AI and Healthcare: Doctors' perspective on work and professional identity

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Abstract

In recent years, artificial intelligence (AI) has continuously evolved and impacted various sectors, including healthcare. Understanding the implications of these changes on the identities of medical professionals has become significantly important. Consequently, this study aimed to enhance the existing literature concerning identity work and AI by demonstrating how interactions between doctors and AI contribute to the process of identity formation. To accomplish this objective, an inductive semi-structured qualitative study involving fourteen participants was conducted, and the data was analysed using a combination of Braun's Thematic Analysis and the Gioia method. The findings indicated that, likely due to the strong professional identities of the doctors, they perceived AI as a means of identity enhancement rather than as a source of identity threat. Furthermore, medical practitioners regarded AI as a tool or assistant rather than a colleague, and their receptive attitudes were evident in how they emphasised its advantages. Additionally, perceptions of AI have shifted over time; considering the continuous learning and development that doctors experience throughout their careers, the integration of AI has been shown to perpetuate an ongoing process of identity work and adaptation, potentially leading to changes in their professional identities. This study has also revealed important practical implications concerning the implementation of AI, the degree of its integration, and the factors necessary for determining how to incorporate AI within a hospital, ensuring a balance between technological advancements and the positive expression of professionals' identities.

Keywords: artificial intelligence, professional identity, identity work, medical professionals, identity threat, identity enhancement.

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1. Introduction

Technology has undergone rapid advancements in recent years, particularly regarding Artificial Intelligence (AI) technologies, including deep learning, machine learning (ML), neural networks, and natural language processing, which have played an important role across various professional fields (Kasula, 2023). AI can be viewed as an 'agent' that operates on behalf of a person and analyses behaviours, distinct types of data, and communication history to achieve the desired outcome (Hancock et al., 2020). AI has also been recognised as a significant element across various industry sectors, with the healthcare sector being one of the early adopters (Nasr et al., 2021; Howard, 2019; Tursunbayeva & Renkema, 2022; He et al., 2019). Numerous AI applications have already been identified as beneficial; for instance, machine learning has been extensively utilised in precision medicine, neural networks assist in predicting whether a patient will develop a particular disease, and deep learning has significantly advanced radiology, facilitating the better detection of potentially cancerous cells (Davenport & Kalakota, 2019). Therefore, the healthcare sector and doctors have been profoundly influenced by AI innovation and are likely to be even more affected by future developments in AI (Tursunbayeva & Renkema, 2022; Selenko et al., 2022; Reddy et al., 2019).

Indeed, as AI applications expand in the medical field, doctors must adapt to AI as part of their routine and begin utilising it. Although the extent of AI's prevalence and the necessity for its integration varies among different medical specialties (Davenport & Kalakota, 2019), this can be a sensitive issue for professionals in the healthcare sector, as they may face challenges when working with AI. Doctors hold a wide range of perspectives regarding AI implementation. While the majority can highlight the advantages and view AI integration as beneficial for both doctors and patients, others have expressed concerns about it potentially replacing clinical decision-making and diminishing doctors' accountability for diagnoses (Sarwar et al., 2019), ultimately affecting the core of their professional identity (Selenko et al., 2022).

Identity can be described as a collection of meanings that individuals associate with themselves, encompassing how they perceive themselves through their relationships, personal qualities, affiliations with groups, and the values they uphold (Petriglieri et al., 2011). Similarly, professional identity embodies the connection between an individual's performance and their relationship to their work, considering personal and professional values (Chen & Reay, 2020; Pratt et al., 2006;

Brown, 2017). The pillars of individual identities are values; these not only highlight an individual's thinking processes, actions, attitudes, and emotions but also constitute a central element for professionals in the workplace (Carminati & Gao Heliot, 2022). In particular, doctors' professional identity is rooted in robust and strong values, which are also linked to the Hippocratic Oath and their commitment (Jephson et al., 2024). Due to their influence on work practices, disruptive technologies, such as AI, can affect some core aspects of the medical profession and, consequently, their work, including their professional identities (Zaman et al., 2021). Identity threat is 'an experience appraised as indicating potential harm to the value, meanings, or enactment of an identity' (Petriglieri, 2011, p. 644). In professional contexts, a discrepancy between professional values and workplace values can result in identity threats, which may be perceived as detrimental to doctors (Brown, 2017; Petriglieri, 2011). While identity threat could pose a problem for medical professionals, this depends not only on how they engage with AI technology but also on how it is integrated into their daily tasks, as various factors can influence this dynamic (Selenko et al., 2022; Petriglieri et al., 2011). Nevertheless, considering AI's advantages, doctors do not necessarily need to consider it a threat when working with it (Huang et al., 2019). Indeed, AI may also be regarded as an enhancement to their identity. Focusing on professional identity, especially in the medical field, is important as it shapes how individuals perceive themselves as professionals, interact with others, and evaluate their success in the workplace (Cruess et al., 2014).

Researchers have increasingly focused on how AI could be integrated into doctors' lives, drawing particular attention to specialties such as radiology (Chen et al., 2021; Akudjedu et al., 2023), surgery (Hashimoto et al., 2018), clinical neuroscience (Loh, 2018), and anaesthesiology (Pham, 2023). However, completely replacing doctors with AI may be challenging due to the current limitations of this technology (Reddy et al., 2018; Shuaib et al., 2020). This is because, despite advancements, a blend of technology and healthcare professionals is central to diagnosis and treatment applications (Davenport & Kalakota, 2019). Although several studies have analysed the connection between AI and healthcare professionals (such as the implementation process, the complexity of tasks taken over by AI, and how well AI is integrated into existing processes) (Davenport & Kalakota, 2019), it remains unclear how these doctors perceive AI's influence on their professional identity in the workplace (Selenko et al., 2022). Indeed, besides posing a threat, AI could provide doctors with essential information about patients while assisting them in developing better, personalised treatment plans (Le Nguyen & Do, 2019; Buck et al., 2022), thus

enhancing their professional identity. This technology could also support them in improving patient outcomes by leveraging the insights it generates while augmenting the speed of decision-making and the doctors' expertise (Edison, 2023).

Therefore, this research aims to analyse AI's role for doctors and how they respond to it (i.e., by experiencing identity threat and/or enhancement) in the context of these technological developments. The research question (RQ) that this thesis focuses on answering is as follows:

RQ: How do healthcare professionals perceive the influence of AI implementations on their professional identity?

This thesis contributes to the existing literature on AI and identity in two ways. Firstly, it aims to highlight how AI can influence doctors' professional identities, either positively or negatively, by examining their responses to it and perceiving it as either a threat to their identity or a means of enhancement. This builds on the previous research by Selenko et al. (2022) and Petriglieri (2011). Additionally, this research considers the potential effects on their professional identities and values by analysing how these doctors engage in identity work to adapt more effectively to the implementation and integration of AI. Consequently, it explores both the advantages and disadvantages of AI from the perspective of medical professionals, contributing to a deeper understanding of how future advancements in AI may impact the profession and their professional identity.

The research also has significant consequences for practice. Firstly, as interest in health and its improvement has recently risen (Best et al., 2012; Kyratsis et al., 2017), individuals must understand how to adapt to AI accordingly. HR managers in the healthcare sector can also find this research helpful, as it helps them grasp how employees perceive working with AI, how it could affect their performance, and how they can better support doctors during this transition. Secondly, this paper could assist professionals in making informed judgments about the role of AI in daily activities while properly considering its downsides and benefits. Finally, the study can be helpful for AI developers to understand how their technologies influence end users and for hospital managers to consider implementing policies and guidelines for working with AI.

After presenting an overview of relevant literature on AI, medicine, and professional identity, the methodology section describes the data collection and analysis techniques. The results section

follows, and the discussion section examines the findings. The theoretical and practical implications, along with the limitations and directions for future research, precede the conclusion of this academic paper.

2. Theoretical Background

2.1. AI & Healthcare

AI has been playing an increasing role in all aspects of human life, and the work environment is no exception. Over the years, many definitions of AI have been proposed. However, as complex as this is, it has been proven difficult for scientists to agree on a common one, as what has helped with the continuous developments of AI is the uncertainty and disagreements regarding a precise definition (Agre, 2014). However, AI could be defined as 'an industry of computer science related to the automation of intelligent behaviors, and it must be based on applying theoretical principles as well as the operation of applicable models' (Le Nguyen & Do, 2019, p. 1). It can also be defined as 'a collection of interrelated technologies used to solve problems that otherwise require human cognition' (Walsh et al., 2019, p. 2) or as 'a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation' (Kaplan & Haenlein, 2019, p. 17). These three definitions intertwine to describe AI; however, the cognitive component is often overlooked. This element may assist professionals in shifting their focus from cognitive skills to the soft skills they can develop as a positive result of working with AI (Huang et al., 2019).

AI is increasingly involved in various aspects of human life, often without people being consciously aware of it (Helm et al., 2020; Lu et al., 2018). It encompasses a range of technologies, including Natural Language Generation, Speech Recognition, Virtual Reality, Decision Management, Deep Learning and Neural Networks, Robotic Process Automation, Text Analytics, and Natural Language Processing (Lu et al., 2018). Among the many fields where AI has made a positive impact (e.g., finance, HRM), one that has greatly benefited from advancements in this technology is the healthcare sector (Nasr et al., 2021; Howard, 2019; Tursunbayeva & Renkema, 2022; He et al., 2019). AI has been increasingly implemented in healthcare, as it has proven helpful in various aspects, including treatment identification, clinical decision-making, healthcare interventions, diagnostic error reduction, and enhancing the care process (Helm et al., 2020;

Schwalbe & Wahl, 2020). For instance, clinical decision support systems are 'computer programs that draw upon clinical data and knowledge to support decisions made by healthcare professionals' (Reddy et al., 2018, p. 23). AI is integrated into these programs and has aided in predicting the onset of septic shock and making treatment decisions (Anakal & Sandhya, 2017). Furthermore, regarding medical applications, AI can assist with patient monitoring, including implementing electronic healthcare records and their benefits (Reddy et al., 2018). AI software may also be utilised in intensive care units, for imaging and radiology applications, and to assist doctors during specific interventions (Ramesh et al., 2004; Hosny et al., 2018). Moreover, neural networks have become increasingly important in the healthcare system for predicting outcomes, and their application has been examined in this domain for several decades (Davenport & Kalakota, 2019). Neural networks play a crucial role in this, as recent research indicates they may predict diagnoses more accurately than actual doctors (Reddy et al., 2018).

