills needed to validate the answers provided by these tools. As informant 14 demonstrated: “…it is obvious that it is a skill to be able to use it, as well as to understand what you get from it. Possibly there will be new jobs that focus entirely on these tools.” New jobs or work roles might be created as well, which informant 7 has already witnessed where: “A lot of "prompt experts" appeared”. Companies ask for skill sets that only few people actually have, which can be counter productive at the end of the day.”

With the creation of new skills and new jobs there is also a concern for jobs disappearing. This is described by informants 6, 7, and 13, that some people or jobs will become obsolete or redundant and will get replaced in the process. Informant 6 further elaborated on the topic by describing how new technology might affect jobs:

I believe that some jobs will be replaced by this new AI wave, but the same thing has happened before with the industrialising of robots in the production industry. Floor workers instead became technicians for the robots, doing their old work etc.

Informant 6 also points out that the replacement of work roles has happened before in the industrial revolution, but that the people and the organisations have adapted to it. Further informant 9 argues that developers as a role will go through changes due to CAI: “It will make software development become more automatic, and demand less developers probably.” On the contrary, Informant 12 believes that ChatGPT will not replace everything, for example consulting or decision-making.
5. Analysis

In this chapter, the empirical findings are analysed through the theoretical framework and their results are investigated in the context of the research questions, theoretical framework, and concepts presented in the literature review.

The analysis was conducted using the theoretical framework consisting of four key concepts: The Fourth Industrial Revolution (4IR), the Fifth Industrial Revolution (5IR), automation of cognitive routine and non-routine tasks, and Actor-network theory (ANT). It is important to note that the concepts of 4IR and 5IR have been discussed together under the term "Industrial Revolutions," as they are linked and represent an extension of each other, and “Automation of cognitive routine and non-routine tasks” is presented as “Automation”. The empirical findings presented in the previous chapter are divided into two sections where each is presenting data from the two data sources. In this section, the empirical findings from both the interviews and questionnaires are combined and analysed together rather than being separate. This approach allowed for a more detailed understanding of the research topic. The theoretical framework consisting of four concepts guided the analysis throughout this process, making sure that the conclusions were grounded in a solid theoretical foundation.

5.1. Industrial revolutions

AI is created with the goal of using intelligent machines or software to solve problems or tasks (Håkansson & Hartung, 2020; McCarthy, 2007), to respond using the information available, and lastly, to provide a response to the user in a human way (Håkansson & Hartung, 2020). This is noticed in the empirical findings as ChatGPT is used in for example testing and generating code and solving IT related problems in the organisation.

The literature review discusses the concept of the 4IR, a technological advancement transforming industries by automating tasks and leading to changes in the skills required for certain jobs (Muzdalifah et al., 2022). Historically, new technologies have been seen as disruptive forces, impacting the workforce and organisations while increasing efficiency and productivity. These technological revolutions have also raised concerns about job loss and economic inequality (Crowther & Ford, 2005; Du Boff, 1978). Building upon the 4IR, the 5IR aims to maximise the strengths of both humans and technology (Noble et al., 2022). It is expected to enable task automation, new product and service development, and the creation of new industries and business models (Noble et al., 2022). Consistent with this, the empirical findings show that ChatGPT will lead to changes in organisations, leading to changes in work roles and tasks. The findings suggest that ChatGPT may replace roles like copywriters, customer service agents, and developers due to the possibility of automation of tasks and the capabilities ChatGPT offers. The empirical findings suggest that new services are seen to evolve where ChatGPT is used, for example, as a support in answering to customers and employees, solving problems and giving personalised answers. No new products have been mentioned by the informants as a result of using ChatGPT. The empirical findings highlight changes to organisations business models, showing that small companies are benefiting the most from implementing ChatGPT as it automates several tasks for example hiring and legal, allowing them to free up resources and focus on strategic development.

Even though there is a risk of job reduction, informants mentioned new work roles and opportunities connected to ChatGPT. The informants pointed out the growing need for experts in CAI/ChatGPT to manage these systems and language models, as well as having to hire
more engineers. Informants also believed that more people would work with big data and AI, leading to new fields like AI engineers and ChatGPT experts. This idea is in line with the literature review about the possibility of new work roles and opportunities when working with AI technologies (Autor & Dorn, 2013; Brynjolfsson & McAfee, 2014; Willcocks, 2020). Higher levels of education and skills are more likely to benefit from these changes (Freddi, 2018) which is also a part of 4IR, likely leading to a reduction of low-skilled and medium-waged jobs while increasing the demand for high-skilled jobs such as data analysis and experienced software developers (Freddi, 2018; Dirican, 2015; Willcocks, 2020; Caruso, 2018).

