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## Ekonomihögskolan

*Institutionen för informatik*

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# Navigating the Integration of AI-based Technologies in Healthcare

**Acceptance Factors among Healthcare Practitioners**

Kandidatuppsats 15 hp, kurs SYSK16 i Informatik

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# Navigating the Integration of AI-based Technologies in Healthcare: Acceptance Factors among Healthcare Practitioners

ENGELSK TITEL: Navigating the Integration of AI-based Technologies in Healthcare: Acceptance Factors among Healthcare Practitioners – SVENSK TITEL: Navigera i integrationen av AI-baserad teknik i sjukvården: Acceptansfaktorer bland vårdutövare

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SAMMANFATTNING (MAX. 200 ORD):

Denna kandidatuppsats utforskar acceptansfaktorer för AI-baserade teknologier inom svensk sjukvård bland vårdpersonal. Genom en kvalitativ forskningsmetod med semistrukturerade intervjuer har data samlats in från sjuksköterskor och läkare i svensk sjukvård. Resultaten analyserades tematiskt och resulterade i sex huvudteman som belyser viktiga insikter om hur vårdpersonal uppfattar och accepterar användningen av AI i deras arbetsmiljö. Denna forskning betonar behovet av att förstå och adressera vårdpersonalens perspektiv för att framgångsrikt integrera AI-teknologier i svensk sjukvård. Vidare rekommenderas framtida forskning för att utforska djupare dynamiken kring implementeringen av AI-teknologier inom vården och för att ge praktiska implikationer för effektiv användning av dessa teknologier. Genom att öka medvetenheten om acceptansfaktorer och utmaningar kan denna forskning bidra till att främja en

mer effektiv och hållbar integration av AI i svensk sjukvård, vilket i sin tur kan leda till förbättrad vårdkvalitet och patientresultat.

ABSTRACT:

This bachelor thesis explores acceptance factors for AI-based technologies in Swedish healthcare among healthcare practitioners. Using a qualitative research method with semi-structured interviews, data was collected from nurses and physicians in the Swedish healthcare system. Thematic analysis of the results yielded six main themes that provide valuable insights into how healthcare professionals perceive and accept the use of AI-based technology in their work environment. This research emphasises the need to understand and address healthcare practitioners' perspectives to successfully integrate AI-based technologies in Swedish healthcare. Further research is recommended to delve deeper into the dynamics of implementing AI technologies in healthcare and to provide practical implications for their effective use. By increasing awareness of acceptance factors and challenges, this research contributes to promoting a more efficient and sustainable integration of AI in Swedish healthcare, ultimately leading to improved quality of care and patient outcomes.

## Acknowledgements

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Lovisa Wendel & Rebecca Froborg

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# 1. Introduction

This chapter serves as an introduction to the exploration of AI integration in healthcare, focusing on healthcare practitioners' acceptance. It highlights the transformative potential of AI technologies, identifies key issues surrounding their adoption, and discusses relevant previous studies.

## 1.1 Background

The digital transformation of recent decades has fundamentally redefined society, with Artificial Intelligence (AI) playing a pivotal role in this paradigm shift (Kitsios et al., 2023). Non-autonomous AI-based technologies are expanding the range of services and tasks they can undertake. This emergent technology shows potential for streamlining and improving work across diverse industries. By incorporating AI into various facets of healthcare, new opportunities emerge for more effective diagnoses, treatments, and resource management (Shinners et al., 2020).

The integration of AI-based technologies in the healthcare industry can result in substantial transformations that impact all stakeholders involved. These shifts span from basic scientific research to the way decisions are made about own personal health, such as for example AI-based algorithms which are transforming clinical decision-making processes. Recent studies show that deep learning algorithms perform better in prognostic and future event prediction than doctors (Bonderman, 2017). By analysing great amounts of data, these algorithms are capable of extracting significant patterns and offer valuable insights into patient care. Full acceptance of these changes holds the potential for significant benefits. However, as Coiera (2019) suggests, there could be severe consequences for not participating and accepting the changes that come with the adoption of AI-based technologies. It is within this context that the topic of user acceptance of AI-based technologies in healthcare becomes central, as it is essential to comprehend how healthcare practitioners respond to and adjust to the integration of AI-based technology in clinical settings in order to maximise its potential benefits.

## 1.2 Problem identification

Within healthcare organisations, the integration of AI-based technology aims to support human professionals in task completion, emphasising the significance of acceptance and trust among healthcare practitioners towards this technology. This integration necessitates a shift in how work is approached, requiring the healthcare sector to embrace this new collaborative model

with AI-based technology. While the core work tasks may remain consistent, the restructuring of processes demands human adaptability.

AI-based technologies in healthcare hold considerable promise for the future, offering potential improvements in outcomes, cost reduction, and efficiency gains (Bukowski, et al., 2023). Notably, in areas such as prediction and diagnosis, AI-based technologies demonstrate higher success rates (Bukowski, et al., 2023). However, challenges persist in terms of acceptance and trust (Bukowski, et al., 2023). Empirical studies uncover a dual-directional mistrust phenomenon: experienced healthcare practitioners often dismiss AI recommendations irrespective of their quality, while less experienced healthcare practitioners may overly rely on potentially flawed guidance from AI-based systems (Bukowski, et al., 2023).

Distinct behavioural patterns emerge in the use of AI-based technology for decision-making, some practitioners may ignore AI suggestions, while others negotiate; that is, the person determines which parts of the recommendation to follow or modify by weighing and prioritising them. Other practitioners may consider them; that is, either reject the suggestions or inversely listen to the recommendation. While some practitioners may fully rely on them. Hence, it is imperative to explore the factors influencing the adoption of AI-based technologies in the everyday work of healthcare practitioners. This entails examining the levels of acceptance and trust among healthcare practitioners towards the technology, as well as its impact on their decision-making processes (Bukowski, et al., 2023).

### 1.3 Previous Related Studies

LaRosa & Danks (2018) examined the importance of preserving and strengthening the trust between patients and healthcare practitioners in an era where technological innovations are becoming more and more common in healthcare. The research provided guidance to ensure that the use of AI-based technology does not undermine the patient-physician trust. The researchers stress the central role that trust plays in healthcare relationships and identify three key factors contributing to its success: reliability, understanding of behavioural mechanisms, and experiences with the physician. The research also highlights how the introduction of AI-based technology can affect these aspects and underscores the need to regulate such systems in a manner that promotes and maintains trust between patients and physicians.

Asan et al. (2020) in their research examined the importance of trust between healthcare practitioners and AI-based technology and found that trust between healthcare practitioners and AI-based technology is a crucial factor in how healthcare practitioners utilise and adopt AI based technology. The study empathises that, despite the need for AI-based technology, it is of great importance to study the extent and impact of human trust in AI-based technology. Furthermore, it is highlighted that the efficiency of the use of AI-based technology not only depends on the mathematical processes, but also on human factors including trust. Based on Asan et al. (2020), factors that have an impact on the trust of the technology includes organisational policy, culture, specific tasks, other similar calculation tools used by the healthcare provider, interactions with

patients as well as internal and external environmental factors. Lastly, the research empathises that AI-based technology raises deep questions about medical liability and that it is important to understand and manage these issues when integrating AI-based technology into healthcare.

Based on the preceding research, it is evident that trust is a pivotal factor influencing the acceptance and utilisation of AI-based technology within healthcare settings. Both LaRosa & Danks (2018) and Asan et al. (2020) underscore the significance of trust between healthcare practitioners, patients, and AI-based technology in ensuring successful integration and adoption. However, while existing studies have highlighted the importance of trust, there remains a notable gap in understanding the specific aspects that contribute to the establishment and maintenance of trust, as well as its impact on acceptance and usage of AI-based technology. Therefore, our study aims to delve deeper into these aspects, seeking to identify and analyse the multifaceted factors that shape trust, acceptance, and utilisation of AI-based technology among healthcare practitioners. By addressing this knowledge gap, we can enhance our understanding of the complexities surrounding the integration of AI-based technology into healthcare practices and inform strategies to foster trust and optimise the implementation of AI-based technologies for improved patient care.

## **1.4 Research Purpose and Research Questions**

Based on the aforementioned, the purpose of this bachelor's thesis is to explore the acceptance of emerging AI-based technologies within the Swedish healthcare context, particularly focusing on the healthcare practitioners' perspective. By understanding the extent of acceptance and the factors influencing it, this bachelor's thesis research aims at shedding light on the dynamics surrounding the adoption of AI-based technologies in healthcare settings and providing healthcare practitioners with a deeper understanding of how these technologies can be effectively utilized.

To answer the purpose of the bachelor's thesis, the following research questions are posed:

RQ1: How do healthcare practitioners perceive the use of AI-based technologies in the Swedish healthcare?