The applications of AI are not limited to the aspects mentioned above. They also extend to how this technology could assist with more administrative tasks, such as filling patients' charts and scheduling appointments (Tursunbayeva & Renkema, 2022). Furthermore, AI and ML can be utilised for prioritising patients, reducing waiting times, and handling routine or repetitive tasks, which could be helpful for those working in the medical field by allowing doctors to save time and focus more on the actual care process (Reddy et al., 2018; Meskó & Gorog, 2020). Past research has shown that AI already outperforms individuals in some respects due to its speed and processing capabilities (Selenko et al., 2022; Brynjolfsson et al., 2018), and it could even replace humans in certain fields of activity (Parker & Grote, 2022). Moreover, implementing AI and the Internet of Things has proven useful in creating devices that collect data for customising healthcare products (Mariani et al., 2023). Overall, AI has simplified medical practices, ultimately aiding the medical profession.

As primary actors in the medical profession, doctors prioritise the interests of others over their own, respond to societal needs, comply with moral and ethical standards, navigate high levels of complexity, and are accountable for their decisions while adhering, as much as possible, to their moral values (Swick, 2000). AI has infiltrated the medical field in recent years in numerous ways, and although this can be seen as a privilege for automating certain processes, there exists a fine line between what doctors find helpful and what may be perceived as intrusive (Derevianko et al.,

2023). Indeed, integrating AI in medicine may also present drawbacks, including potential medical errors, challenges in understanding decision-making processes, funding issues, and resistance from healthcare professionals regarding AI adoption (Reddy et al., 2018). A medical specialty that leads in AI application is radiology (Stewart et al., 2020; Brandes et al., 2020; Gong et al., 2019; Chan & Siegel, 2019), particularly in advanced medical imaging such as CT and MRI (Stewart et al., 2020). Furthermore, studies indicate that AI is also utilised in ophthalmology, cardiology, dermatology, clinical neuroscience (Loh, 2018), as well as in surgery (Hashimoto et al., 2018) and anesthesiology (Pham, 2023), where its accuracy has demonstrated benefits in aiding clinicians to diagnose certain diseases better. According to Perez et al. (2024), there has been an increased application of AI in radiology in recent years, highlighting that by entrusting specific repetitive and tedious tasks to AI, radiologists can concentrate on more complex issues.

Therefore, integrating healthcare professionals' expertise with AI's capabilities is fundamentally important (Reddy et al., 2018), as doctors may view this either as a threat or an enhancement to their professional identity, depending on the identity work they may need to undertake.

2.2. Professional identity and identity work

Defining identity and more specifically professional identity has proven to be a challenging task in recent years, as it is a concept that cannot be 'easily put in a box' as it has more sides than just proving to be a competent person or adopting specific values and traits (Wiles, 2013, p. 857). According to Petriglieri et al. (2018, p. 126), identities are "meanings associated with the self by virtue of personal attributes, relationships, and group memberships. " In the past, an individual was considered a professional based on their certifications; however, today, it is more about how people perform their jobs and apply their knowledge and skills (Caza & Creary, 2016). Furthermore, identities are now viewed as fluid concepts that develop over time, rather than as singular milestones that individuals should or could achieve. They have also been recognised as decisive factors influencing the acceptance or rejection of processes or changes (Brown, 2017).

Professional identity is a crucial aspect of a person's life, as it represents the connection between their work and how they relate to it (Chen & Reay, 2020; Pratt et al., 2006; Brown, 2017). It can be seen as a form of group identification, as individuals may develop a shared identity based on the work culture and environment. However, it can also be regarded as individualistic, as people cultivate their identities based on various factors (Wiles, 2013). One of these factors is represented

by the values held by a professional, which are the main constituents not only of their identity but also of their behavior (Schwartz, 2016). Individuals' emotions, values, and identities significantly drive their behavior (Brown, 2017). To better understand why individuals act in specific ways and how their identities are influenced- especially in response to changes in the work environment- the role of their values should be considered (Carminati & Heliot, 2023).

Furthermore, when considering various aspects that could influence professional identity, it is also important to consider identity work, defined as 'people's engagement in forming, repairing, maintaining, strengthening, or revising their identities' (Ibarra & Obodaru, 2016, p. 56). One of the main factors contributing to identity work is identity threat (Petriglieri, 2011). Indeed, as AI is a powerful force for change, it becomes essential to explore how individuals perceive and respond to it –either as an identity enhancement or an identity threat (Selenko et al., 2022). This identity work may manifest as a process where individuals first attempt to make sense of what is happening and then seek to embrace the newly formed identity (Kyratsis et al., 2017). According to Selenko et al. (2022), implementing AI can increase the risk of identity threat if it leads to changes or eliminations of aspects related to work that people see as important. Conversely, AI-based changes can also result in positive identity transformations if these developments help individuals become closer to their ideal selves at work or facilitate improved job-related personal adjustments. Thus, it is imperative to understand the role of identity work and identity values, as they help explain certain behaviors and attitudes of employees, especially in changing environments or when individuals perceive discrepancies in their identity (Brown, 2017).

According to Bayerl et al. (2018), professionals are bound not only by the rules they must follow but also by their moral values and standards. When confronted with changes, such as new workplace practices that do not align with their professional or work identities, individuals may resist this change rather than embrace it (Chen & Reay, 2020). It is challenging to provide an exact definition of professional identity. However, it represents 'an important cognitive mechanism that affects workers' attitudes, emotions, and behavior in work settings and beyond' (Caza & Creary, 2016, p. 4). Building on this idea, work identity focuses more on how a person perceives themselves in relation to their job (Petriglieri et al., 2018), while professional identity pertains to the sense of self that a person develops regarding their professional career (Caza & Creary, 2016). However, although the challenges that doctors might face when dealing with identity threat may

seem mainly negative, Carminati & Heliot (2023) argue that learning, self-improvement, knowledge development, and maturation can all be positive consequences of clashing identity values.

People's motivation to perform well in their jobs is closely linked to their professional identity. For example, if a person views their job or environment negatively, their job satisfaction may be lower than that of someone who feels they can thrive in that setting (Vogel& Feldman, 2009; Bayerl et al., 2018). Therefore, how doctors perceive the potential impact of AI on their work identity, along with whether they see it as a threat or a positive aspect, needs further analysis. Moreover, in recent years, due to the rapid advancement of AI, society has shifted from a 'Thinking Economy' to a 'Feeling Economy,' and these developments could help professionals refocus from cognitive skills to the soft skills that can be nurtured through interaction with AI (Huang et al., 2019). This topic has received significant attention recently, as several universities now offer special classes for doctors to enhance their specific soft skills that complement the abilities of AI (Paranjape et al., 2019). AI's rising prominence in task and process automation has also highlighted for researchers the importance of the emotional aspects of jobs, which are closely related to the soft skills specialists require (Huang et al., 2019).

2.3. Identity threat and identity enhancement

AI has been considered a threat in the last couple of years for many fields of activity, as it was perceived as taking people's jobs or replacing the human touch in some areas (Kaloudi & Li, 2020; Nowak et al., 2018). However, for the medical field, it can be considered more as a positive aspect rather than a negative one, as its benefits have been widely discussed over the years (Helm et al., 2020; Lu et al., 2018; Tursunbayeva & Renkema, 2022; Reddy et al., 2018). Therefore, it is necessary to examine if doctors perceive both the positive and the negative aspects of AI so that both identity threat and identity enhancement are considered.

According to Petriglieri (2011, p. 644), identity threat is 'an experience appraised as indicating potential harm to the value, meanings, or enactment of an identity'. Three main components of identity threat can be identified: (1) threat appraisal, when individuals evaluate the impact certain factors could have on their identity, (2) the anticipation of identity harm, when the person tries to understand if the danger is immediate, and (3) temporary or long term and coping responses to identity threat when the individual might try to either change the importance of the identity threat

or the meanings associated with it, which it the end could lead to an identity exit, which means to stop engaging with a role (Petrieglieri, 2011). The degree to which a person is more inclined to make these changes is also in close connection with the malleability of their identity, which, according to Petrieglieri (2011), can take four different forms: 1. changing the level of importance of an identity for the individual; 2. adapting the meaning associated with the change; 3. abandoning an identity and the characteristics associated with it; 4. embracing and acquiring a new identity. Therefore, doctors may consciously or unconsciously experience some of the abovementioned stages when working with AI.

In this study, the model developed by Jennifer Petrieglieri is adopted due to the thought-provoking aspects presented in the theory, which merit further exploration. First, this theoretical model is relatively recent; therefore, empirical research is needed to examine its application in real-life situations. Furthermore, it is a cognitive deterministic model that does not account for the emotional component. However, since identity is defined as comprising emotional, cognitive, and relational components (Carminati & Heliot, 2023), including affective elements is important. It has been discovered that emotions can generate identity work and enhance the understanding of potential identity conflicts, which aids in comprehending possible identity changes (Carminati & Heliot, 2023; Cascon-Pereira et al., 2016). According to Cascon-Pereira and Hallier (2012), emotions play a central role in both creating and adjusting identities and appear to be more than just an outcome.