As described in the theory, 4IR and 5IR is likely going to transform the way work is organised and performed with increased automation, decentralisation of decision-making, and leading to changes in the skills required for certain jobs (Muzdalifah et al., 2022). However, this is not entirely consistent with the empirical findings, as one informant believes that ChatGPT will not replace consulting or decision-making. Changes in skills, such as learning to use AI tools effectively in prompt writing, with emphasis on focusing on the input to achieve better output and writing improved questions for more accurate answers, and developing skills to validate answers, can be observed in the empirical findings.

The literature shows that a key factor for having a successful adoption of AI is employee engagement and participation. To engage employees it is important to educate and train them in how to apply their knowledge and skills efficiently. As the theory suggests, competence is an ability to apply skills and knowledge successfully in different situations and contexts, within a work role (Spencer & Spencer, 1993). Competence shows how well a person can perform a task or activity using their learned abilities and can be developed through education, training, experience and reflection. The empirical findings indicate the need for new competence, where organisational guidelines and training procedures are established in areas such as AI optimisation, AI ethics, AI strategy and implementation (for example legal) to enable employees to work efficiently with ChatGPT.

Organisations need to pay attention to potential changes in the workforce and actively support employees in adapting to new technologies and work roles (Caruso, 2018; Abbasian et al., 2022; Rajnai & Kocsis, 2017). Autor and Dorn (2013) and Brynjolfsson and McAfee (2014) further explain that 4IR has the potential to disrupt traditional employment models, impact organisations and change how the work is going to be done. The empirical findings also support the literature review’s argument that CAI will lead to organisational changes, such as shifts in day-to-day work, where more focus will be on thinking about innovative ways to advance rather than for example spending time on building processes, tools and systems as CAI will automate many of the functions and processes managed by different departments within organisations. The empirical findings suggest that ChatGPT can be used in various areas such as automation of tasks or routines in software development, text processing (writing emails or clearing IT support tickets), and generating ideas (finding inspiration, creating catchy headlines). Further the informants highlighted that every organisational area will experience changes, with ChatGPT having a disruptive impact on all organisational aspects. The Informants emphasised that these changes would particularly benefit small organisations, as many functions and processes managed by different departments in larger companies could be automated with CAI.

The empirical findings suggest potential benefits of implementing and using ChatGPT which results in increased efficiency, improved quality of work, saving costs, and the creation of
new job opportunities. Increased efficiency and productivity can be noticed as an outcome of the automation of repetitive tasks and the assistance provided by the use of ChatGPT in various work processes, such as coding and formulating texts. Several studies have highlighted the potential of new technologies to improve efficiency, and productivity (Muzdalifah et al., 2022; Noble et al., 2022). With the potential benefits the empirical findings also suggest challenges in job displacement, the need for training employees and the need for evaluation and monitoring the technology's development. The findings present a challenge between writing specific text for more exact and reliable outputs but also the need to protect personal information. Another challenge pointed out in the empirical findings is the transparency of generated outputs, described as being difficult to determine whether a text was written by an AI or a human and that there is no clear traceability for the origin of the content.

5.2. Automation

The literature review suggests that AI has potential in automating non-routine tasks, such as decision-making and problem-solving (Acemoglu & Restrepo, 2020; Frey & Osborne, 2017). However, the empirical findings do not entirely agree with this, as they indicate that while the problem-solving process may be automated with CAI assisting in software development and to understand concepts or text, the decision-making process is not expected to be automated. With the new roles, new skills are also going to be required. For example, informants in the study highlighted the need for new skills and competencies related to effectively using CAI technologies, such as writing good prompts and learning how to use the AI tools optimally. This finding is consistent with the literature review, which emphasises the importance of developing new skills and competencies related to working with CAI technologies (Autor & Dorn, 2013; Brynjolfsson & McAfee, 2014).

Skills can be categorised into hard and soft skills (Spencer & Spencer, 1993). Hard, or technical, skills are related to specific tasks or occupations such as different programming languages, data analysis, cybersecurity and database management. Soft, or interpersonal, skills involve communication, collaboration, and problem-solving abilities (Lyu & Liu, 2021), and may for example include time management, teamwork and leadership. The empirical findings reveal that both hard and soft skills are being supported with the help of ChatGPT. Soft skills are supported in areas like communication, as for example writing an email and problem-solving when testing and developing pieces of code. The effect on Hard skills is also noticed, as it is a technical skill, and used in the context of for example, knowledge in programming and coding, software testing and debugging and technical documentation in enabling IT employees to improve their technical writing skills.

The theory highlights that routine tasks are those that are repetitive and can be easily automated using AI algorithms (Autor, 2015; Frey & Osborne, 2017). The empirical findings show that ChatGPT automates various routine tasks, such as email drafting, content creation, customer support, and aspects of programming and software development. ChatGPT generates draft responses to emails, produces different types of texts for media, marketing, and copywriting, integrates with chatbots and helpdesk systems to provide responses to customers and employees, and generates code snippets or suggests improvements to existing code.