RQ2: What factors affect the healthcare practitioners' acceptance of the use of AI-based technologies in the Swedish healthcare?

## **1.5 Delimitations**

The bachelor's thesis study involves healthcare practitioners working within the Swedish healthcare sector, specifically focusing on nurses and physicians. A nurse is responsible for clinical decisions that offer individuals increased opportunities to improve, maintain, or regain their health, manage health problems, diseases, or disabilities, and achieve the best possible

well-being and quality of life until death. A physician is a healthcare practitioner who is trained and licensed to diagnose and treat illnesses, injuries, and other medical conditions in patients. No restrictions are imposed regarding respondents' age or gender.

The bachelor's thesis research explores the healthcare practitioners' perspectives regarding the use of AI-based technologies within healthcare. It does not focus on any specific AI-based systems or tool or technical aspects of them, but rather on the general perception of their acceptance. This bachelor's thesis study includes practitioners use AI as well as practitioners who do not use AI to gain a comprehensive understanding of the overall attitude towards AI technology, highlighting the acceptance within the healthcare sector.

## 2. Literature review

In this chapter, we present a review of literature concerning the acceptance of AI-based technologies within healthcare. It encompasses definitions of artificial intelligence, studies on AI acceptance in healthcare settings, factors impacting trust in AI, and the utilisation of the Theory of Reasoned Action to comprehend technology adoption dynamics.

### 2.1 Search strategy

The bachelor's thesis research is positioned in the domain of Healthcare Information Systems as our focus lies on exploring the acceptance of AI-based technologies within the healthcare sector. To gather relevant literature, we utilised resources such as the scientific databases of ACM Digital Library, AIS Library, Emerald and SSRN. In addition, we complemented our literature review search with GoogleScholar. Employing keywords such as "AI", "AI based technologies", "Healthcare", "AI acceptance", "Trust" and "Integrated AI tools" and combination of these keywords, we conducted searches across research journal papers, conference papers and books. We decided to include material written in both English and Swedish, given that the research is conducted in Sweden. However, we recognise the relevance of research from other countries as well. Our literature review search concluded to the following material as shown in table 1.

Table 1. Overview of Literature Review Material

Article	Source/ Database	Motivation of Selection
Shapiro, S. C. (2003). Artificial intelligence (AI). In Encyclopaedia of Computer Science (pp. 89–93). John Wiley and Sons Ltd. Available at: <a href="https://dl.acm.org/doi/abs/10.5555/1074100.1074138">https://dl.acm.org/doi/abs/10.5555/1074100.1074138</a>	ACM	Origin of artificial intelligence
European Commission. (2018). A Definition of AI: Main Capabilities and Scientific Disciplines. Available at: <a href="https://digital-strategy.ec.europa.eu/en/library/definition-artificial-intelligence-main-capabilities-and-scientific-disciplines">https://digital-strategy.ec.europa.eu/en/library/definition-artificial-intelligence-main-capabilities-and-scientific-disciplines</a>	European Commission	Definition of AI
Bukowski, L. A., Levin, J., Sivaraman, V., Kahn, J. M., & Perer, A. (2023). Ignore, Trust, or Negotiate: Understanding Clinician Acceptance of AI-Based Treatment Recommendations in Health Care. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23) (pp. 1–18). Association for Computing	Inspec	AI acceptance

Machinery, New York, NY, USA. Available at: <a href="https://doi.org/10.1145/3544548.3581075">https://doi.org/10.1145/3544548.3581075</a>		
Zhao, G. Y., & Tu, C. Z. (2022). A literature review on user acceptance of AI-enabled application. Journal of Computer Science Coll., 37(6), 25–35. Available at: <a href="https://dl.acm.org/doi/10.5555/3532930.3532934">https://dl.acm.org/doi/10.5555/3532930.3532934</a>	ACM	Helped us define factors that affect user acceptance
Region Skåne. (n.d.). Våra ansvarsområden. Available at: <a href="https://www.skane.se/om-region-skane/detta-gor-region-skane/vara-ansvarsomraden/">https://www.skane.se/om-region-skane/detta-gor-region-skane/vara-ansvarsomraden/</a>	Region Skåne	Definition of the organisation
GBD 2019 Human Resources for Health Collaborators. (2022). Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet, 399(10341), 2129-2154. doi: 10.1016/S0140-6736(22)00532-3. Available at: <a href="https://pub-med.ncbi.nlm.nih.gov/35617980/">https://pub-med.ncbi.nlm.nih.gov/35617980/</a>	Pubmed	Helped us select our sample group
Liu, J. (2020). Artificial Intelligence and Data Analytics Applications in Healthcare: General Review and Case Studies. In Proceedings of the 2020 Conference on Artificial Intelligence and Healthcare (CAIH2020), 49–53. Association for Computing Machinery, New York, NY, USA. DOI: 10.1145/3433996.3434006. Available at: <a href="https://dl.acm.org/doi/10.1145/3433996.3434006">https://dl.acm.org/doi/10.1145/3433996.3434006</a>	ACM	Helped us to define what types of AI-based technologies that are used within healthcare surroundings.
Fulmer, G., & Gelfand, M. J. (2012). At What Level (and in Whom) We Trust: Trust Across Multiple Organizational Levels. Journal of Management, 38(4), 1167-1230. Available at: <a href="https://doi.org/10.1177/0149206312439327">https://doi.org/10.1177/0149206312439327</a>	Sage Journals	Helped us define the concept “trust”
Lockey, S., Gillespie, N., Someh, I. A., & Asadi, I. (2021). A Review of Trust in Artificial Intelligence: Challenges, Vulnerabilities and Future Directions. Proceedings of the 54th Hawaii International Conference on System Sciences. Available at: <a href="https://www-scopus-com.ludwig.lub.lu.se/record/display.uri?eid=2-s2.0-85108370948&amp;origin=resultslist&amp;sort=plf-f&amp;src=s&amp;sid=59a76b9a1a0682f82c67a668f32e5a09&amp;sot=b&amp;sdt=b&amp;s=TITLE-ABS-KEY%28A+Review+of+Trust+in+Artificial+Intelligence%3A+Challenges%2C+Vulnerabilities+and+Future+Directions.%29&amp;sl=112&amp;ses-sessionSearchId=59a76b9a1a0682f82c67a668f32e5a09&amp;relpos=3">https://www-scopus-com.ludwig.lub.lu.se/record/display.uri?eid=2-s2.0-85108370948&amp;origin=resultslist&amp;sort=plf-f&amp;src=s&amp;sid=59a76b9a1a0682f82c67a668f32e5a09&amp;sot=b&amp;sdt=b&amp;s=TITLE-ABS-KEY%28A+Review+of+Trust+in+Artificial+Intelligence%3A+Challenges%2C+Vulnerabilities+and+Future+Directions.%29&amp;sl=112&amp;ses-sessionSearchId=59a76b9a1a0682f82c67a668f32e5a09&amp;relpos=3</a>	Scopus	Helped us to identify factors that affect trust in artificial intelligence
Cruzes, D., Passos, C., S., & Mendonça, M. (2013). Applying theory of reasoned action in the context of software development practices: insights into team intention and behavior. In Proceedings of the 17th International Conference on Evaluation and Assessment in Software Engineering (EASE '13) (pp. 2–11). Association for Computing Machinery, New York, NY, USA. Available at: <a href="https://doi.org/10.1145/2460999.2461001">https://doi.org/10.1145/2460999.2461001</a>	ACM	Definition of the Theory Of Reasoned Action

## 2.2 Artificial intelligence (AI)

### 2.2.1 Artificial intelligence (AI) definition

According to Shapiro (2003), the origins of Artificial Intelligence (AI) can be traced back to a conference held at Dartmouth College in 1956, where the term "artificial intelligence" was first coined. The article outlines three distinct perspectives within AI: Computational Psychology, Computational Philosophy, and Machine Intelligence. Computational Psychology involves developing programs that mimic human behaviour, while Computational Philosophy explores whether intelligence can be computed. Conversely, Machine Intelligence aims to extend the capabilities of computers, focusing on tasks achievable by humans (Shapiro, 2003).

In accordance with the European Commission's definition of AI (2018), AI systems have the ability to utilise symbolic rules or learn numerical models, and they can adapt their behaviour by analysing the impact of their previous actions on the environment. AI encompasses various methods and techniques, including machine learning, machine reasoning, and robotics (European Commission, 2018).