There is a constant fear among professionals of being replaced by AI. However, in the medical field, a complete replacement of doctors seems highly unlikely (Davenport & Kalakota, 2019), as it is more probable that their work will be augmented by AI instead of being entirely replaced (Tursunbayeva & Renkema, 2022). Currently, AI can not wholly replace doctors, as human expertise is crucial in preventing mistakes and communicating with patients (Masters, 2019). This has been particularly evident in jobs such as radiologist or pathologist, but even in these fields, automation will not reach 100% (Davenport & Kalakota, 2019). However, a study by Brandes et al. (2020) on medical students from Brazil revealed that students are less inclined to choose radiology as a specialty after graduating due to the fear that AI might take over. Conversely, research conducted on Canadian medical students indicated that they would prefer radiology as a specialty because of its integration with AI (Gong et al., 2019). Given the numerous applications

of AI in the medical field today, some people consider it dangerous if doctors do not leverage the advantages of this technology, as they might overlook important aspects related to diagnosis (Tursunbayeva & Renkema, 2022).

Still, doctors may feel threatened by the implementation of AI regarding both their professional capabilities and recognition (Jussupow et al., 2022). Time exposure plays a key role in identifying situations that can be perceived as identity threats; the more time a person spends exposed to a certain experience, the more they view it as a threat to their identity (Petriglieri, 2011). How individuals respond to identity threats is significant. According to the literature, the first response to an identity threat is often to address its root cause (Petriglieri, 2011). However, it is impossible to do so in this case, as doctors cannot entirely control the decision to implement AI technology in the medical field. They may also choose to target those who made the decisions that led to the identity threat, but this does not guarantee that the issue will be resolved. Responses can also be positive, which is closely correlated to doctors' involvement in the change process and their willingness to adapt to a changing environment (Chen & Reay, 2020).

Working with AI does not always have negative effects, as people using it can have diverse experiences. Instead of feeling a threat to their identity, they might experience an enhancement of their identity under such circumstances (Ramarajan et al., 2017). How an individual perceives AI as an essential component of themselves and their commitment to working with and integrating AI to accomplish tasks at work is closely connected to how they relate to AI, whether positively or negatively (Mirbabaie et al., 2021). Defining identity enhancement has proven challenging, as the concept is broad and complex to delineate (Savulescu, 2020). Identity enhancement is an experience that individuals perceive as supportive and synergistic to their various identities, arising from both internal and external factors (Ramarajan et al., 2017). Previous studies focusing on the positive effects of AI on professional identity indicate that professionals view this technology as a turning point in identity formation and adaptation, with its significance closely tied to their level of understanding of this technology (Strich et al., 2021). It is necessary to investigate how doctors who work with AI perceive this influence and to understand whether identity enhancement due to AI usage is present in the medical field. A study by Perez et al. (2024) illustrates that radiologists who work with AI must adapt their work identities when using AI while also highlighting that

these individuals experience both positive and negative feelings when integrating it into their practices.

Overall, individuals can either choose to restructure their identities, which involves engaging in identity work, or maintain their current identities despite the changes occurring, attempting to minimise and even ignore the change (Petriglieri, 2011; Chen & Reay, 2020). Since there are no strict rules regarding how a person may react to such changes, it is also important to consider individual perspectives. This is why understanding how specific values, beliefs, and attitudes may influence doctors' reactions to working with AI needs to be explored. This study thus aims to shed more light on this topic. It will highlight whether the medical staff perceives AI as a threat or as an enhancement while also seeking to understand how their professional identity is changing.

3. Methodology

3.1 Research design

In the past years, AI has played an increasing role in the healthcare field (He et al., 2019), and therefore, there is a need to investigate how doctors perceive this development that could represent a threat or an enhancement of their work and professional identities. For this reason, a qualitative inductive research study was conducted. According to Aspers and Corte (2018, p.155), qualitative research is 'an iterative process in which improved understanding for the scientific community is achieved by making new significant distinctions resulting from getting closer to the phenomenon studied'. This type of study was chosen because qualitative research allows the possibility of developing new theories and a better understanding of the participants' experiences without the limitations that a quantitative study imposes (Tracy, 2019). By doing a qualitative study, the researcher is more prone to 'engage in a progressive extension of existing knowledge as a way of discovering new knowledge' (Gioia et al., 2013, p. 15), which represents a key aspect because this research aims to explore the connection between AI and identity threat in the medical field, while also aiming to understand the experiences of these professionals and the meaning behind them (Fossey et al., 2002; Grossoehme, 2014). Considering that a relatively small number of participants has been studied for this research, a qualitative study has been alleged proper to 'preserve the individuality of each of these analyses' (Bickman & Rog, 2009, p. 221).

3.2. Data collection and sample characteristics

The purposive sampling method was chosen to investigate the relationship between AI and professional identity (identity threat and/or identity enhancement). When using a non-probability sampling method 'the units are deliberately selected to reflect particular features of groups within the sampled population' (Ritchie et al., 2003, p. 80). Therefore, the population characteristics were used to choose participants for this research, which are appropriate for small-scale studies (Ritchie et al., 2003; Saunders et al., 2009). The researcher got familiarised with AI applications in medicine and tried to gather more information about other applications during the interviews.

The participants were contacted through LinkedIn and the researcher's network and asked if they could refer other people who could also be interested in being involved in this study. During the contacting phase, and when the interviews were conducted, the researcher asked if the doctors work with AI and how aware they are of this aspect. The doctors that were interviewed were from certain medical specialties that have been proven, based on the literature and the doctors' experience, to use AI the most when performing their professions, such as radiology, surgical specialties (pediatric and orthopedic surgery, otolaryngology, general and oncologic surgery), emergency medicine, anesthesiology and intensive care, neonatology and (Davenport & Kalakota, 2019; Chen et al., 2020; Pham, 2023). However, the research was also open for doctors following other specialties as long as participants confirmed that they use AI. The snowball sampling method was also used, where participants were asked if they might have colleagues from those specialties working with AI and if they would be interested in participating in the study. Most participants said their willingness to participate was also closely related to their interest in this topic.

A total of eighteen interviews were conducted, but only fourteen of them have been included in this research. This choice was made because even though the participants were asked if they worked with AI during the reaching-out phase and at the beginning of the interviews, the level of AI use did not prove to be sufficient during the interviews. The interviewees were chosen based on their particular features, facilitating the exploration and understanding of complex aspects (Ritchie et al., 2003). According to Hennink and Kaiser (2022), a sample size of sixteen participants should be sufficient to reach saturation, as research showed that between nine and seventeen interviews could be enough. Moreover, considering that a qualitative study usually requires between five and thirty interviews to be considered relevant (Saunders et al., 2009), a total

number of fourteen interviews was deemed appropriate as saturation had been reached. Based on the information gathered during the interviews, the researcher also checked for repetitive information; therefore, checking if data saturation was attained, a decision was made to stop the interviews. A survey was sent to the participants before the interviews, where they could fill in their demographic data to focus only on the central questions for this study during the interviews.

Table 1

Overview of Participants

No.	Medical Specialty	Years of experience	Gender	Age
Doc 1	Radiology	2	M	26
Doc2	Radiology	33	F	58
Doc 3	Otolaryngology- Head and Neck Surgery	20	F	48
Doc 4	Neonatology	20	F	49
Doc 5	Emergency Medicine	2	M	26
Doc 6	Anesthesiology and Intensive Care	4	F	28
Doc 7	Anesthesiology and Intensive Care	26	F	51
Doc 8	Anesthesiology and Intensive Care	27	M	28
Doc 9	Anesthesiology and Intensive Care	2	M	26
Doc 10	Infectious Diseases	6	F	31
Doc 11	Pediatric and Orthopedic Surgery	27	M	53
Doc 12	Radiology	2	F	26
Doc 13	Pediatric Orthopedics	1	F	25
Doc 14	General and Oncologic Surgery	19	M	44

3.3. Research instrument

Semi-structured interviews were conducted for this research due to their high degree of flexibility for the participants and since the researcher used open-ended questions (Ruslin et al., 2022). This

aspect was important because the interviewer wanted to gather specific data about the use of AI in the medical field while also offering the participants a certain degree of freedom to add more information that they might consider relevant. Moreover, according to Kallio et al. (2016), semi-structured interviews are one of the most used research methods in qualitative studies, especially in healthcare. The interviews generally lasted between 25 and 45 minutes and were held in English or Romanian, based on the participants' preferences. The interviewed participants lived in various countries, including Romania, the United Kingdom, Ireland, France, and Austria. The researcher is indeed proficient in both languages. The interviews were audio recorded and transcribed using the Amber Script software and each transcription was reviewed by the researcher. Ethical approval for this study was received from the BMS Ethics Committee from the University of Twente: 240893.

In order to maintain the privacy of the participants while also allowing for easy identification, all personal information and identification data were concealed, and the terms Speaker 1 were used instead. The interview was composed of questions based on the literature on AI, professional identity, and the medical field. At the beginning of the interviews and during the contact phase, the researcher explained again what AI means in this study to ensure that both participants shared a similar understanding of this concept. A pilot test of the interview guide was conducted, as this is important in order to identify possible changes and adjustments that need to be made to the interview protocol (Kallio et al., 2016). The interview protocol can be found in Appendix B.

3.4. Data analysis

Thematic analysis (Braun & Clarke, 2006) was used to analyse the data and the data structure suggested by Gioia et al. (2013). Even though thematic analysis offers the researcher a certain degree of flexibility, which might lead to the researcher being able to collect detailed and complex data, this data analysis method has six steps that must be followed (Braun & Clarke, 2006). First, to become more familiar with the data, the interviews were transcribed and read again. Furthermore, the first-order concepts were generated (Gioia et al., 2013) based on the initial codes, followed by trying to keep the wording as close as possible to the one used by the participants during the interviews. Following this step, the second-order themes were generated, composed of first-order concepts grouped based on corresponding themes (Gioia et al., 2013), which were elaborated and maintained as similar as possible to the participants' quotes. The second-order concepts were then

reviewed and renamed in the next stage and clustered together in aggregated dimensions, facilitating the display of the findings in a more structured form (Gioia et al., 2013). In order to interpret the data, rigorous attention was placed on the quotes gathered during the interviews, and the most relevant ones can be found in the results section. The concepts discussed in the theoretical framework part played an important role when generating the first and second-order themes.