Non-routine tasks are described as complex tasks which require human understanding, creativity, decision-making, critical thinking and the ability to adapt to new and unique situations (Autor et al., 2003). As suggested in the theory these kinds of tasks are generally
more difficult to automate and are typically performed by humans. The recent innovations in the field of AI and the release of ChatGPT may allow for an increased automation of non-routine tasks as described by Demir et al. (2019) and Frey and Osborne (2017), AI enables computers to perform tasks that would typically require human intelligence. The empirical findings show that ChatGPT has impacted several non-routine tasks, such as formulating personalised emails, creating marketing campaign texts, assisting in writing and reviewing code for errors and improvements, developing user stories, processing customer and employee IT support questions with personalised answers, helping in the hiring process to identify suitable candidates, and in strategic development.

The empirical findings provided both potential benefits as well as potential challenges that CAI can have on roles and organisations because of its implementation. In order to ensure that CAI is used efficiently and responsibly, careful considerations must be made while implementing it into the existing processes. This will need for example additional investments in employee education and training.

5.3. Actor-network theory

The Actor-network theory is according to Cresswell (2019) described as a social theory used to analyse and explain social and technological systems. In this study, the empirical findings are analysed through the lens of the Actor-network theory (ANT) to explore the impact of ChatGPT on work roles and organisations within the IT industry. As ANT is a social theory the relationship between the actors is more important than their existence (Aanestad, 2003). The actors with and concepts that have an impact on actors within the network. This includes human actors which are the employees and non-human actors such as ChatGPT and organisational processes. By blackboxing these actors, which means to see them as a single entity (Cresswell, 2019), an observation can be seen in the relationships and interactions that happen within the network. The introduction of ChatGPT to the IT industry, as a non-human actor introduced to the network, has led to the translation process where actors within the network are transformed to achieve shared goals (Cresswell, 2019). In these translation processes organisations should develop guidelines and create training procedures and employees should develop new skills like generating good prompts and evaluating the authenticity of the output in order to successfully integrate and use ChatGPT in the workplace. ChatGPT and organisational processes, which are non-human actors do also need to adapt to the human actors (Cresswell, 2019) and the changing demands of the industry such as how ChatGPT handles the input [Sensitive data] and the need to set up guidelines that limit employees what data they can feed to ChatGPT. The translation process shows how important non-human actors are in shaping social phenomena and this can be seen in that ChatGPT has resulted in changes in work roles, skills, and competencies, leading to the creation of new roles like CAI experts and AI engineers. Due to these changes some work roles such as copywriters and entry level developers may become obsolete. These key aspects highlight that every actor in the network is connected to each other and how the relationships between the actors can affect the whole system (Cresswell, 2019).

Using the Actor-network theory to analyse the empirical findings helped to understand the complex interactions between human and non-human actors (Cresswell, 2019) and also served to identify key factors that influence change and to recognise the consequence of adapting to ChatGPT. Rather than focusing entirely on individual characteristics or existence of actors, ANT emphasises the importance of the relationships between them. This approach provided an additional perspective in the understanding of the impact of ChatGPT on organisations and work roles within the IT industry.
5.4. Summary
The analysis of the empirical findings with the theoretical framework highlighted the similarities and differences. Both show that an increase in efficiency and productivity and the increased automation of various tasks is leading to changes in the organisation and tasks. Changes can be seen in regard to the work roles such as the redundancy of existing roles, changes to existing ones and the creation of new work roles. Changes to existing work roles implies upskilling and reskilling of the roles to further adapt to the demands of ChatGPT. The analysis also highlighted implications such as the awareness of changes happening in the industry and the consequences because of the impact ChatGPT has. On the other hand, no similarities could be seen in regards to the development of new products or the replacement of consulting or decision-making. Further the empirical findings highlight challenges regarding the impact of ChatGPT, which are not as clearly highlighted by the literature.
6. Discussion

This chapter presents a discussion of the findings from the data analysis in the previous chapter. The aim is to interpret the significance of the findings guided by the research aims and questions. These findings are explored with the existing literature, critically engage with the broader themes and theoretical framework and discuss any differences or similarities.

The aim of this study is to investigate the potential impact of ChatGPT on work roles and organisations in the IT industry where the following questions have been formulated to guide the research:

- **RQ1**: How does the increasing adoption of ChatGPT in internal work processes of businesses in the IT industry change work roles and impact the organisation?

- **RQ2**: What are the potential implications for changes in work roles due to ChatGPT?