### 2.2.2 Artificial Intelligence (AI) acceptance

A study on clinician acceptance of AI-based treatment recommendations in healthcare revealed that the majority of clinicians were generally receptive to the idea of AI support (Bukowski, et al., 2023). Moreover, the study also found that explanatory visualisations of AI recommendations increased clinicians' perception of AI's usefulness and increased their confidence in their own decision-making. Clinicians exhibited four distinct behavioural patterns in response to the recommendations: ignore (where clinicians were unaffected by the AI recommendation), negotiate (where clinicians weighed and prioritised individual aspects of the recommendation), consider (where clinicians either utilised the recommendation or overrode it), and rely (where clinicians accepted some part of the recommendation in every decision) (Bukowski, et al., 2023).

The varied reactions to the recommendations stemmed from various factors, with the primary one being clinicians' individual attitudes, experience and trust to AI recommendations. Their diverse experiences with AI and their general trust in the technology played a big role in how they choose to engage with the AI system (Bukowski, et al., 2023).

A study conducted on User Acceptance on AI-enabled applications identified several factors that influence user acceptance (Zhao & Tu 2022). These factors include perceived trust, perceived enjoyment, social norms and perceived behavioural control, all of which play a significant role in how users perceive and interact with AI-based technology. Perceived trust towards AI-based technology can impact a user's willingness to adopt it, while perceived enjoyment can

enhance motivation for continued usage. Additionally, social norms can influence user attitudes and behaviour toward AI-based technology (Zhao & Tu 2022).

Several crucial aspects were identified to promote user acceptance, including transparency, data security, ease of use and reliability. Ensuring that users feel secure and comfortable with the AI-based technology increases the likelihood of acceptance and regular use. Transparency regarding how AI-based technology operates and utilises user data can enhance the user trust, while data security is essential for safeguarding user integrity and safety. Usability involves making the technology user-friendly and intuitive, while reliability is crucial for users to be able to trust that AI-based technology will function correctly and deliver the desired results (Zhao & Tu 2022). Addressing these various factors in the development and implementation of AI-based technology will enhance the prospects of user acceptance.

## **2.3 Swedish healthcare – Region Skåne**

The Swedish healthcare works differently within the different counties. Considering the scale of our research, it felt more appropriate to concentrate on a smaller area and, thus, the research focuses on the healthcare of Skåne County (Region Skåne, 2023). Region Skåne is a big organisation working with different areas such as: healthcare, dental care, sustainability, research, and infrastructure. However, the healthcare section is the biggest organisation. Region Skåne is responsible for the decision-making over the whole healthcare section and coordinates the public financial healthcare for both private and communal hospitals among Swedish residents in Skåne (Region Skåne, 2023).

### *2.3.1 Healthcare practitioners*

When mentioning healthcare practitioners in this study we are solely referring to nurses and physicians. Focusing on nurses and physicians in our study is essential due to their pivotal roles in healthcare delivery. They are directly involved in patient care, diagnosis, treatment, and management of various health conditions. Their actions significantly impact patient outcomes and overall healthcare quality. According to GBD 2019 Human Resources for Health Collaborators (2022) nurses and physicians constitute the largest workforce in healthcare globally. Their sheer numbers make them representative of the healthcare industry as a whole, making any findings or interventions applicable to a wide range of settings and contexts. Nurses and physicians often work closely together in interdisciplinary teams to provide comprehensive care to patients. Additionally, physicians' diagnostic responsibilities align with the increasing integration of AI-based technology in healthcare, making their insights particularly valuable.

### *2.3.2 AI-based technology in healthcare*

In Liu's (2020) research article, a comprehensive exploration of AI-based technologies within the healthcare sector is undertaken, highlighting their wide-ranging applications,



advancements, and implications. The article discusses various AI tools, including robotics-assisted surgery, diagnosis of ailments, medical big data analysis, and virtual nursing assistants. These tools are employed across different aspects of healthcare practices, each serving distinct purposes. For instance, medical big data analysis facilitates the breakdown of complex datasets that would have previously required years to process without AI-based technology. On the other hand, diagnosis of ailments and robotics-assisted surgery directly assist physicians in their healthcare practices, enhancing precision and efficiency in patient care.

This bachelor's thesis research aims to explore the general perception of AI-based technology within the context of healthcare, rather than focusing on any specific AI-based technology. This approach is chosen because the extent of AI-based technology implementation within Region Skåne is not yet fully understood. Additionally, we believe it is relevant to investigate user acceptance aspects regardless of the specific technology being utilised. By examining the broader perception of AI-based technology in healthcare, we can gain insights into how individuals within the region perceive and interact with AI-based technology, thus providing valuable information for future implementation strategies and user-centred design approaches.

## 2.4 Trust as a concept

### 2.4.1 Trust

In the research of user acceptance of AI in healthcare the concept of trust is of central importance. To understand how trust can influence the attitude towards and interaction with AI-based technology in healthcare, it is important to examine different dimensions and definitions of trust at different levels and within different contexts.

According to Mayer and colleagues (cited in Fulmer & Gelfand, 2012), the trust is described as

*“the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party”* (Fulmer & Gelfand, 2012, pp. 712).

This definition highlights the importance of being prepared to take risks and be vulnerable in relation to another part within the trust relationship. Furthermore, it is emphasised that trust often includes two central dimensions: positive expectations of reliability and willingness to accept vulnerability (Fulmer & Gelfand, 2012). Positive expectations of trustworthiness refer to the perceptions, beliefs, or anticipations regarding the trusted party's intentions and capability to be relied upon. The willingness to accept vulnerability is about being prepared to take risks and be uncertain, as well as making decision to rely on the trusted party (Fulmer & Gelfand, 2012).

### 2.4.2 Factors affecting trust in Artificial Intelligence

Transparency plays a crucial role in shaping trust towards AI-based technology. Studies indicate that when AI systems lack transparency and explainability, users tend to mistrust them and are less likely to accept their outcomes (Lockey et al. 2021). Similarly, the accuracy and reliability of AI systems are of great importance. Users expect AI systems to deliver precise and equitable results and any instances of inaccuracies can significantly impact the users' trust in the system (Lockey et al., 2021).

Moreover, literature suggests that familiarity and experience interacting with AI systems contribute to building trust. Therefore, establishing trust in AI systems requires effective governance through appropriate regulations to ensure their trustworthy development and deployment. Hence, prioritising the establishment of trustworthy AI systems through effective governance mechanisms may be more beneficial than solely seeking explanations for specific outcomes. Governance measures that encourage stakeholder collaboration, support bias recognition and elimination, and clarify control over personal information usage have been proposed to enhance trust (Lockey et al. 2021). Furthermore, gaining insights into the factors influencing stakeholders' trust in AI systems, aligned with real data on reliability and effective AI design, is crucial for mitigating the risk of negative outcomes. Another challenge relates to the automation of AI systems. Automation has the potential to result in deskilling and loss of human control over decision-making processes. A consequence to this may be a diminished sense of trust in these systems along with a feeling of reduced independence (Lockey et al. 2021).

## 2.5 Theory

### 2.5.1 The Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) seeks to predict and elucidate human behaviour. Originating from studies in social psychology, TRA provides a robust framework for understanding human actions. It particularly emphasises the interplay between attitudes and behaviours. Within the realm of healthcare, TRA is extensively utilised, employing evaluative theories to gauge individuals' behavioural intentions (Cruzes, Passos and Mendonça, 2013).

Central to TRA are individuals' beliefs and attitudes, which serve as catalysts for adopting specific behaviours. Additionally, subjective norms and anticipations, coupled with organisational culture, exert significant influence on team behaviour intentions and subsequently on team practices (Cruzes, Passos and Mendonça, 2013).

Throughout various organisational landscapes, TRA has proven its mettle, offering invaluable insights into human behaviour and wielding predictive prowess regarding behavioural intentions. By delineating between behavioural intention and actual behaviour, TRA sheds light on the moderating factors that influence attitudinal sway. Furthermore, within the research field of information systems, TRA serves as a structured lens through which to scrutinise the impact of

perspectives and attitudes on behaviour and everyday work practices. Its efficacy in healthcare studies attests to its versatility, transcending boundaries across diverse domains. (Cruzes, Passos and Mendonça, 2013).

The theory offers understanding of the adaption of innovations and emerging technologies such as the AI-based technologies and tools used in healthcare. TRA focuses on individual beliefs, attitudes, and intentions, while IDT emphasises the diffusion process across a larger social system, such as a healthcare organisation. TRA provides a framework for predicting individual behaviour based on attitudes and subjective norms. Integrating this theory enables us to develop deeper comprehension in regard to explaining technology adoption. Further, TRA recognise the role of social influence in shaping attitudes and behaviour. By reflecting our findings in combination with TRA, it allows us to explore how interpersonal communication and social networks influence the adoption process at both the individual and collective levels. By using TRA to understand individual motivations and to analyse diffusion dynamics, we can suggest more targeted interventions to promote the adoption of AI-based tools in healthcare.