4. Results

This research explored how healthcare professionals, such as doctors, perceive the influence of AI implementations on their professional identity and practice. This section presents the findings obtained from the interviews, elaborating on the first-order codes and second-order themes according to the Gioia method. The data structure developed using this method is illustrated in Figure 1, and additional quotes supporting the first-order codes can be found in Appendix C.
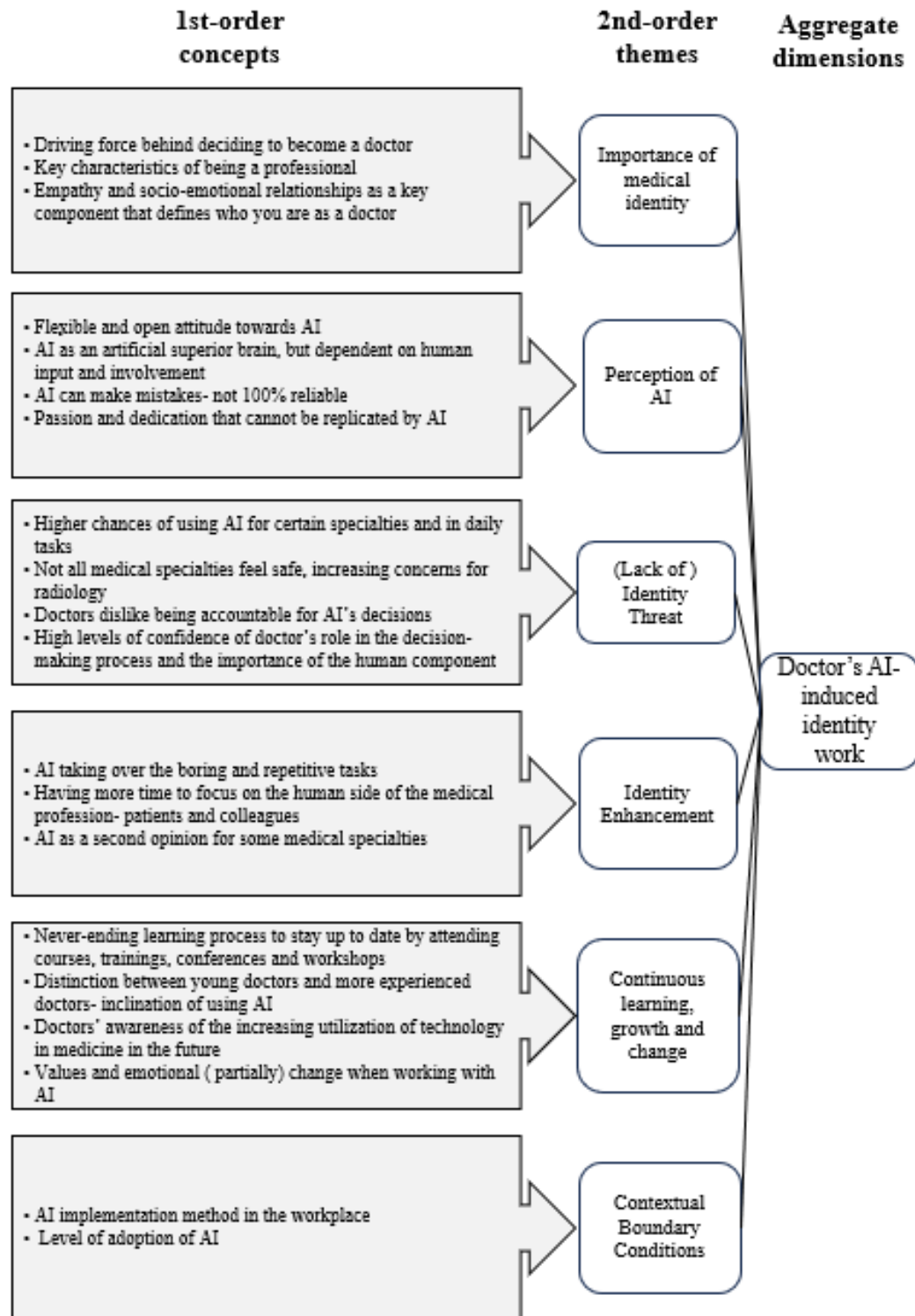
Figure 1: *Data Structure*

4.1 Doctors' AI-induced identity work

After analysing the data collected through the interviews about doctors' perceptions of working with AI, five main themes were identified: 'Importance of Medical Identity,' 'Perception of AI,' '(Lack of) Identity Threat', 'Identity Enhancement,' 'Continuous Learning and Growth' and ' Contextual Boundary Conditions.'

4.1.1. Importance of medical identity

From our participants' words, it was clear that their medical identity was very salient and important for all of them, and they saw "becoming a doctor" as **a vocation**. Many doctors highlighted that '*I could not see myself doing something else* ' (*Doc 1, Doc 5, Doc 7, Doc 8, Doc 9, Doc 11, Doc 13, Doc 14*) and that '*a person needs to be willing to make certain sacrifices when deciding to become a doctor*' (*Doc 6, Doc 8, Doc 9*). Furthermore, when asked what motivated them to become doctors, the interviewees underlined that:

It was something that I had always wanted to do; ever since I was little, I knew I wanted to become a doctor. Therefore, when the time came and I had to choose a career path, I decided to pursue my dream. (Doc 12)

I believe this profession is a good fit for me from all points of view. It is a noble profession, a necessary one that underpins a healthy society. So, in other words, it is a necessity. (Doc 1)

Additionally, throughout the interviews, the participants shared what they believed to be some **key characteristics and qualities of being a doctor**.

I believe that dedication to this job should come first. It is very important not to settle for mediocrity, be serious, and always be willing to learn. You must understand that everything you do has consequences for your patients. (Doc 1)

You need to be fair to both you and your patients. I mean, there are times when you need to be able to recognise your limitations and ask for help when you feel overwhelmed by a situation because any mistake you make can be fatal to the patient. It is important not to put your pride or desire to assert yourself ahead of the patient's needs. The desire to always want to be better, to know more things, and to be more in control of what you know are also important. You need to be determined, and I mean to be determined in everything you do, because it is a pretty difficult environment to endure. (Doc 8)

Even though several characteristics overlapped for various doctors- such as the importance of being *fair* and *respectful* toward patients- one trait mentioned unanimously was *empathy*: the importance of imagining what it would be like if the tables were turned. Hence, being empathic was crucial in their relationships with their patients and colleagues. Therefore, **empathy and socio-emotional relationships** were **key components that define medical identity**, as mentioned by these doctors:

Being empathetic is a fundamental attribute for a doctor; it is one of the core characteristics of our profession, and I would say it is what drives us to want to save our patients. Of course, it is important to be an intelligent person, but I believe that without empathy and perseverance, you cannot succeed in this profession. (Doc 5)

A doctor is always a combination of three things: the knowledge you have, how you can put the things you know into practice, and how you can build connections with people (the patients and your colleagues). (Doc 11)

The quotes above summarise what doctors perceive as essential characteristics that underline their professional identity. They highlight the importance of various aspects that contribute to what defines them both as doctors and as professionals, showcasing a strong medical identity.

4.1.2. Perception of AI

The participants were asked what AI meant to them, and the majority expressed that they see it as a technological advancement that is increasingly growing across many fields of activity:

I would say that AI acts as a valuable tool in the decision-making process, assisting you in reaching certain conclusions, providing recommendations, and double-checking your work. It has been increasingly utilized in radiology lately, and in one word, I would say that it represents the future to me. (Doc 2)

During the interviews, an overall **positive and open attitude towards AI** was observed in all participants, regardless of their medical specialty. Many of the doctors that were interviewed declared that being open-minded and willing to integrate AI into their practices represented fundamental aspects, especially nowadays:

I would say that I have always had a positive attitude towards working with AI […]. Using AI also helps with efficiency, as we ask ourselves questions like: 'Are we efficient enough? Can some things be improved? Can we save more lives? 'And since these questions constantly pop up in our minds, it helps us realise how important it is to be open-minded and have a certain flexibility when using AI because, in the end, you recognise how much AI helps you throughout the medical process. (Doc 4)

Participants noted that they attempted to grasp AI's potential by ensuring that they comprehended the concept of AI and its impact on their work. The doctors recognised AI's potential in their field and perceived it as **an artificial superior brain.**

I perceive AI as a superior brain in terms of the connections that it can make. For example, looking at the theoretical aspect, if you want to access a specific piece of information automatically, this 'artificial brain (AI)' can offer you much more complex and complete information. Also, most of the time, it considers multiple points of view. What I mean is that I believe it to be like a brain that incorporates multiple brains, which we as humans do not possess. This makes it superior; it is mainly related to the amount of information it can store and the connections it makes. So, for me, it represents a superior entity. (Doc 10)

Though doctors acknowledged the benefits of AI after working with it, some participants also highlighted a few limitations they perceived because *'the more you work with a system, the more you understand possible flaws that it might have'* (Doc 2). Therefore, participants noted the impossibility of being replaced entirely by AI, as they believe **that in the foreseeable future, AI would still need human input** to achieve the best results and highest level of functionality and accuracy:

You could use AI in a specific field only, together with people who are specialists in that domain. I think that AI can help you a lot and can improve the work that you are doing, but I do not believe that in the medical field, we will get to a point where you can remove the human component altogether. Regardless of technological developments, doctors will still be needed in medicine. (Doc 5)

Emphasising the significance of the human component represented a key aspect during the interviews as participants consistently mentioned that even though human errors do occur, and AI

has the potential to help mitigate some of these errors, **AI can also make mistakes, since it cannot be considered 100% reliable and human involvement is still required.** This showed that even if the level of trust in AI increases, doctors would rather trust their judgment or that of their colleagues over AI when making important decisions.