This discussion, with the research question in mind, focuses on the potential benefits and challenges of adopting ChatGPT, including the potential for job displacement, the need for new skills and competencies, and the importance of organisations being prepared for and managing change. This study aimed to explore the potential impact of ChatGPT on work roles and organisations in the IT industry. The empirical findings, supported by a theoretical framework grounded in the concepts of the Fourth and Fifth Industrial Revolutions, Automation, and Actor-network theory, provided valuable insights into the potential consequences of adopting ChatGPT in the IT industry. The results are consistent with similar studies that have explored the impact of AI and automation on work roles, skills, and competencies (Autor & Dorn, 2013; Brynjolfsson & McAfee, 2014). This study contributes to the existing literature by specifically exploring the potential impact of ChatGPT, a recent advancement in the field of AI, on the IT industry. This chapter ends with a summary of key findings being discussed in this chapter in relation to the theoretical framework (see table 3).

The empirical findings suggest that the increasing adoption of ChatGPT can without a doubt change work roles and impact organisations. These changes involve the automation of routine and non-routine tasks, leading to efficiency improvements and cost savings. As a result of ChatGPT, some work roles, such as copywriters, customer service agents, and entry-level developers, may become obsolete because of ChatGPT automating them. This might expand to more areas as the development of ChatGPT proceeds. New job opportunities in areas like CAI/ChatGPT management, big data, and AI engineering are expected to emerge, requiring the development of new skills and competencies. The shift towards a more technically skilled workforce is consistent with the theoretical framework of the Fourth Industrial Revolution (4IR) and the Fifth Industrial Revolution (5IR) which highlight the impacts of new technology advancements on work roles and skills and the increasing need for highly skilled workers capable of working with advanced technology (Muzdalifah et al., 2022). The Actor-network theory supports this observation, emphasising the interaction and transformation within the network of both human and non-human actors. The emergence of new roles like AI engineers and ChatGPT experts suggests a growing need for highly skilled professionals, giving more evidence to support the theory.

4IR and 5IR are expected to enable task automation, new product and service development, and the creation of new industries and business models (Noble et al., 2022). The empirical
findings suggest that new services are seen to evolve where ChatGPT is used, for example, as a support tool, answering to customers and employees by handling queries and providing personalised answers. The creation of new products were not mentioned by the informants as a result of using ChatGPT. This could be due to the fact that there are no changes to products yet as ChatGPT is a new phenomena or because of the aim of the research, which focuses more towards the organisational and employee impacts rather than product development. The empirical findings show that there are definitely changes to organisations business models. Small companies are benefitting the most from implementing ChatGPT as it automates several tasks for example hiring and legal. The automation of tasks can lead to being able to free up resources and shift their focus on processes such as for example strategic development. The creation of new industries due to ChatGPT could not be seen in the empirical findings. Several existing industries are on the other hand being affected such as for example copywriting, software development and marketing which might make the industries obsolete and lead to the creation of new industries in the future.

As described in the theory, 4IR and 5IR is likely going to transform the way work is organised and performed with increased automation, decentralisation of decision-making, and leading to changes in the skills required for certain jobs (Muzdalifah et al., 2022). However, the empirical findings do not entirely agree with this as they indicate that while the problem-solving process may be automated with ChatGPT assisting in software development and to understand concepts or text, the decision-making process is not expected to be automated. A possible explanation could be due to the fact that ChatGPT is in its early stages of advancement and the potentials have not been fully discovered. As the technology continues to evolve, its potential to impact decision-making processes might be realised. The empirical findings suggest several areas where skills are changing but also where new skills have to be developed such as focusing on input by writing improved questions and validating the output. As these changes are inevitable, supported historically in theory, organisations and individuals need to prepare for this shift in using new technology by focusing on upskilling and reskilling in areas related to AI and data analysis. Another interesting question, beyond technical skills, what kind of “soft” skills might become more important in an AI-dominated workplace? The need for writing improved questions and validating the output highlights the emerging role of humans as supervisors or trainers of AI. This suggests a shift in work roles from doing tasks to supervising AI.

Autor and Dorn (2013) and Brynjolfsson and McAfee (2014) describe that 4IR has the potential to disrupt traditional employment models, impact organisations and change the way work is done. The theory also highlights that organisations need to pay attention to potential changes in the workforce and actively support employees in adapting to new technologies and work roles (Caruso, 2018; Abbasian et al., 2022; Rajnai & Kocsis, 2017). The empirical findings suggest ChatGPT changes the organisation by for example impacting daily work routines, where more focus is on thinking about innovative ways to advance rather than spending time on routine tasks. The informants strongly emphasised that every organisational area will experience changes, with ChatGPT having a disruptive impact on all organisational aspects. The impact of adopting ChatGPT could vary depending on organisational factors such as organisational size, type of work, culture such as how open the organisation is to new technologies. Larger organisations often have more resources allowing them to invest in new technologies and provide employee education. Smaller organisations, which can be more agile compared to larger, may have less resources to invest which might slow down the process of adopting new technologies. The impact that automation related transformations might have on various organisations can depend on the type of work they do. Organisations dealing with
routine tasks such as manufacturing or data analytics are likely to observe higher degrees of change since these activities are being specifically suitable for automation. Industries that depend on creativity, strategy, or interpersonal relationships being the main driving processes, may see less direct impact even though AI could still introduce efficiencies in other tasks. Traditional and restrictive companies may find it hard with implementing new technology since employees might be resistant to change established work routines. A company culture which revolves around innovation and learning can increase the ability to accept new technologies. Organisations that are “technology-forward” might be more motivated to explore and invest in new technology, leading to faster adoption and potentially more significant changes in work roles and organisational processes.