Concluding, the theory of Reasoned Action allows us to understand the healthcare practitioners' beliefs, attitudes, and behavioural intentions regarding the adoption and use of AI-based tools in their everyday work. That is, the theory of Reasoned Action is used to interpret and discuss our research findings in later chapters. Integrating the Theory of Reasoned Action when interpreting and discussing our research findings in later chapters, offers us a more comprehensive understanding of technology adoption and diffusion processes, allowing us to explore the interplay between individual beliefs, social influences, and broader contextual factors.

The literature review formed the theoretical basis of this work by presenting the main concepts of artificial intelligence (AI) and its acceptance, Swedish healthcare, AI-based technology in healthcare, and factors affecting trust in AI. The literature review along with the theory of Reasoned Action (TRA) formed the theoretical framework of this bachelor's thesis, which is used to understand, analyse and discuss the research findings.

## 3. Methodology

In this chapter, we discuss how we conducted our study, and what research approach we adopted. We present and justify the methods that we used for collecting our data, and the method of analysing them. Lastly, the quality of our research and its ethical concerns is also being discussed.

### 3.1 Research approach

There are three research approaches: the quantitative, the qualitative, and the mixed methods approach. The quantitative research approach tests theories by examining relationships between variables and proving or disproving hypotheses in a deductive way. It uses numerical data analysed with statistical methods. The qualitative research approach explores the meanings people give to social or human problems. It involves asking questions, collecting data in natural settings, analysing data to find general themes, and interpreting the results. The mixed methods research approach combines both qualitative and quantitative approaches, blending philosophical assumptions and methods in a study (Oates, 2006).

This bachelor's thesis research adopts a qualitative research approach. This approach is chosen because it is considered suitable for understanding people within their social and work context. Unlike the quantitative approach, which aims to generalise findings, the qualitative approach focuses on understanding and interpreting data. Therefore, the qualitative research approach was deemed more appropriate for exploring the healthcare practitioners' perspectives regarding the acceptance of emerging AI-based technologies within the Swedish healthcare.

### 3.2 Method of data collection

#### 3.2.1 Interviews

When it comes to exploring respondents' perspectives, experiences, and beliefs it is recommended to use qualitative methods to collect data. One of the main methods of collecting data in qualitative research is interviews. Oates (2006) describes qualitative interviews as a pivotal method for collecting non-numerical data, including narratives, stories, and opinions pertinent to the research. Through qualitative interviews, researchers gain profound insights into respondents' thoughts, experiences, and perspectives, fostering a more nuanced understanding of complex subjects.

For our research we decided to conduct semi-structured interviews. Semi-structured interviews are a mix between structured and unstructured interviews, where the researcher plans ahead the by structuring an interview guide to guide their thoughts but still leave space for a discussion

more freely with the respondents (Oates, 2006). In this qualitative study, semi-structured interviews were conducted to explore the acceptance of AI-based technology integration among healthcare professionals.

It is important to record all interviews owing to the fact that all data can be captured accurately. Therefore, it is important to prepare all the important equipment before, such as a recorder for audio or video. Furthermore, picking out a suitable place where all the interviews are going to be recorded is consequential. It is further important to pick a comfortable environment where the respondents feel safe and relaxed expressing their opinions. In the beginning of the interview, it is highly recommend explaining for the interviewer the purpose of the study and the expected outcomes for the interview and of course their permission to start recording. It can be beneficial to show interest during the interview to establish a positive relationship with the interviewer. By planning the interview and preparing its essentials, we as researchers can expect a better outcome (Alsaawi, 2014).

### 3.2.2 Respondents, Selection Criteria, Sample Size, and Conduction of interviews

Respondents were selected through a combination of methods. Firstly, contact was established with Region Skåne to request cooperation in identifying healthcare practitioners willing to participate in the study. Additionally, existing contacts within Region Skåne, facilitated through personal networks, were utilised to broaden the pool of potential interviewees.

After this first contact, a screening was made to the interested respondents to check whether they fit to the criteria we had set for their selection. That is that they should be either physicians or nurses and have a current employment at Region Skåne. Age or gender were not considered for the selection of respondents; still we tried to maintain gender balance among them. Thus, we concluded to the following research respondents as shown in table 2.

Table 2. Overview of Research Respondents

Respondents	Role	Gender	Work Experience	Interview Date and Duration
Respondent 1	Endoscopy Nurse	Female	15 years in current field	2024.04.05 15 min.
Respondent 2	Physician, Specialist in internal medicine, Operations manager - Endocrinology, Renal medicine, Rheumatology	Male	18 years	2024.04.05 25 min.
Respondent 3	Physician, Professor of Cardiology	Male	26 years	2024.04.08 11 min.

Respondent 4	Nurse in neurology	Female	8 months	2024.04.08 15 min.
Respondent 5	Physician, Operations manager	Male	17 years as manager	2024.04.08 14 min.
Respondent 6	Physician, Specialist in skin and genital diseases	Female	33 years	2024.04.08 25 min.
Respondent 7	Nurse at pediatric surgery	Female	4 months	2024.04.08 15 min.
Respondent 8	Assistant Chief Physician at the Internal Medicine clinic	Male	20 years	2024.04.08 15 min.

The above respondents were contacted again by email to set convenient interview dates and times. The interviews were conducted online based on respondents' preferences. All interviews were conducted in April 2024.

For the interviews, a semi-structured interview guide was developed inspired by concepts found through our literature review, to provide a flexible framework for the interviews (for the Interview Guide see Appendix B). The interview guide contained key topics and questions aimed at exploring respondents' perceptions of AI-based technologies, their experiences with their integration in healthcare, and their views on potential benefits and challenges. This guided approach facilitated in-depth exploration while allowing for spontaneous discussion and development of emerging themes.

To maintain confidentiality and protect participant anonymity, assurances were provided that all responses would be anonymised, with no identifiable information disclosed in any published or disseminated materials. This commitment to anonymity created an environment conducive to open and honest sharing of perspectives, enhancing the credibility and richness of the collected data. All interviews were recorded and later were transcribed verbatim.

### 3.3 Method of Data Analysis

For the analysis of our collected data, we decided to use thematic analysis following the guidelines of Braun and Clarke (2006). Thematic analysis is a method for analysing qualitative data, which is utilised to identify, analyse, and report themes that are identified within the gathered data. The method encompasses several sequential steps: preparation and familiarisation with the data, coding, theme development, defining names and themes, data exploration and interpretation and, producing the report. Codes represent the smallest units of analysis, capturing

noteworthy aspects pertinent to the research question, while themes furnish a framework for organising and articulating researchers' observations (Braun & Clarke, 2016).

Following the six-step approach outlined by Braun and Clarke (2006), we conducted an analysis of the data gathered from the interviews. Initially, we transcribed the interviews using the tool Klang AI and translated them into English. We have chosen to translate our interview guide and transcriptions from Swedish to English to facilitate direct quotations in our text. By having these available in English, we streamline the inclusion of quotes and references from our interviews in our research. Continuing, we immersed ourselves in the data, engaging in multiple readings and listening's of the interviews to ensure thorough comprehension and capture of all respondents' insights. We then proceeded to identify initial codes by pinpointing keywords and highlighting relevant phrases throughout the interviews. As we collected these initial codes, we organised them into distinct categories that reflected recurring patterns. From these categories noteworthy topics emerged which constitute our findings presented under themes.

Table 3. Codes and Emerging Themes

Theme	Code
Attitudes and Perceptions	AP
Current Use	CU
Acceptance and Trust	AT
Benefits and Limitations	BL
Human vs AI Decision-making	HAD
Future usage and expectations	FUE

### 3.4 Ethical considerations

When conducting a study, it is crucial to integrate ethical perspectives throughout the research process to ensure its proper execution. Respondents should be treated with respect and protected from any negative consequences, whether psychological, social, political, or economic. This extends to both individuals and their organisations, who have same rights respondents (Oates, 2006). These rights, including the right not to participate, right to withdraw, right to give informed consent, right to anonymity, and right to confidentiality, are outlined by Oates (2006).

Following Oates (2006) suggestion, we, the researchers carry several responsibilities during the study. We made sure to avoid unnecessary intrusion into respondents' lives and refrain from asking irrelevant questions, such as those concerning age when it is not pertinent. Ethical handling of collected data is crucial, which means that we did not conceal or alter data to fit pre-conceived notions. Additionally, presenting data in a manner that avoids causing harm was essential.

### 3.5 Reliability and Validity

In conducting research, ensuring validity and reliability is paramount. Oates (2006) distinguishes between two types of validity: content validity and construct validity. Content validity ensures that questions cover relevant areas representative of the research topic, leaving no crucial areas overlooked. Construct validity, on the other hand, confirms that questions effectively measure the intended constructs. Reliability, as defined by Oates (2006), pertains to the consistency of results if the study were replicated.