I had a case once with a prisoner who came to the ER and said that he swallowed some foreign objects. We did an X-ray, and the AI system we used said there was no foreign object and the X-ray was clear. I returned to the patient, and after doing a detailed anamnesis in the end, we realised that there was indeed something there; there were some staples from a shirt tag. I thought it was interesting but more in a disturbing way that AI could not identify the existence of an object. It should have picked up that there was an object there [...]. This was a case where I was proven that I should never count 100% on the AI and that it also misses some things. (Doc 5)

The experiences made the doctors realise the importance of checking every output they get from AI and helped them better understand that even though AI is a technology with immense potential, it should not be trusted blindly. Moreover, most participants adapted to the rapid developments of AI in the medical field and consciously integrated it as much as possible in their work settings. While the majority stated that they enjoy keeping up with the latest developments regarding AI, they mentioned as well the fact that this is closely related to who you are as a person and how open-minded you are as '*There are many doctors who seem pretty conservative to me, and what I mean by this is the fact that they do not want to learn to embrace AI because they believe that it will steal their job. However, this is not the case (Doc 5).*

Even though the participants were aware of the benefits of working with AI, some of the doctors also stated that **always counting on technology can be dangerous** and that they still need to be able to do their jobs properly without it.

Somehow, I perceived a change in my identity because I started asking myself questions such as 'Who am I without technology? How do doctors in less developed countries practice medicine without the help we get from technology? What would I do if I did not have access to such things? . I must also be able to practice medicine and adapt to different scenarios without counting on all these machines and software, because one day you might not have access to them. Technological advancements and AI help, but they should not be a decisive factor in everyday practice (Doc 9)

Lastly, another aspect that played a significant role in how doctors perceive the importance of their medical identity is represented by the fact that the professionals consider that **AI could not replicate the passion and dedication shown by them**. This aspect was mentioned under different nuances during the interviews, such as:

Combining this passion for medicine with the satisfaction you get when you save someone's life gives you a feeling that a 'computer' could never understand. (Doc 5)

This is not only my job but also represents my passion, and I love what I do [...]. This job combines passion and dedication for what you do and the satisfaction you get after solving complex cases, and I believe that AI could never understand these feelings. (Doc 11)

Therefore, even though the implementation process can take different shapes based on the medical specialty, the interviewees expressed a growing willingness to work with AI more and more, as they have had the opportunity to experience first-hand how it helps them, how it improves the medical act and what are the benefits for both doctors and patients. Furthermore, based on the opinions expressed by the participants, doctors believe it is impossible to replace AI entirely, judging by its limitations. However, they are also aware of technology's impact on them and its implications for their jobs.

4.1.3. (Lack of) Identity Threat

A thorough examination reveals that all the participants, regardless of their medical expertise, had to integrate AI into their everyday duties and subsequently adapt to an expanded use of AI. Even though all the doctors worked with AI, specific **medical specialties** were inclined **to use this technology more than others.** Consequently, this variance enabled those doctors to provide a more comprehensive view of their experiences. This higher frequency of use has been observed mainly for radiology, anaesthesiology, and surgical specialties, as an **increased use of AI in their daily tasks** has also been observed:

There is a software in radiology that uses AI and can help you double-check the results before delivering them to the patient. I participated in a study developed by one of my colleagues where I would give a diagnostic, and then the researcher would ask AI to do the same. I was pleasantly surprised to see that in 99,9% of the cases, there was a match between our results. (Doc 2)

My specialty, anaesthesiology, has always been connected to state-of-the-art technology, as we use a lot of special monitors and machines […]. It is a job where we depend on technology, and AI is integrated into our daily tasks. (Doc 7)

However, doctors from other medical specialties who were not afraid to express their opinions offered a captivating perspective regarding the impact of AI on radiology. Several of them stated that radiology was the most susceptible of all medical disciplines to the risks of replacement by AI and that AI could represent a threat to this specialty.

There are certain specialties where AI can significantly impact, such as radiology (…). I believe that in the future, not that many radiologists will be needed, but instead, you will need fewer of them (radiologists) who could coordinate some AIs. (Doc 14).

However, while it seemed that radiologists might initially perceive AI as a threat, and even though there was broad consensus on the impossibility of total replacement, a **certain level of concern among some specialties was expressed**. Indeed, radiologists perceived themselves as competing with AI, especially in the beginning when they started using it:

There is an ongoing discussion about how and if AI could replace our jobs. I have also experienced an amalgam of emotions, from fear of being replaced entirely and thinking that my job would disappear to understanding that AI could not wholly replace me. (Doc 12)

When I chose this specialty (radiology), I felt a general concern among my colleagues that there was a chance that AI could replace us in the future, but as time passed, this concern vanished […]. I believe that not all radiologists will be replaced by AI, but AI will replace the radiologists who do not want to integrate and work with AI. (Doc 1)

During the interviews, doctors shared their concerns about AI being a potential threat to their medical professional identities, as they would be held accountable for certain decisions that an AI could individually make. The fact that they would not like to **be accountable for AI's decisions** demonstrated that even though there is a high level of trust in AI, participants were hesitant to declare that they support AI-generated decisions before verifying them.

You will always need to get validations for results or diagnostics from the doctors. People will always want a real person to hold them accountable if something does not turn out well (Doc 12).

This shows that, though doctors count on AI to double-check their work, they still take responsibility for whatever happens. It is acceptable for them if they have the final word, and AI is used to support their decision-making. Doctors highlighted that specific issues with this arise when, for example, AI makes decisions without them double-checking because, at that point, they perceive their authority would be undermined.

At the end of the day, no matter what happens, you are still responsible, so it is your decision to consider what AI says and how much you would count on its results. It would not be good if, for example, an AI system in the emergency department does the triage automatically, and then if it misses something, doctors are responsible for this (Doc 5).

Therefore, even though doctors seemed to be open regarding AI, the possibility of perceiving it as a threat also needed to be considered. Some of the participants stated that they did not perceive AI as a threat in their profession, as **their role in the decision-making processes remains crucial** and **they could not be replaced so easily**:

I am not afraid of it. You need the human component in the job that I am doing, and I do not expect anaesthesiology to be done without the human component (the doctor) in the future. (Doc 7)

I believe that in the decision-making process, the human component must be present. I could say that I am highly positioned in this decision-making process, so I am not worried about being replaced by AI. (Doc 11)

Most participants shared this perspective, mentioning that although AI has significantly advanced in recent years and influences how individuals do their jobs, they still feel safe considering their chosen profession. Being a doctor gives them certainty and stability because '*There will always be a need for doctors' (almost all participants).*

To sum up, despite the open attitude towards AI, some reluctance was present and showed that doctors were not entirely comfortable with it, as they also had to take responsibility for AI's possible wrong decisions, which could ultimately affect their image as doctors and, consequently, their professional identities. Nonetheless, doctors could choose how much they integrate AI into their daily tasks and medical practices. Making these choices, consciously and unconsciously, put them in a mental space that allowed them to be clearly in charge and exercise control over AI.

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Consequently, they generally did not view AI as a serious threat, as they maintained the final say in decision-making and enjoyed a high level of autonomy regarding AI usage.

4.1.4. Identity enhancement

Participants shared some AI aspects that significantly impacted their perception and professional identity. The doctors discussed squandering too much time on repetitive tasks that AI could automate or take over entirely. Based on the interviews, a dynamic emerged between doctors and AI. Although they mentioned occasionally relying heavily on it, most stated they perceive it more as taking over **tedious and repetitive tasks**. In other words, they perceived AI as an assistant rather than a colleague, as a tool that can help them, not as their equal.

I perceive AI as a tool that will help us even more in the future, especially when it comes to small and repetitive tasks such as counting micronodules for example, as I believe it will help us (doctors) be more productive and give faster and more precise answers. I mean, I see it as helping the doctor even more in the coming years. I believe it will be as a future assistant for the doctor. (Doc 12)

I hope that AI will make our jobs easier. There is much bureaucracy, much writing that we need to do, and many charts that we need to fill in manually. So, from this point of view, I think that if AI can take over these kinds of tasks, it would help a lot and could prove to be a valuable sort of assistant, I could say to the doctors. (Doc 8)

A captivating perspective was offered by one of the most experienced doctors among the participants. Even though he stated that he did not believe that AI could replace him as he was *'too important in the decision-making process' (Doc 11)*, he mentioned that when it came to the bureaucratic process, he would use AI to replace the nurses he worked with '*I would happily replace the nurses that I am working with regarding this part (the bureaucracy) with AI. I would not hesitate even a second because you can avoid human errors and speed up the process* (Doc 11).

These arguments were based on the reasoning that they would prefer AI to manage those tasks so they could concentrate more on aspects such as interaction and communication with the patients. This could also lead to having more time to focus on human-to-human connections and even develop new skills, which leads to perceiving AI as an enhancement tool.

Integrating AI more and more will benefit both doctors and patients, as it will allow the first one to spend more time with the patient and focus more on the human side, communication, and empathy. (Doc 4)

Furthermore, participants emphasised the importance of communicating with their colleagues and working together as a team, as this process helps improve the quality of the medical services. Therefore, doctors pointed out that, with AI taking over repetitive tasks, they **could focus more on professional relationships with their colleagues**, which ultimately could benefit them and the patients.