The empirical findings suggest there are challenges for the organisations such as the need for employee training and adaptation, the need for careful evaluation and monitoring the technology's development. ChatGPT has rapidly increased in popularity and is easily accessible to everyone with a connected computer. It is being used as a support tool in various tasks but the greatest effect can be seen in non-routine tasks. The automation of the non-routine tasks was not possible before technologies like ChatGPT which could be a significant factor in their popularity. The effect of ChatGPT fast rising in popularity and being an effective tool can result in employees using it before the companies could investigate its implications. Considering the fact that ChatGPT is a new phenomenon and the research was conducted at an early stage [launch of ChatGPT] it leads to questions such as how its adoption and impact might evolve over time. In terms of practical implications the findings highlight the importance of organisations being prepared and engaging employees in successfully adopting and implementing AI technologies like ChatGPT. To ensure employees can effectively use the new technologies and adapt to the changing demands organisations have to establish guidelines and training procedures. Organisations have to create guidelines and training procedures to ensure employees effectively use the new technologies and adapt to changing work roles. Another consideration organisations should consider is the ethical and legal consequences of using CAI such as controlling the input and the ability to trace the origin or source of the output.

Non-routine tasks are complex tasks which require human understanding, creativity, decision-making, critical thinking and the ability to adapt to new and unique situations (Autor et al., 2003). Studies have also highlighted the potential of new technologies to improve efficiency, and productivity (Muzdalifah et al., 2022; Noble et al., 2022). Non-routine tasks have, because of their complex nature, historically been performed by humans and are therefore difficult to automate. With the introduction of ChatGPT several non-routine tasks that require creativity, decision-making and critical thinking have been affected. Tasks such as strategic development and creating personalised content were shown to be able to be automated. The automation of non-routine tasks could free up time for employees to focus on even more complex and creative tasks. Because of this it could also lead organisations to reduce their workforce as less employees are needed for the same tasks. Other possible effects could be loss of creativity or a risk of over relying on technology. The use of ChatGPT in the IT industry may result in an overall increase in efficiency and productivity, contributing to economic growth and the development of new products, services, or business models. As the literature and the empirical findings highlight, the automation of non-routine tasks is suggested to be the main force affecting all previously mentioned aspects of employment and organisations, as these are effects that were not achieved to this extent previously with other technologies.
### Table 3