To enhance research validity, meticulous attention was given to question formulation, drawing upon validated sources from recognised journals in the literature review. Clear and unambiguous questions were crafted, with a conscious effort to avoid leading queries. Respondents were encouraged to seek clarification if any uncertainty arose.

By using established interview procedures and choosing a varied sample of healthcare professionals without knowing anything about their AI usage or attitudes beforehand, reliability was increased. This approach aimed to capture a comprehensive understanding of AI acceptance within the healthcare sector. To guarantee correct data interpretation, rigorous review and transcription procedures were carried out after the interview.

In conclusion, by adhering to reliable sources, crafting clear questions, and maintaining consistency in our approach, we heightened the validity and reliability of our research, offering valuable insights into attitudes toward AI in healthcare.



## 4. Empirical findings

The purpose of the data analysis was to explore the healthcare practitioners' perspective regarding their acceptance of emerging AI-based technologies within the Swedish healthcare context. To this effect, data analysis according to Braun and Clarke (2006) was performed and generated the following six themes which represent the research findings.

### 4.1 Theme 1: Attitudes and Perceptions

Based on the collected data from the interviews with our respondents, it is evident that many of our respondents is expressing their concerns about the widespread fear that AI may lead to job losses. *"Sometimes I can get a little scared that it will take every job"*. Despite these concerns, another respondent felt that *"I see a greater danger in not taking advantage of the possibility of AI than in actually doing it"*, suggesting a growing acceptance of AI-based technology.

One respondent emphasised the importance of AI not replacing human roles but rather enhancing them, stating that *"I think it can help the human eye a lot. But it can't replace the human eye, it must probably be coordinated so that it's done combined in some way. That it's an aid but it won't take over"*. This underscores the importance of using AI as a complement to human expertise.

A respondent emphasising the fact that their work is within the healthcare, expressed concern that *"You lose control over your knowledge, and you don't know if the data you get is valid"*. This highlights the specific issues around data integrity and result validation in sensitive areas like healthcare.

One respondent stressed the importance of being cautious with AI usage, especially in healthcare, saying that *"It's important to be a bit cautious, especially in healthcare. So, that it is truly validated and functional"*. This indicates the need for education and awareness to ensure the correct usage of AI-based technology.

Despite some apprehensions about AI, a respondent expressed appreciation for its potential, stating that *"When it helps me, it's okay. When it doesn't work, I get furious"*. This suggests that positive experiences can contribute to increasing acceptance of AI.

### 4.2 Theme 2: Current Use

Variability in AI adoption is evident from the collected statements. While there are instances where AI is integrated into specific healthcare practices, such as the detection of polyps during examinations, as indicated by the quote *"We have just tested equipment earlier with an AI module to find polyps, detect polyps during examinations. So, it also exists within our operations."*,

there is also a contrasting statement suggesting limited usage: *"We work very little with AI."* This discrepancy suggests that the adoption of AI varies across different healthcare settings, with some areas embracing AI technologies more readily than others.

Despite the existence of AI in specific applications, there seems to be a cautious approach towards broader utilisation. The quote *"about the use of various types of AI in healthcare, I would say it's still very limited. I want to confidently state that we do not use artificial intelligence at all for decision support or prediction in healthcare."* highlights a reluctance to use AI for decision support or prediction in healthcare. Additionally, the statement *"So if I were to use AI, I would need to go to the private sector and download something like ChatGPT or some other type of AI variant."* implies a lack of readily available AI solutions within the healthcare sector.

The statement *"Sometimes I use it. It doesn't work very well. But I use it sometimes when it's very short things. So, it happens. But it takes too much time to use it in practice."* reflects the respondent's experience with speech recognition technology. This acknowledgment highlights the technical challenges and limitations present in the current implementation of AI, particularly in the domain of speech recognition. The respondent's observation suggests that while speech recognition technology is utilised intermittently, its efficacy and efficiency fall short of expectations. This underscores the pressing need for advancements in AI-based technology, to improve usability and effectiveness within healthcare settings.

Concerns about the lack of effective control mechanisms for AI in healthcare are evident in the statement *"There is no good control mechanism for AI now when the technology is advancing so rapidly, it always lags behind. So that's a problem."* This highlights the need for robust regulations and control mechanisms to ensure the ethical and responsible use of AI in healthcare.

The utilisation of AI in specific roles and functions is demonstrated in the quote *"I use it in my work as a study director, mainly in generative AI. Where I use it to streamline."* Here, AI is utilised to streamline tasks and improve efficiency, suggesting that AI is seen as a tool to enhance specific functions rather than replacing human expertise entirely.

In addition, it is noteworthy that respondents R4, R5, and R7 explicitly state that they do not utilise AI in their respective work contexts. This further emphasises the variability in AI adoption within the healthcare landscape, with some individuals and institutions choosing not to engage with AI technologies altogether.

In summary, this underscores the observation that AI usage in healthcare appears to be limited, with varying degrees of success in its implementation across different settings. Where implemented, AI's effectiveness varies, highlighting the need for further exploration and refinement to optimise its impact on healthcare delivery.

### 4.3 Theme 3: Acceptance and Trust

When comparing the quote *"If you say that it should be fed with so much information that it provides correct information"* with others expressing concerns about potential misuse of AI, such as *"Of course, if AI perceives that consciousness is more important than the patients or what we work with, then they can start corrupting the system for their own benefit"*, we see that trust in AI relies partly on ensuring systems are accurately fed with data and used ethically and responsibly.

The respondent expressing *"The threat from AI is partly this big global threat with nuclear war and so on. But it's also a threat to me as an individual. Do I need to exist then?"* highlights existential concerns about AI's impact on professions and individual identity. This uncertainty can hinder trust and acceptance, as individuals question the necessity of their roles in an AI-driven future.

Comparing answers like *"That they see that it is effective and that it saves time for those who work"* with concerns about AI's potential drawbacks, such as *"Maybe relying too much on it. And yes, that you just become a bit blind, and the technology doesn't always work"*, underscores the importance of demonstrating AI's effectiveness and reliability to build trust and acceptance. This suggests that perceptions of AI's performance strongly influence trust levels.

The call for education and gradual introduction of AI, as expressed in *"You would need good education about it and maybe introduce it gradually so that everyone has time to learn and use it correctly"*, indicates that trust in AI can be cultivated through informed understanding and incremental adoption. This approach helps address concerns and fosters confidence in AI technologies.

Overall, these quotes illustrate the complex interplay between acceptance, trust, and various factors influencing attitudes towards AI in SMEs. Trust is not only dependent on AI's technical capabilities but also on ethical considerations, effectiveness, and the broader impact on individuals and society. Education and transparent communication about AI's capabilities and limitations are crucial for building trust and fostering acceptance among stakeholders.

### 4.4 Theme 4: Benefits and Limitations

Respondents recognise the potential benefits of AI in healthcare, such as the ability to quickly provide decision support based on factual data *"Yes, the opportunities are to quickly get a decision base. Based on cold facts. On raw facts, you can quickly get a base. Then you still need humanity. Is it reasonable and so on."*, saving time and reducing human error *"But the positive thing would be that at the end of the day, a lot of time would be saved, and it might also reduce human error."* and facilitating tasks to improve efficiency *"I've used it occasionally when I've hit a wall. To scan the available science on how a certain type of managerial function works or*

*what to expect when doing certain types of analyses and so on. Because it sets the agenda for how I can think one step ahead.”*

AI has shown promise in enhancing medication management by providing alerts for potential interactions *“So, on the computer, if I try to add a medication to the medication list that interacts with another one, a warning signal comes up and it says why I shouldn't give it. So, I think that's one way.”* and streamlining documentation processes through speech recognition and chat functions *“The thing about when it typed what you said, I also think is good. It's much faster than the secretaries having to sit and type. Then sometimes the machine said wrong, so it wasn't that. But then you just have time to go through it. It's easier to correct a word, write a whole text, so to speak. And then I think it's good with chat function at the health center and so on.”*

Despite its potential, AI is not without limitations. Some respondents' express concerns about misdiagnoses and the inability of AI to analyse or diagnose accurately *“It needs more. It's misdiagnosed, so to speak. It sees things that aren't quite right. And it can't analyse, it can't diagnose, it can only show that something is abnormal.”* Technical challenges, such as the need for improvement in closed-room environments and handling patient data, pose barriers to the effective implementation of AI in healthcare *“And it has to, I mean, you have to do it in closed rooms or how to put it. You can't use cloud services in the same way but should we do it in, there is a lot of room for improvement, but summarise records for example, yes it must be done in, or what is it called? A confined environment simply. It's patient data so there are some built-in limitations that make it slower in healthcare. It will, it's absolutely clear.”* There is also a recognition of the importance of maintaining AI as a support tool rather than the sole reliance for decision-making, highlighting the need for human oversight *“So you have to be vigilant that it remains more of a support. It shouldn't be the only thing you rely on.”*