The more we work together as a team, the more connected we are to each other, which is a good thing because, you see, it is important to communicate with the patient. However, it is also important to communicate with your colleagues because if this part goes well, then everything goes well. (Doc 2)

You need to collaborate closely with your colleagues and build trust between each other, as it brings nice benefits. (Doc 4)

Moreover, this aids in having a higher level of certainty between the doctors and, consequently, working better: *'You cannot be a surgeon if you are not a team player. This can prove difficult because surgeons are people with big egos, so if you do not collaborate with your colleagues in other specialties, but especially with your colleagues in your team, it can be quite difficult. If you do not collaborate, you cannot effectively do surgery, or you cannot do high-level surgery.' (Doc 14).*

Furthermore, it is noteworthy that, for certain medical specialties, doctors also considered **AI a second opinion**, an enhancement to the decisions they could make.

I believe that when it comes to AI, it represents something that complements our work, not something that replaces it […] more like a second opinion that you can use to double-check your work. (Doc 10)

Even though some concerns about being replaced by AI were presented for a particular medical specialty, the overall perception of AI was positive, especially if the human component was maintained, which seemed to be the case for doctors and how they perceived their medical role.

Choosing consciously or unconsciously to view AI as a tool, doctors seemed to (almost) discredit the potential threat of AI, choosing to focus on how it could enhance their profession and skills.

4.1.5. Continuous Learning and Growth

According to the interviews, based on the actions and strategies put into practice, doctors were able to take important steps towards further integrating AI into their professional lives. This study's participants showed increased willingness to participate in and adapt to the complex learning process. In the medical field, '*the learning process never ends' (Doc 1, Doc 3, Doc 7, Doc 8, Doc 11)* and therefore there is a constant need for doctors to be up to date with the latest technological developments, newest studies, and procedures, to be able to provide the best care for their patients. Consequently, when deciding to integrate and use AI**, staying up to date** with the most recent advancements **by attending workshops, conferences, courses, and training on this topic** was essential.

We have training for each procedure. I have done some regarding the ultrasound part and developed some new echo skills. Once new techniques or machines are developed, we have workshops or representatives coming in and presenting them to us. Somehow, we are forced to learn as we get a new device, or we are constantly having training on each new device and how to use it. If we can, we can also take courses, and I attended some courses regarding some machines that use AI. (Doc 3)

One of the doctors brought up a valuable point that emphasises the importance of attending these kinds of events, as the person mentioned that *'there is a need to update the knowledge that you have constantly, because things are changing, are evolving [...] I had an introspection moment, thinking that I have 15 years left until I retire. Well, in this period, I cannot remain where I am now regarding my knowledge and the procedures that I perform, and therefore, I signed up for courses that taught me how to use some new machines that were using AI. It was difficult because I was one of the oldest people there, and younger people taught us, so I perceived a slight discomfort. However, in the end, you have to do this (to keep on learning) for the greater good of the patient and to increase the chances of survival. (Doc 7)*

Committing to a medical career entails signing up for **a never-ending learning process**. To our doctors, even though this came as a prerequisite, it could vary from person to person, as it was strongly related to the intrinsic motivation to improve as a professional in addition to wanting the

best for the patient. Furthermore, participants noted a **distinction between young doctors and more experienced doctors**. The first category represented a generation that grew up with technology and that has a more natural inclination towards using it even in a professional context:

Yes, being passionate about what you are doing is important, but I believe it is always more important to take the time needed to improve yourself and your skills […] I am glad that we had the chance in the hospital where I am working to work with AI and other state-of-the-art technology even from the very early start of my training as a doctor because it shapes who you are as a professional…it has an impact on whom you become as a doctor. (Doc 13)

The second category focused more on doctors less familiar with AI developments and who seemed to need to put extra effort into integrating it into their work:

Nowadays, the more experienced doctors have gotten to a point where we need to learn from the younger doctors when it comes to using specific machines, for example. We learned to do medicine in a certain way, back in those days when we did not have access to all this technology. So, you see, it is a matter of perspective, of thinking I need to adapt to this, and I am so glad I can learn from these young doctors instead of thinking that it could be a shame to learn from someone younger than you, which is what we were taught in the past. (Doc 7)

Therefore, doctors from different generations played a significant role in seeing the changes they encountered and perceiving that this continuous learning process could enhance their experience and help them improve as professionals.

Moreover, with an eye toward the future, many participants noted the relevance and importance that technology plays and will play in their professional lives and emphasised the impact that the increasing use **of technology in medicine will have in the future.**

In my job, the technology part is essential, and I expect this trend, where technology is integrated more and more, will continue. In the future, I expect to have even more help than we do now (…). I am sure that the complexity of the machines we currently use will increase and that, thanks to AI, they will be more innovative and more intelligent. I have already observed an evolution compared to the past (the doctor mentioned that they had bought state-of-the-art machines), and the new ones are more complex, have additional functionalities, and are safer for the patient. I think this will be the case more in the future. (Doc 7)

Last but not least, the participants shared **values** that they considered important in defining who they were as doctors. Almost all participants mentioned 'teamwork' as one of the most significant values, followed by *'dedication' (Doc 1, Doc 2, Doc8, Doc 9, Doc 13)* and *'perseverance' (Doc 3, Doc 5, Doc 6, Doc 11)*. The doctors were asked if they had experienced any **values and/or emotional change compared to before they started working with AI**. On one hand, the majority mentioned that their values did not change; instead, they adapted them to the new way of working.

I do not believe that values change. At least, that was not the case for me. However, I can say that I believe you define them differently, so yes, in a way you can say that they change, but this change happens based on how you relate to them. (Doc 4)

On the other hand, participants stated that they experienced some emotional change regarding how they related to working with AI and how they perceived themselves after implementing this new way of working:

In the beginning, I was afraid of AI because it was this idea that it would replace me and that I might not have a job in the future. I had very intense feelings about this, I personally have gone from several visions and moods and thoughts related to this, from fatalistic stuff, that I am not going to have anywhere to work anymore and it is going to replace us completely and that there will be no more doctors and will just be this software to the realisation that it will be our assistant and starting to perceive its benefit (…). After understanding how it works and can help me, I became more confident in my skills and more open to using it. I understood that there was nothing I should have feared. (Doc 12)

Gaining insights into the never-ending learning process and the resulting attitude shift towards AI has clarified some key aspects regarding the factors driving change when employing and integrating AI.

4.1.6. Contextual Boundary Conditions

Several boundary conditions that influence the implementation process and affect AI perception have been identified, which played a role in how this was viewed as either a threat or an enhancement. Consequently, participants noted that if **the method of implementation in the workplace** involved greater engagement with medical professionals, soliciting their feedback,

providing ongoing training, and clearly explaining the new tools, they were more likely to adopt a positive attitude toward using these technologies.

I am very happy that in the hospital where I work, I have the chance to attend training sessions often regarding the new machines that we should use. Very often, we have people who offer different workshops, and they present new technologies and new procedures. I believe this is very important because it leads to a smoother implementation and integration, and I observed that people are less inclined to reject using these new technologies. (Doc 3)

Another important boundary condition was **the level of adoption of AI in a hospital**. Doctors working in more modern hospitals were more inclined to use AI frequently, either because they engaged with it from the start of their medical careers or because this technology was already integrated into their workplaces when they began. They were not offered the option to opt out of its use. By not giving them this choice, particularly to young doctors starting their careers, they were more likely to view it as the default working method and be receptive to future technological innovations.

Many of the software and machines that we use help us a lot. I think it was very important that I had the chance to work from the beginning in a state-of-the-art hospital because this way, I could learn from the start how to use all of this technology, which made me more willing to try any other new technologies that will appear in the future. (Doc 13)

Coming to the hospital where I currently work, I was forced to adapt rapidly to a high level of use of technology and AI. It might have been a bit challenging in the beginning, but now I see how different things are compared to doctors who work in a less updated hospital and who do not have access to these technologies. (Doc 9)

The identified boundary conditions significantly influenced doctors' perceptions of AI. The method of implementation was crucial because it can directly impact workflow integration and the decision-making roles of doctors -AI can function either as a decision-support tool or a decision-making tool- and any inherent biases they might possess. Furthermore, the level of AI adoption in the hospital helped cultivate more trust in the technology, as a higher level of adoption can lead to greater confidence in AI and foster better collaboration among hospital staff. If a system is widely integrated within a hospital and individuals have similar proficiency levels, this can enhance

teamwork among doctors. Consequently, these factors not only shaped their responses but also influenced doctors to view AI not as a threat but rather as an enhancement.

Overall, our doctors saw the increase in technology as the inevitable path towards the future. They indicated not only that they had to adjust to using AI even more but also that they viewed AI as a mandatory part of their future careers, which would aid them in further developing as professionals.