**Summary of key findings**

<table>
<thead>
<tr>
<th>Theoretical Framework</th>
<th>Empirical Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>New technology advancements impact work roles and increase the need for highly skilled workers capable of working with advanced technology</td>
<td>New technology [ChatGPT] is impacting work roles. Some work roles are expected to become obsolete, while new job opportunities are expected to emerge, requiring the development of new skills and competencies.</td>
</tr>
<tr>
<td>4IR and 5IR are expected to enable service development (Noble et al., 2022).</td>
<td>New services, such as ChatGPT being used as a support tool and providing personalised answers.</td>
</tr>
<tr>
<td>4IR and 5IR are expected to enable new products (Noble et al., 2022).</td>
<td>The creation of new products was not mentioned by the informants as a result of using ChatGPT.</td>
</tr>
<tr>
<td>4IR and 5IR are expected to automate tasks and enable new business models (Noble et al., 2022).</td>
<td>New business models are developed, as new technology automates tasks previously done by humans which enables organisations to focus on other processes.</td>
</tr>
<tr>
<td>4IR and 5IR are expected for the creation of new industries (Noble et al., 2022).</td>
<td>The creation of new industries due to ChatGPT could not be seen in the empirical findings.</td>
</tr>
<tr>
<td>4IR and 5IR are likely going to decentralise decision-making (Muzdalifah et al., 2022).</td>
<td>The empirical findings do not agree with this as they indicate that while the problem-solving process may be automated with ChatGPT, the decision-making process is not expected to be automated.</td>
</tr>
<tr>
<td>4IR and 5IR are likely going to transform the way work is organised and performed, leading to changes in the skills required for certain jobs (Muzdalifah et al., 2022).</td>
<td>The empirical findings suggest several areas such as copywriting and software development, where skills are changing but also where new skills have to be developed.</td>
</tr>
<tr>
<td>Autor and Dorn (2013) and Brynjolfsson and McAfee (2014) describe that 4IR has the potential to disrupt traditional employment models, impact organisations and change the way work is done.</td>
<td>ChatGPT changes the organisation by for example impacting daily work routines, where more focus is on thinking about innovative ways to advance rather than spending time on routine tasks. Every organisational area will experience changes, with ChatGPT having a disruptive impact on all organisational aspects. Organisations dealing with routine tasks are likely to observe higher degrees of change.</td>
</tr>
<tr>
<td>The theory also highlights that organisations need to pay attention to potential changes in the workforce and actively support employees in adapting to new technologies and work roles (Caruso, 2018; Abbasion et al., 2022; Rajnai &amp; Kocsis, 2017).</td>
<td>Organisations face challenges such as having to create training programmes for employees. Organisations need to have guidelines and discuss changes with employees about this new technology. Further organisations need to carefully...</td>
</tr>
<tr>
<td>Non-routine tasks are complex tasks which require human understanding, creativity, decision-making, critical thinking, and the ability to adapt to new and unique situations (Autor et al., 2003).</td>
<td>ChatGPT has automated several non-routine tasks such as writing personalised emails, creating unique code and being used as a creative tool in marketing.</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Studies have also highlighted the potential of new technologies to improve efficiency, and productivity (Muzdalifah et al., 2022; Noble et al., 2022).</td>
<td>The use of ChatGPT may result in an overall increase in efficiency and productivity. As the literature and the empirical findings highlight, the automation of non-routine tasks is suggested to be the main force.</td>
</tr>
</tbody>
</table>

*Note. Comparison of the theoretical framework to key empirical findings.*
7. Conclusion

This chapter will summarise the key findings in relation to the research aim and questions. It will also highlight the contribution and review the limitations of the study. Furthermore, this chapter will propose opportunities for future research.

The aim of this research was to explore the effects of ChatGPT on work roles and organisations. The literature review highlighted four key concepts: the Fourth Industrial Revolution (4IR), the Fifth Industrial Revolution (5IR), Automation, and the Actor-network theory. These concepts guided the research which employed two qualitative data collections methods; semi-structured interviews and questionnaires. The objective of using two data collection sources was to triangulate the results to determine if they supported each other. The data was collected from a total of 14 informants, residing in Germany and Sweden, which in this research were various professionals in the IT industry. The informants were asked about how they use ChatGPT as a work tool, the guidelines and training in place, and how it has affected their work roles, skills, and the organisation as a whole. Further the theoretical framework was used both in the collection and interpretation of the empirical findings. With this foundation the research tried answering the two research questions as stated below.

- **RQ1:** How does the increasing adoption of ChatGPT in internal work processes of businesses in the IT industry change work roles and impact the organisation?

- **RQ2:** What are the potential implications for changes in work roles due to ChatGPT?

The rapid technological advancements of AI in recent years, specifically ChatGPT, have resulted in work roles and organisations undergoing changes. The findings indicate that ChatGPT’s automation of routine and non-routine tasks is what is impacting the work roles and organisations. Work roles such as copywriters, customer service agents, and entry-level developers may become obsolete, new opportunities are developing in areas like CAI/ChatGPT management, big data, and AI engineering. This is in line with the theoretical framework of the Fourth and Fifth Industrial Revolutions. In terms of organisational structures, ChatGPT appears to offer benefits, especially for smaller companies. By automating tasks, ChatGPT enables smaller companies to focus more on other processes such as for example strategic development. While there were no observations in the empirical findings of the emergence of new industries due to ChatGPT, its impact on existing ones like copywriting, software development, and marketing suggests potential future changes. In some areas such as decision-making, the impact of ChatGPT is less clear, likely because of the technology’s early stage of development. The empirical findings indicate that ChatGPT's impact may vary depending on factors such as the nature of the work, organisational size and culture but also how prepared organisations are to adapt to new technologies. The study highlighted potential challenges such as concerns for job loss, need for employee training, over-reliance on technology, and potential for reduced creativity. The study confirms the significant impact of ChatGPT adoption on work roles and organisations in the IT industry. The complexity of these impacts necessitates further research, particularly as ChatGPT and similar technologies continue to evolve.