The role of AI in healthcare is envisioned as complementary to human expertise, with respondents emphasising the importance of human involvement in refining AI-generated outputs *“And then I actually push AI to improve what I get out and then I add the final touch myself.”* and exercising caution in deploying AI in patient-critical applications *“You have to choose the applications that are not directly patient-critical, where it must not go wrong.”* Respondents also acknowledge the need for careful consideration in training AI models to ensure relevance across different healthcare contexts and patient populations *“And one talks about this with patients, if you train an AI model, it will reflect the training data you have so it is not certain that the paediatric clinic will have the same challenges as I have working with the elderly and then we have somewhere in between so you have to be a little careful about that and take it slow. But it will be needed in all forms, whether it is image diagnostics as you said or if it is administrative to summarise records to make it easier to present data faster.”*

In summary, while there is recognition of the potential benefits of AI in healthcare, its implementation is tempered by various limitations and challenges. The integration of AI is seen as a process that requires careful consideration, human oversight, and continuous improvement to realise its full potential and ensure its responsible use in enhancing patient care and healthcare delivery.

## 4.5 Theme 5: Human vs AI Decision-making

Based on the insights gathered from the interviews conducted with healthcare professionals, it becomes evident that the interplay between human judgment and artificial intelligence is crucial in decision-making processes within the healthcare sector. Respondent 1 emphasised that while AI can significantly enhance the capabilities of the human eye, it cannot entirely replace human judgment. They stated: *“No. I think it can help the human eye a lot. But it can't replace the human eye, it must probably be coordinated so that it's done combined in some way. That it's an aid but it won't take over.”*.

Furthermore, Respondent 2 highlighted the overwhelming capacity of AI to handle vast amounts of data compared to human capabilities. They pointed out: *“Because it can hold 27,000 parameters in its head and I can handle 8-9. It's self-explanatory that we can't fight against that. It doesn't work.”*. This underscores the need for a symbiotic relationship between human expertise and AI capabilities. In addition, Respondent 3 expressed reservations about the current extent of AI's involvement in clinical decision-making processes, indicating that AI has not yet reached a level where it can autonomously make critical decisions. They remarked: *“But decision-making in clinical processes, it hasn't come that far yet.”*.

Moreover, respondents highlighted the irreplaceable role of human intuition and empathy in certain healthcare scenarios. Respondent 4 emphasised the limitations of AI in discerning subtle cues and contextual nuances, stating: *“An intern who hasn't slept for 24 hours isn't so damn sharp. But the computer is never tired.”*. Similarly, Respondent 5 emphasised the importance of human observation in detecting non-verbal cues and emotional contexts, remarking: *“But artificial intelligence doesn't hear what isn't said. It can't read a room. It has no idea what the patient means when it just does that.”*.

Furthermore, respondents cautioned against overreliance on AI and emphasised the necessity of retaining human involvement in decision-making processes. Respondent 6 warned against the danger of removing the human element entirely, stating: *“Maybe not just artificial intelligence alone, but this removing the human element, I think it's very dangerous.”*.

In conclusion, the interviews underscored the complex interplay between human judgment and AI capabilities in healthcare decision-making. While AI offers significant potential to augment human abilities, it is crucial to recognise its limitations and ensure that human expertise remains central in critical decision-making processes.

## 4.6 Theme 6: Future Usage and Expectations

Respondents' express optimism regarding the potential of AI to transform healthcare practices and anticipate significant advancements in its application. As one respondent stated, *“I think we have potential and the future will certainly steer us in that direction”*. This optimism reflects

a widespread belief in the transformative power of AI to improve patient care and enhance healthcare delivery systems.

Moreover, respondents emphasise the critical role of AI in various aspects of healthcare management, including planning, suggestions, patient selection, and risk minimisation. They stress the need for AI tools to demonstrate credibility and reliability to gain acceptance within healthcare organisations and among healthcare professionals. One respondent aptly articulates this sentiment, stating, *“Because I believe that if AI isn't going to start operating on people, then someone else has to do it. [...] It needs to be so much better than humans for us to believe in it. So, I think that's important for the organisation. So that you see the potential and the gain and the credibility”*.

There is a recognition of the importance of AI in preventive healthcare, with an emphasis on pushing illness ahead rather than dealing with it reactively *“I think what's important when it comes to AI initially is actually the preventive part [...]. That's where I think the great potential for AI will be and that's where we need to become much smarter.”*. Respondents stress the significance of detecting early signs of illness to prevent hospitalisations and improve long-term health outcomes.

Respondents highlight the potential for AI to provide quick decision support based on factual data, emphasising the need for a balance between AI-driven insights and human judgment *“Yes, the opportunities are to quickly get a decision base. Based on cold facts. [...] Then you still need humanity. Is it reasonable and so on.”*. They envision AI assisting in initial assessments in emergency rooms and with patients *“There are significant opportunities. If AI becomes really solid, it can make initial assessments in the emergency room and with patients.”*.

While respondents acknowledge the potential of AI, they also express the need for improvement in its current capabilities, particularly in distinguishing between benign and malignant conditions and in streamlining workflow processes *“I hope it gets better. [...] But it's not good enough yet. It needs to get much better.”*. There is a desire for AI to make healthcare professionals' jobs easier, safer, and more efficient *“It should make my job easier, safer, and better.”*.

In summary, respondents foresee significant opportunities for AI in healthcare, particularly in preventive care and workflow efficiency. However, there is a consensus on the need for continuous improvement in AI technologies to enhance their reliability, effectiveness, and integration into healthcare practice.

Table 4. Themes and its factors

Themes	Factors
<b>Attitudes and Perceptions</b>	<ul style="list-style-type: none"> <li>- Personal attitude towards technology</li> <li>- Personal attitude towards AI</li> <li>- Opinion on AI usage in healthcare</li> <li>- Fears regarding AI</li> </ul>

<b>Current Use</b>	<ul style="list-style-type: none"> <li>- Where AI stands today in healthcare</li> <li>- Current usage of AI in healthcare</li> </ul>
<b>Acceptance and Trust</b>	<ul style="list-style-type: none"> <li>- Key factors for trust in AI</li> <li>- Factors for the acceptance of AI in healthcare</li> <li>- Risk assessment of AI in healthcare</li> </ul>
<b>Benefits and Limitations</b>	<ul style="list-style-type: none"> <li>- Benefits of AI in healthcare</li> <li>- Limitations of AI in healthcare</li> <li>- AI's role in healthcare</li> </ul>
<b>Human vs AI Decision-making</b>	<ul style="list-style-type: none"> <li>- Human vs AI, what should be used when?</li> <li>- Personal use of technology</li> </ul>
<b>Future usage and expectations</b>	<ul style="list-style-type: none"> <li>- Expectations for AI in healthcare</li> <li>- Areas of application for AI in healthcare</li> </ul>



## 5. Discussion

In this section, we delve into the discussion of our research findings, drawing insights from the studied literature and theories. By applying the theoretical frameworks and literature findings to our empirical data, we gain deeper insights into the multifaceted dynamics surrounding the acceptance and adoption of AI-based technology in healthcare contexts.

The following table 5 summarises the research findings and illustrates the themes that answer each research question.

Table 5. Themes answering Research Questions

RESEARCH QUESTION	THEMES
RQ1: How do healthcare practitioners perceive the use of AI-based technologies in the Swedish healthcare?	Theme 1 – Attitudes and perception Theme 2 – Current use Theme 3 – Acceptance and Trust Theme 5 – Human vs AI decision-making Theme 6 – Future Usage and Expectations
RQ2: What factors affect the healthcare practitioners’ acceptance of the use of AI-based technologies in the Swedish healthcare?	Theme 3 – Acceptance and Trust Theme 4 – Benefits and limitations Theme 5 – Human vs AI decision-making

Following, the findings from chapter 4 are considered in context of the research questions and thus each theme is reviewed and presented according to the research question it supports.

### 5.1 How do healthcare practitioners perceive the use of AI-based technologies in the Swedish healthcare?

The findings showed that healthcare practitioners' attitudes towards the use of AI-based technology in healthcare are complex and varied, according to previous related studies and our own study. Some view AI-based technology as a means to enhance their professional practice, while others express concerns about automation and potential job loss. Previous research, by Sivaraman et al. (2023), suggests that healthcare practitioners are generally open to the idea of AI-based technology support in the medical field. Our research also supports the notion that many practitioners are willing to integrate AI-based technology into their workflows, as long as it meets a variety of criteria that emerged from our interviews.