5. Discussion

This thesis explored how doctors working with AI perceive its influence on their professional identity and practice. It also sought to investigate whether doctors view AI as an enhancement of their identity while acknowledging the potential for identity threats, as highlighted by previous research on this topic (Jussupow et al., 2022; Strich et al., 2021). As illustrated in Figure 2, the findings demonstrate that due to various factors—namely, attitudes towards AI, AI's reliability, the importance of human relationships, levels of confidence in the doctor's role, and shifts in values and emotions, along with certain contextual boundary conditions—doctors may experience an identity change when working with AI. This research also clarified how AI can positively or negatively challenge doctors' professional identities and highlighted the unfolding of identity work for them when faced with these challenges. Additionally, it revealed that doctors may engage in specific activities and behaviours when working with AI to mitigate potential identity threats, such as identity protection, by minimising the importance of AI and clearly stating that they view it as an assistant rather than an equal while also striving to benefit from this technology fully. Therefore, we demonstrated that doctors engage in identity work not only to address potential threats but also during the implementation and integration of AI. In conclusion, implementing AI influences doctors' professional identities, initiating a sense-making and identity work process that may ultimately transform their professional identity.
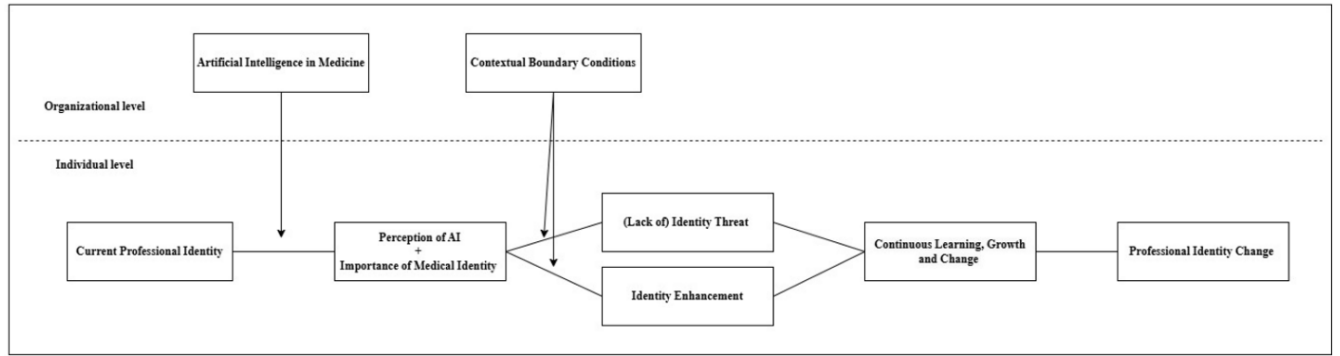
Figure 2: *Visualization of findings*

5.1 Theoretical Implications

This thesis makes two significant theoretical contributions to the current identity literature by discussing how AI can trigger the sensemaking processes via identity work and, consequently, possible identity change.

5.1.1. AI & Identity threat and enhancement

This research contributes to the literature on AI and professional identity by examining whether doctors view their interactions with AI as a threat to or enhancement of their identity while also investigating specific boundary conditions that may influence this perception. Previous studies have not clearly established whether the changes noted by medical professionals are seen as threatening or enhancing to their professional identities (Selenko et al., 2022). Thus, this paper enriches the existing literature by identifying distinct boundary conditions that influence the perception of AI as an enhancement. These factors include the method of implementing AI in the workplace, opportunities for continuous learning and skills development, and the level of AI adoption, all of which have been shown to play a crucial role. In contrast, the unreliability of AI, the absence of human connection, and AI-driven systems making decisions—leaving doctors to shoulder the responsibility—are identified as factors that could contribute to identity threat. Moreover, a previous study by Selenko et al. (2022) called for further exploration of how medical professionals perceive their identities. This thesis emphasises that working with AI is viewed as an enhancement, while identity threat is only evident to a limited extent.

The findings corroborate and expand on past research demonstrating that, despite a persistent fear among doctors about the possibility of being replaced (Davenport & Kalakota, 2019; Kaloudi & Li, 2020; Nowak et al., 2018), medical professionals also recognised the potential benefits of collaborating with AI (Helm et al., 2020; Lu et al., 2018; Tursunbayeva & Renkema, 2022; Reddy et al., 2018), as there was a more nuanced understanding of the possible enhancements. Consequently, the results supported the notion that doctors considered the advantages of using AI, highlighting its positive aspects. This was closely linked to their strong medical identities; they acknowledged a minimal chance of being replaced, allowing them to mitigate this concern and focus more on the benefits. This supports the findings by Huang et al. (2019), which stated that a positive consequence of AI was the shift experienced by professionals from cognitive tasks towards socio-emotional ones. By recognising advantages such as having more time to concentrate on the human side of care, utilising AI for second opinions, reducing workload, and delegating tedious and repetitive tasks to AI, doctors could better embrace the positive aspects of AI usage, demonstrating a fit between the roles of medical professionals and AI.

Previous studies have examined the possibility of identity threats (Jussupow et al., 2022; Mirbabaie et al., 2021; Petriglieri, 2011) associated with working alongside AI, which has led individuals to adopt various attitudes based on the perceived threat level (Petriglieri, 2011). Our research identified collaboration with AI as a potential source of identity threat, especially in the field of radiology. Doctors from other medical specialties expressed varying degrees of concern regarding the prospect of radiologists being replaced. However, findings concerning the radiologists themselves indicated that while AI initially posed a potential threat to their identities, this perception was mainly due to how other specialties viewed radiology as easily replaceable. Despite recognising this potential threat, their decision to pursue this specialty demonstrates that, for radiologists, working with AI has not endangered their professional identities. This contradicts the study by Brandes et al. (2020), which illustrated that concerns about working with AI emerged during medical school for radiology, resulting in reluctance among students to choose this specialty, as noted in the results. The doctors interviewed who chose this field stated they were fully aware of this possibility and made an informed choice. Therefore, while a slight level of concern was initially noted and a shift in radiologists' attitudes regarding their relationship with AI and its impact on their professional identities was observed, our study emphasises that they do not see themselves as easily replaceable by AI. Instead, they regard this technology as an enhancement

to their profession, which also influences their professional identities. This aligns with and extends the findings of the study by Perez et al. (2024), which revealed that radiologists utilising AI have to adapt their professional identities and highlighted that integrating AI into their practice can evoke both positive and negative emotions.

Moreover, AI has been shown to assist professionals in shifting their focus from cognitive tasks to socio-emotional ones by working alongside them (Huang et al., 2019). Thanks to AI's assistance, greater emphasis has been placed on the importance of dedicating more time to the human aspect and interpersonal interactions. These elements closely align with the core values of medical professionals, explaining the stronger inclination to view AI as an enhancement. The results also illustrated how doctors believe that AI could help them refine medical processes and support decision-making procedures, consistent with previous findings (Edison, 2023). However, regarding the decision-making process, this research highlighted several nuances of AI's involvement. On one hand, it indicated that doctors would consider AI as a second medical opinion and that double-checking their work could enhance their confidence; on the other hand, there was a reluctance to be held accountable for decisions made solely by AI without prior consultation. This demonstrates that, although attitudes towards AI were generally positive, concerns about risks to autonomy could decrease receptiveness, underscoring the need to ensure that human autonomy is respected in the context of AI, thereby supporting previous research by Laitinen & Sahlgren (2021).

A high level of confidence among doctors exists, suggesting that AI will still need a human component in the foreseeable future and that the likelihood of its replacement is nearly impossible. Furthermore, this research expands current knowledge by demonstrating that while AI may be used in the diagnostic process, it is seen more as a second opinion than as an independent diagnostic method, allowing medical professionals to retain a certain level of control over the medical process. These findings highlight the importance of AI software in diagnostics and support prior studies emphasising doctors' positive views of AI in various diagnostic methods (Le Nguyen & Do, 2019; Buck et al., 2022). Additionally, this research enhances the existing understanding of doctors' perceptions of working with AI. As AI is a significant force for change (Selenko et al., 2022), a coping response to a potential identity threat has been observed in this study, where doctors consciously and/or unconsciously tried to downplay the significance of AI in certain

scenarios. Employing derogation as a protective strategy against identity threat (Petriglieri, 2011), AI was mainly described as an assistant, dismissing the notion that it could pose a potential threat. This research found that AI was viewed as an assistant capable of handling tedious and repetitive tasks rather than as an equal—contrary to the findings by Selenko et al. (2022), which suggested that AI could be perceived more as a "quasi-social actor." Beyond this protective strategy, the preference among doctors to delegate monotonous tasks to AI may also explain the contradiction regarding the potential of AI replacing radiologists. Many doctors from other medical specialties noted that they utilised software that allowed them to interpret X-rays in emergencies with the assistance of AI. Consequently, this may have contributed to the notion that radiologists could be more easily replaced in the future, differing from how radiologists themselves perceived the situation.

Despite varied attitudes towards AI—often downplaying its significance by perceiving it merely as a tool for handling tedious and repetitive tasks—this study demonstrates that doctors generally hold a positive view of AI. This finding corroborates research conducted by Selenko et al. (2022), which indicated that AI-driven changes could also facilitate positive identity transformations. Regardless of their age, gender, or medical specialty, an overall positive attitude towards collaborating with AI was observed. It was seen as a potential assistant, suggesting that AI did not impede doctors' freedom to act as they wished but rather assisted in the medical process. However, a distinction must be drawn between younger and more experienced doctors, as the latter often need to invest more effort to work with and initially integrate AI.

Therefore, by illustrating how doctors' professional identities are enhanced through collaboration with AI, this study builds upon earlier research indicating that working with AI can lead to identity enhancement (Ramarajan et al., 2020). Expanding on the current literature, which posits that both identity threat and enhancement should be considered (Selenko et al., 2022), our research underscores that the overall perception among doctors is positive, as they view AI as an enhancement to their professional identities. Additionally, certain factors crucial to this process and influencing this perception were uncovered.

5.1.2. Adapting to AI & Identity work

Secondly, this thesis contributes to the literature on identity work by examining how doctors utilise identity work and sense-making processes to better adapt to the implementation and integration of

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AI. It also considers the role of their professional identities and values in this process. Our study demonstrated a heightened openness towards AI, with only negligible reluctance to engage with it. Prior research has indicated that professionals regard AI as a pivotal factor in identity formation and adaptation, with their relationship to it closely linked to their understanding of AI (Strich et al., 2021), their perception of it as an essential aspect of their identity, and their commitment to utilising it (Mirbabaie et al., 2021). The results indicated that AI was effectively employed and integrated across various medical specialties, with participants highlighting its significant role in performing their duties and noting that the absence of AI could pose a considerable challenge. This enhances the existing literature by demonstrating that medical professionals do not perceive AI as a threat but as an integral component of their work. Furthermore, previous research conducted by Brown (2017) emphasised the necessity of delving deeper into analysing identity work and understanding how individuals navigate this process. The findings revealed that doctors, particularly those who did not initially utilise technology, required a smoother and more linear adaptation process to achieve the same level of AI proficiency as those who incorporated technology from the onset of their residency. These results indicate that, in terms of both tasks and professional identities, the implementation process is more complex for more experienced doctors and necessitates performing identity work. This supports previous research (Brown, 2017), which emphasises that identities represent fluid concepts that develop over time rather than singular milestones that individuals should or could achieve. Thus, this study demonstrates that undergoing a constant, never-ending learning process, which pushes individuals out of their comfort zones and assists in shaping their medical identities, is required. This finding aligns with the research conducted by Chen and Reay (2020), which shows that a positive response to AI-induced change is attainable.