7.1. Contribution

This research contributes to academic and practical perspectives within the field of artificial intelligence (AI), specifically in the context of work roles and organisations in the IT industry.
The aim of the research was to explore the changes of implementing ChatGPT within IT organisations. The research fills a gap, highlighted in the literature review, as the impacts of ChatGPT on employment and organisations within the IT industry have been largely unexplored since it is a rather new technology. This research supports the existing knowledge on 4IR and 5IR and the role AI is playing in these revolutions. It was also shown, supporting the theories, that AI, like ChatGPT, can automate both routine and non-routine tasks leading to a change in skills and work roles. Further, the research gives insights into the potential effects of ChatGPT on organisations and their business models. For example, smaller companies which can benefit from implementing ChatGPT, because of new and advanced automation capabilities. The research findings also show the need for organisations to adapt to the changing technological landscape. Organisations should not view ChatGPT as a threat but rather as an opportunity for growth and innovation. The changes to work roles is not necessarily leading to job loss but could also indicate a change in the type of work roles and skills required. The empirical findings present challenges with the adoption of ChatGPT such as concerns of job loss and the need for training the employees. Organisations have to develop strategies to handle these challenges by for example creating guidelines and providing training to ensure the successful integration of AI technologies like ChatGPT. These insights could be used by policy makers and the general public to create a discussion around policies, encouraging responsible adoption of ChatGPT while also managing potential societal effects such as jobs and employees becoming obsolete. The educational sector could also benefit from these findings to design educational plans that prepare students for the changing job market.

7.2. Limitations
The study was conducted in the fast-changing IT industry and presented several potential challenges and limitations such as limited sample size, ethical concerns, access restrictions, geographical coverage, data quality issues, political considerations, and time constraints:

- The sample size might be too small to support relevant results applicable to the whole IT industry.
- Restricted access to specific departments or employees due to privacy, willingness, or confidentiality may affect the representativeness of the sample.
- Exploring sensitive internal work processes may impact the interest of organisations to participate.
- The study was limited to a specific geographical area, Germany and Sweden, and may not represent the entire population of IT industry employees.
- Participant bias or response inaccuracies may affect the quality of data collected through the two data collection methods: qualitative interviews and questionnaires.
- Political considerations such as regulation or legislation on AI may influence the opinions.
- The research is conducted over a sensitive limited time period which may not be enough to explore the full complexity of the adoption of conversational AI and its impact on employees and organisations.

The described potential limitations could impact the research by limiting the generalisability of the findings and affecting the reliability and validity of the results.

7.3. Future Research
Suggestions for future research could be to explore CAI in decision-making as the theory in 4IR and 5IR suggest that AI is expected to automate decision-making processes. It would be
interesting to explore how and if CAI could be used in the decision-making process. The theory also describes new industries and products emerging due to AI technology which could be another aspect for future research to explore the effects of CAI on other industries but also what these new industries might look like. Lastly it could be interesting to investigate what new products could emerge out of CAI and how it might affect product development and innovation.
References


Appendices

Appendix A. Interview guide

Interview Guide

Introduction

● Hello, my name is XXX and my colleague XXX, we are here today to ask you questions about the adoption of Conversational AI ChatGPT in your organisation.
● Remind: it's important to be in a quiet and disturbance free environment (If there's people/noise around).
● Everything you say in this interview will be anonymised and you can withdraw the consent at any point of time.
● The interview will be recorded and transcribed for data analysis purposes.
● Do you have any questions or concerns before we start the recording and the interview?

START RECORDING

● Do we have your permission to record the interview?
● And about the timeline I will give you a heads up when we are halfway through the questions
● I would like to start thanking you for taking the time to participate in this research study.
● Can you please start by introducing yourself, your role in the company, and your general experience working with conversational AI technology?
● How long have you been working in your role and what are your main areas of expertise in the organisation?

Section 1: Experience with Conversational AI

● Can you describe the conversational AI solutions that have been implemented internally in your company and what work processes have been changed due to that?
● What are the biggest benefits and challenges with adopting conversational AI in the organisation?
● How has the implementation of conversational AI impacted the work roles of employees in your organisation? (Examples?: skills, competences)
● What is the reaction of employees towards the use of conversational AI in their work processes?
● In your opinion, how do you think the use of conversational AI technology will evolve in the near future?

Remind - “now we have gone through half of the questions…, let's proceed to the next section…”
Section 2: Ethical Considerations
- Can you tell me about any ethical concerns or considerations that were taken into account during the adoption/implementation of conversational AI solutions in your organisation?
- Have there been any privacy or security concerns associated with the use of conversational AI in your work processes? AND How have these concerns been addressed?

Remind - “now we come to the last section…which is…”

Section 3: The Impact on the IT Industry
- How do you see conversational AI technology impacting the IT industry as a whole?
- In your opinion, what are the biggest challenges or limitations for the adoption of conversational AI in the IT industry? (Generally)
- Are there any concerns regarding the impact of conversational AI on the job market in the industry? (because of impact on work roles)

Ok that was the last interview question.