This perspective aligns with existing literature such as Zhao & Tu (2022), which underscores the value of AI-based technology in healthcare as an additional tool rather than a replacement for human expertise. Other factors identified by Zhao & Tu include perceived trust, perceived enjoyment, social norms, and perceived behavioural control. Our respondents echoed this sentiment, emphasising that AI should complement their roles rather than replace them. Furthermore, they expressed concerns about relinquishing control over their knowledge and mistrusting the data received by AI-based technology, which confirms the significance of perceived trust. Our findings also indicated the importance of user-friendliness in AI-based technology, correlating with the factor of perceived enjoyment.

Zhao & Tu's research also identified several crucial aspects related to user acceptance, including transparency, data security, ease of use, and reliability, all of which were confirmed by our respondents. They expressed concerns about the validity of data, the importance of understanding the tool's functionality, and the efficiency of AI-based technology. This aligns with research by Lockey et al. (2021), which emphasises that confidence in AI systems is heavily influenced by factors such as data accuracy and autonomy over knowledge. Many respondents also emphasised the necessity for AI-based technology to outperform humans for them to be willing to use it, which includes ease of use, where our respondents emphasised that the tool should directly assist them without a steep learning curve.

In terms of current use, our research indicates variability in AI-based technology adoption across different healthcare settings. While some instances showcase AI-based technology integration into specific healthcare practices, contrasting perspectives indicate limited usage overall. This cautious stance towards broader AI utilisation aligns with existing literature highlighting the limited adoption of various types of AI-based technology in healthcare (Lockey et al., 2021).

In light of our findings, the concept of trust as defined by Mayer and colleagues (cited in Fulmer & Gelfand, 2012) becomes particularly relevant in understanding user acceptance of AI-based technology in healthcare surroundings. Our research underscores the importance of trust as a foundational element shaping attitudes and interactions with AI-based technology within healthcare contexts. When conducting our research respondents express the necessity for accurate data feeding and the AI-based technology's accuracy. Mayer and colleagues' definition of trust involves the willingness to be vulnerable, predicated on the expectation that it will act in ways beneficial to the trustor, despite the inability to fully monitor or control its actions. Furthermore, Fulmer & Gelfand (2012) underscores the importance of taking risks and accepting vulnerability to achieve trust. Based on the literature and the responses from our respondents, one can conclude that trust can be a challenging factor or concept to achieve because of the negative perceptions or beliefs for the non-perfect AI-based technology. Our respondents indicate that they will only use a tool that is entirely flawless and performs better than humans themselves. This can make it difficult to integrate AI-based tools, and therefore, the testing period during development is crucial, as is close dialogue with users, as also expressed by our respondents.

In our study, our respondents emphasised that AI-based technology lacks the ability to read a room or discern non-verbal cues, crucial aspects of human interaction and diagnosis. They also highlighted AI's inability to interpret patient nuances and accurately identify underlying medical issues. Moreover, our respondents expressed the importance of human observation and understanding in detecting subtle cues and emotional contexts that AI may overlook. They emphasised that AI-based technology should be viewed as a tool to augment human decision-making rather than a substitute for it. While AI-based technology offers significant benefits, including its ability to process large datasets and provide valuable insights, it should be integrated into healthcare settings as a complementary tool rather than a replacement for human judgment and compassion. This approach ensures that the human element remains central to patient care, preserving the essential aspects of empathy, intuition, and personalised interaction in healthcare delivery.

There was recognition of AI's importance in preventive healthcare, aiming to predict illness before it progresses. Respondents highlighted the need for early detection to improve long-term health outcomes. Furthermore, they expressed that AI's potential to provide quick decision support based on factual data while balancing human judgment, especially in emergency assessments. In summary, respondents foresee significant opportunities for AI in healthcare but emphasised the need for continuous improvement.

## **5.2 What factors affect the healthcare practitioners' acceptance of the use of AI-based technologies in the Swedish healthcare?**

From our findings several factors emerged that influence the acceptance of AI in healthcare, which can be categorised into those that promote acceptance and those that hinder it.

One factor that promotes acceptance is the expectation that AI-based technology should enhance efficiency and save time for healthcare practitioners. However, concerns were raised by respondents regarding the complexity of AI-based technology systems, fearing that they might increase workload instead of streamlining processes. Therefore, ensuring that AI-based technology is efficient, and timesaving is crucial for acceptance.

Furthermore, it's essential for healthcare practitioners not to feel threatened by AI implementation. Many respondents emphasised that AI should act as a supportive tool, not as the decision-maker, and that final decisions should always rest with the healthcare provider. In the research by Sivaraman et al. (2023) the authors found that visualised AI-based technology contributed to their confidence in the healthcare practitioners' decisions. This was not something that emerged in our study, rather the opposite, where our respondents were very sceptical to the use of AI-based technology in a decision-making process. Related to healthcare practitioners feeling threatened by the implementation of AI-based technology. The respondents expressed concerns about potential job displacement due to AI-based technology. Furthermore, this highlights the importance of introducing AI-based technology as a complement to human expertise rather than a replacement.

Ethical use of data was another significant concern raised by respondents, which mirrors the emphasis on transparency and ethical data processing highlighted in Zhao & Tu (2022). High levels of data security and ethical data processing are indeed crucial for AI-based technology acceptance in healthcare, as suggested by the literature.

Another key factor is the expectation that AI-based technology should reduce human error and perform better than humans themselves. Respondents emphasised that mistakes in healthcare can have severe consequences, underscoring the need for AI systems to be error-free and outperform human capabilities to gain acceptance among practitioners. This aligns with Zhao & Tu's (2022) findings perceived trust towards AI-based technology affects their willingness to use it.

Additionally, respondents highlighted the importance of education and gradual introduction to foster acceptance of AI. This confirms the research by Sivaraman et al. (2023) that there are four behavioural patterns in the response to AI-based recommendations. The various responses differ because of individual attitudes, experiences and trust. Therefore, education and gradual introduction could contribute to individuals' positive experiences which promotes the acceptance of the AI-based technology. Respondents also emphasised the need for targeted implementation of AI in areas where it can enhance efficiency, such as predictive diagnostics, allowing healthcare practitioners to focus on patient care rather than administrative tasks.

In summary, to promote acceptance of AI in healthcare, it's essential to ensure that AI systems are efficient, supportive, ethically sound, error-free, and implemented strategically where they can bring tangible benefits to patient care.

### **5.3 Discussion of Findings with the Theory of Reasoned Action**

In our exploration of healthcare practitioners' perspectives on AI adoption within the Swedish healthcare context, we find rich insights that align closely with the principles of the Theory of Reasoned Action (TRA). In this discussion we delve deeper into how TRA sheds light on the attitudes, intentions, and behaviours of healthcare practitioners regarding AI adoption.

Our bachelor's thesis research reveals a spectrum of attitudes towards AI adoption among healthcare practitioners. Some respondent's express enthusiasm about AI-based technologies potential to revolutionise the healthcare industry, while others voice concerns about job displacement and data integrity issues. According to TRA, these attitudes significantly shape practitioners' intentions to adopt AI-based technologies. Positive attitudes often lead to greater acceptance and willingness to integrate AI-based technologies into practice, whereas negative attitudes may act as barriers to adoption efforts.

The variability in AI adoption observed among healthcare practitioners underscores the influence of subjective norms on behavioural intentions, as proposed by TRA. While some practitioners readily integrate AI-based technologies into specific healthcare practices, others exhibit reluctance due to perceived limitations or concerns about effectiveness. This suggests that

subjective norms, including perceptions of AI-based technologies' usefulness and appropriateness within the organisational context, play a pivotal role in shaping individual practitioners' decisions regarding AI-based technology adoption.

Trust emerges as a critical factor in healthcare practitioners' attitudes towards AI-based technologies, mirroring TRA's emphasis on subjective norms. Practitioners' trust in AI is influenced by perceptions of reliability, effectiveness, and ethical use. Those who perceive AI-based technologies as reliable and effective are more likely to express trust and acceptance, while concerns about data integrity or misuse contribute to scepticism and reluctance.

Practitioners weigh the perceived benefits and limitations of AI-based technologies in their decision-making processes, reflecting TRA's focus on individual beliefs about behavioural outcomes. While they acknowledge AI's potential to enhance efficiency and decision support, concerns about misdiagnoses and technical limitations also surface. These beliefs shape practitioners' attitudes towards AI adoption, with perceived benefits increasing acceptance and perceived limitations fostering scepticism.

The intricate interplay between human judgment and AI-based technologies capabilities highlighted in our findings resonates with TRA's emphasis on individual beliefs about behaviour outcomes. Practitioners recognise AI's capacity to handle vast amounts of data but emphasise the irreplaceable role of human intuition and empathy in certain healthcare scenarios. This suggests that practitioners' beliefs about the effectiveness and reliability of AI-based technologies compared to human expertise shape their intentions to rely on AI in decision-making contexts.

Optimism regarding the future potential of AI-based technologies in healthcare reflects practitioners' expectations about behavioural outcomes, as proposed by TRA. Despite current challenges and limitations, practitioners foresee significant opportunities for AI to transform healthcare practices, particularly in preventive care and workflow efficiency. These positive expectations may influence practitioners' intentions to adopt AI-based technologies in the future, driving efforts towards continued innovation and integration.

In conclusion, our exploration of healthcare practitioners' perspectives on AI adoption within the Swedish healthcare context reveals a complex landscape shaped by attitudes, subjective norms, trust, beliefs about behavioural outcomes, and expectations for the future. These insights, aligned closely with the principles of TRA, emphasise the importance of understanding and addressing the multifaceted factors influencing practitioners' decisions regarding AI adoption.

## 6. Conclusion

In the conclusion chapter we summarise the findings of the bachelor's thesis, which explores the acceptance of AI-based technologies in Swedish healthcare among practitioners. It discusses key factors influencing acceptance, highlights practical implications, and suggests avenues for future research.

### 6.1 Conclusions

The bachelor's thesis examines the integration of AI-based technologies in healthcare focusing on the acceptance factors among healthcare practitioners. The purpose of the bachelor's thesis was to explore the acceptance of emerging AI-based technologies within the Swedish healthcare context focusing on the healthcare practitioners' perspective. By understanding the extent of acceptance and the factors influencing it, this bachelor's thesis research aimed at shedding light on the dynamics surrounding the adoption of AI-based technologies in healthcare settings and providing healthcare practitioners with a deeper understanding of how these technologies can be effectively utilised. For this purpose, we formulated two research questions: RQ1. How do healthcare practitioners perceive the use of AI-based technologies in the Swedish healthcare? and RQ2. What factors affect the healthcare practitioners' acceptance of the use of AI-based technologies in the Swedish healthcare? For this, we conducted qualitative research where data were collected through semi-structured interviews from healthcare nurses and physicians working in the Swedish healthcare. The collected data were analysed thematically to conclude to six themes. The six themes represent the empirical findings of this bachelor's thesis research and were followingly discussed with the help of the theoretical framework. The theoretical framework consists of main concepts of artificial intelligence (AI) and its acceptance, Swedish healthcare, AI-based technology in healthcare, and factors affecting trust in AI, and the theory of Reasoned Action (TRA).

The research findings show that despite increasing acceptance of AI-based technology in healthcare, there are still challenges that need to be overcome. Among the most important factors influencing acceptance are knowledge, education and perceptions of the technology's effectiveness and ethical aspects. The findings highlight the importance of building trust and confidence among healthcare professionals regarding the use of AI-based technologies. By addressing issues around privacy, security, and ethics, we can create a safer environment for the implementation and use of these technologies. Furthermore, the findings also show the need for continuous training and skills development for healthcare professionals to ensure they are well equipped to use and benefit from AI-based technology effectively. This underscores the importance of continuing education and resources to support staff development and adaptation to the rapidly changing technological environment. Additionally, the findings point out that the successful integration of AI in healthcare requires a holistic approach that takes into account both technical and human aspects. By creating a balance between the potential of the technology

and the needs and experiences of healthcare practitioners, we can maximise the benefit of AI-based technologies and improve care for all stakeholders. However, it is important to address potential barriers and challenges to maximise the benefits of these technologies and improve the quality of care for patients. By continuing to explore and adapt AI solutions to the needs and views of healthcare practitioners, we can promote positive developments in healthcare and create a more efficient and sustainable healthcare environment for all parties involved.

## **6.2 Contributions**

The contribution of this bachelor's thesis research is both theoretical and practical. From a theoretical perspective, the research focused on shedding light on the dynamics surrounding the adoption of AI-based technologies in healthcare settings. Furthermore, on a practical perspective, this research aimed to provide healthcare practitioners with a deeper understanding of how these technologies can be effectively utilised. Consequently, it helps all interested stakeholders in understanding the benefits and challenges of the integration of AI-based tools in healthcare, and how to address them. Emphasising in this way the importance of continued dialogue and collaboration between technology developers, healthcare practitioners, and policy makers to promote the successful integration of AI-based technologies in healthcare.

## **6.3 Suggestions for Future Research**

A suggestion for future research would be to repeat the same research with a larger number of respondents holding different roles/positions within healthcare to get additional opinions regarding the use of emerging AI-based technologies in the context of healthcare.

Another interesting suggestion would be to include healthcare practitioners from different countries to conduct a comparative study. Another suggestion is to repeat a similar study complemented with quantitative data.

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# Appendices

## Appendix A. Informed Consent Form

Your participation in this research is completely voluntary. You are free to refuse to participate, and you can withdraw your participation at any time. The data collected from your participation will only be used for our thesis and will be deleted upon completion. You will remain anonymous in the thesis and will have the opportunity to review the transcription of the interview before publication. Does this feel okay?

## Appendix B. Interview guide

Section	Question
<b>Introduction</b>	Do you agree to us recording the interview?
	<p>Your participation in this research is completely voluntary. You are free to refuse to participate, and you can withdraw your participation at any time.</p> <p>The data collected from your participation will only be used for our thesis and will be deleted upon completion.</p> <p>You will remain anonymous in the thesis and will have the opportunity to review the transcription of the interview before publication.</p> <p>Does this feel okay?</p>
<b>Introductory Questions</b>	Tell us a bit about your current position and your duties.
	How long have you been working in your field?
	How much do you use the computer/technology during a typical workday?
	How do you feel about using technology in your everyday work?

<p><b>Main Questions: Understanding the current situation with AI-integrated tools in healthcare</b></p>	<p>Do you know what Artificial Intelligence is?</p>
	<p>Artificial Intelligence (AI) is a technology used to enable computers and machines to perform tasks that normally require human intelligence. Examples include AI medical image analysis, where algorithms are used to detect abnormalities in X-rays and MRI scans. Clinical decision support systems help doctors make decisions about patient care by analysing patient data and medical literature. Predictive analytics uses AI to forecast patient outcomes and identify high-risk patients to prevent readmissions. Virtual health assistants, such as chatbots, help patients access medical information and schedule appointments. AI is also used to accelerate drug discovery, monitor patients remotely with wearable devices, and analyse genomic data to develop personalised treatment plans.</p>
	<p>Do you use Artificial Intelligence in your daily work? Could you give us some examples?</p>
<p><b>Main Questions: Understanding acceptance with AI-integrated tools</b></p>	<p>What is your experience with AI tools? Would you like to share more about this?</p>
	<p>How do you feel about AI integration in healthcare? Do you have any expectations?</p>
	<p>Do you see any potential challenges and opportunities with the integration of AI?</p>
	<p>What opportunities and challenges have you encountered in using AI-based technology? Can you give examples?</p>
	<p>Do you see any potential risks with the increasing use of AI-based technology in healthcare?</p>
	<p>Do you feel that your work has become more precise/reliable/efficient/easy/difficult/risky by using AI-based tools?</p>

	What factors do you consider important when using AI-integrated tools to ensure that your work is performed correctly?
	What factors do you think are important for the acceptance among healthcare professionals regarding AI integration?
<b>Closing Questions</b>	Any final comments or insights you would like to share about what we discussed today?
	Would you like to have the transcription of the interview before we publish it?
	Thank them for their time and participation!

## **Appendix C: AI statement**

In our bachelor's thesis, we have integrated AI-based technology in several ways to facilitate and enhance various parts of the research process. One of the primary uses of AI was to generate an abstract of our research. By using an AI model, we were able to quickly and efficiently summarise our research findings and conclusions in a clear and concise manner. In addition to creating a summary, we also used AI to assist with sentence formulation and text structuring. By employing language processing algorithms, we were able to improve the clarity and flow of our written sections and ensure a consistent and professional tone throughout the work.

Another important use of AI was in the transcription of interviews. Instead of manually transcribing audio files, we utilised an AI-driven transcription service that significantly streamlined the process. This not only saved time but also reduced the risk of errors in transcription and enabled quicker analysis of interview data.

Lastly, in our concluding discussion, we also integrated insights and perspectives obtained from AI-based analyses of our data. By using AI to identify patterns and trends in our research findings, we were able to provide deeper insights and more robust conclusions.

In summary, the use of AI has been crucial in improving the efficiency, accuracy, and quality of our thesis. By integrating AI-based technology, we have been able to perform complex tasks more efficiently and gain increased insight and understanding into our research question and its implications.