Conclusion:
- Is there anything else you would like to add that has not been covered in this interview?
- We would like to thank you for your time and participation in our research study and let you know that your answers and participation is appreciated
- Could you recommend persons that we could interview? (Contact details)
- Who can we contact to get a list with emails to send out the questionnaire?
Appendix B. Questionnaire

1. Welcome page

Information and Request for Participation in a Survey Study about the Impact of Artificial Intelligence on Work.

Who are we, and why are we doing this?
We are graduate students at Linnaeus University Vaxjo, conducting a research study on the impact of conversational artificial intelligence (CAI), such as ChatGPT, on organisations and work roles. Specifically, we are interested in examining the experiences and perspectives of employees and management in IT companies that use CAI, either officially or unofficially, like ChatGPT, to support their work. The goal of this research is to gain a better understanding of how conversational AI is changing work roles and the extent to which it is impacting employees and organisations.

Who can participate?
You must be employed in a company in the IT industry.
The use of conversational AI, such as ChatGPT, must not be prohibited by your employer.

Participation & Consent.
Your participation is voluntary, and you can choose to revoke your consent to participate in this study at any time and without giving reasons. We kindly ask you to answer honestly and openly to provide us with an accurate picture of your opinions and experiences.

Answering the questionnaire takes approximately 4-9 minutes, and the information provided will be kept confidential and anonymized.

If you are interested in the results:
The results will be published as a master's thesis on DIVA around June 2023. If you are interested in the results or would like further information, please contact the researchers listed below.

Master Students:
Julien Papadopoulos (jp223aj@student.linu.se)
Jonas Christiansen (jc222wd@student.linu.se)

Thesis Supervisor:
Diana Chroneer (Diana.Chroneer@ltu.se)

I have understood the information above and voluntarily agree to participate in this project.

☐ Yes, continue with the survey
☐ No

Christiansen & Papadopulos Linnaeus University Vaxjo – 2023
2. Screening page

Are you currently working in the IT industry?
- Yes
- No

Is the use of conversational AI, such as ChatGPT, prohibited in your company?
- Yes
- No

3. Ending page (Screening page)

Thank you for your interest in our questionnaire. Unfortunately, you do not meet the criteria for the desired sample, and we must discontinue your participation in this study.

Thank you for your time and willingness to participate. We appreciate your efforts!
4. Personal information page

What is your current job title/role?

How many years have you been working at your company?

How many employees does your organisation have?

Christiansen & Papadopoulos. Linnæus University Växjö – 2023
5. Questions page

1. How familiar are you with using conversational artificial intelligence, such as ChatGPT, as a work tool? Explain your experiences with conversational AI in your work.

2. Describe how your organisation currently uses or views conversational AI, such as ChatGPT.

3. How has conversational AI, such as ChatGPT, affected or impacted your work?

4. What changes, including benefits and challenges, have you experienced from using conversational AI as a tool in your work?

5. What do you believe are the future implications of using conversational AI as a work tool in the industry?

6. What changes have you noticed in the job market due to the increasing use of conversational AI technology?
6. Comments page

Would you like to comment on this questionnaire, or add any information to help us better understand your answers? Do you think this questionnaire needs improvement? Were any questions unclear, or did you feel uncomfortable answering specific questions? Please leave us your feedback.

7. Ending page

Thank you for completing the questionnaire, we greatly appreciate your help!

Your input is valuable to us and will contribute to our understanding of the topic we are studying. Your responses will remain confidential and will only be used for research purposes.

Your answers have been submitted, and you may now close the browser window or tab.
Appendix C. Information letter

Hello,

We are graduate students at Linnaeus University Vaxjö, and we are conducting a research study on the impact of conversational artificial intelligence (AI) on organizations and work roles. Specifically, we are interested in examining the experiences and perspectives of employees and management in IT companies in Sweden that have implemented, or are in the process of implementing, conversational AI solutions in their internal work operations.

We invite your company to participate in our research study by taking part in a semi-structured interview and a survey as part of the data collection process. The goal of this research is to gain a better understanding of how conversational AI is changing work roles and the extent to which it is impacting employees and organizations. The insights from this study will be valuable in helping organizations make informed decisions about the implementation of conversational AI solutions.

Your participation in this research study would involve a semi-structured interview and a survey. The interview would be conducted remotely at a time that is convenient for your company. The interview would take approximately 30-45 minutes, and the information provided would be kept confidential and anonymized.

We understand that your time is valuable, and we appreciate your consideration in participating in this research study. Please let us know if you have any questions or concerns, and we would be happy to address them. Your participation in this research study would be greatly appreciated, and we look forward to hearing from you.

Thank you for your time and consideration.

Sincerely,

Julien Papadopulos (jp223aj@student.lnu.se, 0704 - 242 164)
Jonas Christiansen (jp222wd@student.lnu.se)