Furthermore, this work builds on prior research indicating that identity work primarily arises from identity threats (Petriglieri, 2011) while also demonstrating that identity work can be initiated by processes deemed enhancing, thereby strengthening individuals' professional identities. The response to AI closely relates to its perception since engagement with disruptive technology can challenge the core defining elements of a medical professional (Zaman et al., 2021), leading to identity work. This study supports this viewpoint and emphasises that perceptions may vary based on doctors' levels of experience. This aligns with findings by Kyratsis et al. (2017), who propose that identity work can unfold as a process where individuals first seek to understand their

circumstances and, upon doing so, strive to accept their newly formed identity. Therefore, given the robust medical identities of doctors, which are rooted in strong, long-established values (Jephson et al., 2024), the medical professionals did not exhibit a greater degree of initial resistance. While some resistance was evident, it did not pertain to the new skills that needed to be learned but rather to the emotional dimensions, as engaging with AI challenged their autonomy and human relationships with patients, fundamental aspects of the medical profession.

Although previous research has focused on cognitive aspects while neglecting the potential influence of emotional elements (Caza & Creary, 2016), identity is viewed as a combination of emotional, cognitive, and relational components (Carminati & Heliot, 2023). Our results revealed that doctors prioritise the emotional aspect, as many emphasised the significance of their socio-emotional relationships with colleagues and how these connections shape their identities as medical professionals. Furthermore, since past studies have demonstrated that emotions experienced by professionals can initiate identity work (Carminati & Heliot, 2022; Cascon-Pereira et al., 2016), this study further explored whether and how medical professionals believed this could lead to changes in professional identity. The findings indicated that despite initially expressing certain negative emotions, such as fear or reluctance, a shift in perspective occurred. In addition to their internal motivation factors and technological advancements, this may also result from the method of AI implementation in the workplace and the level of AI adoption in a hospital, which were identified as contextual boundary conditions influencing this perception. Moreover, given that context has often been overlooked or treated carelessly in previous research, understanding its importance and its role in shaping the identities of medical professionals is crucial (Johns, 2016) and has been considered in this study. Based on the results, the identified contextual boundary conditions showed that access to the latest technology in a hospital made doctors more inclined to use AI and to be more open about it. Furthermore, doctors who worked in hospitals with a more collaborative implementation method, where they were encouraged to attend conferences, workshops, or feedback sessions about the new machines they were using, were more inclined to embrace these technologies. The identified relationship between these doctors and the hospital management supporting their growth confirms a previous study by Ackerhans et al. (2024), which stated that providing supportive leadership, along with necessary resources and dedicated time for training, increased the willingness to adopt certain technologies and helped medical professionals understand their importance. The contextual boundary conditions identified as external factors

influencing perceptions and doctors' reactions indicate that these aspects play a crucial role; without them, the perception of AI could be adversely affected. Thus, the findings suggest that the greater the level of AI implementation in a hospital and the more advanced the hospital is, the more inclined doctors are not only to utilise these technologies but also to stay updated with the latest developments and engage more in identity work to adapt to using AI and enhance its utilisation. This study builds upon previous research by emphasising the influence of these factors and explaining how they contribute to understanding why these doctors perceive AI as an enhancement, despite most prior studies considering it a threat.

Consequently, although the overall sentiment towards AI was positive after individuals adapted to the technology and adjusted their perceptions, a shift in attitudes towards AI was observed. This shift was evident in the increased utilisation of AI for specific tasks and was also linked to emotions, as initial negative feelings transformed into positive ones. This thesis further corroborates existing research asserting that learning, self-improvement, knowledge development, and maturation can arise from conflicting identity values (Carminati & Heliot, 2023). Emphasising that medical professionals undergo a continuous process of learning and growth as they adapt their values and identities to new work methods, this study indicated that doctors must remain updated with the latest technologies and discoveries as part of their self-development journey. Nonetheless, it demonstrated that engaging in identity work could suggest a result of experiencing identity enhancement and is not solely tied to identity threat.

6. Practical implications

This research also has significant practical implications that can assist medical professionals, HR managers, hospital directors, and companies in developing AI technologies. Firstly, as interest in the healthcare sector and its enhancement has surged in recent years (Best et al., 2012; Kyratsis et al., 2017), the integration of AI into medical practice to improve efficiency and effectiveness has become a crucial topic of discussion. This process of AI integration affects not only medical practices but also the professional identities of doctors. Therefore, individuals at all levels of healthcare services must understand AI's influence and adapt accordingly. The findings of this study emphasise the importance of recognising the continuous learning journey that doctors undertake. For instance, doctors must stay updated with the latest discoveries regarding new treatments, diagnostic methods, and technological advancements that can enhance the medical

process. Consequently, HR managers and medical directors should provide ample development opportunities for doctors by enabling them to attend training sessions, conferences, courses, and workshops. By understanding how their employees perceive working with AI and its impact on work performance, HR managers can utilise these insights to offer suitable support to doctors.

Secondly, our results can assist professionals in making informed judgments about the level of AI involvement in daily activities. The findings of this study demonstrate that although there is a significant degree of usage, particularly in certain specialties, doctors do not currently regard AI as a potential colleague but rather see it as an assistant. This information is beneficial for integrating AI into specialties that have not previously utilised it. It can help clarify potential fears of being replaced by AI and alleviate concerns regarding this issue. Furthermore, the results reveal both the downsides and benefits perceived by doctors working with AI. On one hand, they see this as an enhancement that helps reduce time spent on tedious tasks, facilitates improved patient care, allows for greater focus on the human element, and provides a second opinion in some cases. On the other hand, collaborating with AI can produce some insecurity about their roles and jobs in the future, particularly for specific medical specialties, while also emphasising that over-reliance on technology could be dangerous. These aspects help doctors already using AI become more aware of its potential implications on their jobs and provide a deeper understanding of what working with AI entails for medical professionals considering its implementation.

Ultimately, the study can significantly benefit hospital managers considering the implementation of policies and guidelines for leveraging AI to enhance processes. These guidelines could help clarify doctors' roles in AI-influenced decisions and address specific concerns that medical professionals may have regarding their responsibilities related to decisions made by AI. Furthermore, this study also benefits AI developers and companies creating AI systems, as they can gain insights into how the technologies being developed affect end users and how medical professionals perceive their collaboration with AI. For example, they could involve doctors in the design phase to ensure that the tools they create support doctors' work rather than undermine their medical expertise.

7. Limitations and future research

As with all research, this study has limitations that must be acknowledged. These limitations can serve as a starting point for future research.

First, the sample size was relatively small, which may limit the generalizability of our results. However, the high quality of the data—provided by busy professionals such as doctors—and the fact that saturation was reached give us confidence that an adequate number of participants was considered. Nevertheless, future research could aim to conduct similar studies with a larger sample size to explore further nuances and insights.

Second, although interviews were conducted with doctors from diverse medical specialties, the snowball sampling method was used to gather additional participants. This could lead to selection bias (Winship & Mare, 1992), as medical professionals more interested in using AI may be more inclined to participate than others. Furthermore, doctors might have been more likely to recommend colleagues who share the same enthusiasm for the topic. However, some participants mentioned that even though they use AI in their jobs, they do not actively pursue it in their daily work, which may reduce the potential for selection bias. Thus, future studies could consider using a more random sampling method.

Third, our participants were medical professionals working in Romania, Ireland, Austria, France, and the UK. This diversity may have influenced doctors' perceptions of AI, as each medical system has its own policies and regulations. Nonetheless, conducting research with medical professionals from various cultural backgrounds enriches the study by providing a more nuanced perspective. Future research could further explore whether and to what extent national regulations on AI deployment and cultural differences shape professionals' views on AI implementations.

Lastly, only the researcher coded the data, which could limit the reliability of the interpretation process. Although discussions with supervisors occurred multiple times, instilling confidence that the final interpretation was grounded in the data, future research could conduct a similar investigation and analysis, employing multiple coders to ensure intercoder reliability. All the measures mentioned could enable future studies to deepen knowledge on this topic and enhance the reliability of the findings.

8. Conclusion

In conclusion, this thesis examined how doctors perceive the influence of AI implementations on their professional identities and practices. Many participants emphasised the positive aspects of using AI and integrated it into their professional identities, viewing it as an enhancement rather than a threat. Since the integration and use of AI can be regarded as a complex process that requires time and patience, professionals must recognise that this journey involves self-discovery, understanding this technology, and embracing its potential changes. This indicates that professionals should remain open-minded and engage with technological advancements, which can provide unforeseen benefits, particularly in medicine. Therefore, encouraging doctors to view AI as a valuable tool for their professional growth, expertise, and skill development by increasing its usage and implementation in their daily work could represent a crucial step in advancing their professional identity in the future.

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Appendix A: Demographic Data – Questionnaire

Name	Age	Gender	Medical Specialty	Years of Experience	Hospital Location	Do you use AI at work?
A						
B						
…						

Appendix B: Demographic Data – Questionnaire

Themes	Main questions	Probing questions
Introduction& Work Identity	Could you tell me why you decided to become a doctor?	
	Could you briefly explain a day at your job?	
	What does it mean to be a good doctor? In your opinion, what are some qualities of a good professional?	Why?
Values and professional identity	Could you name some values that you believe are important for a doctor? Why?	Are there any other personal values that you would like to add?
	You have been working as a doctor for some time now. Have you observed any difference in the values you had in the beginning and the ones you have now?	
	Would you say that working with AI has influenced your professional identity?	Why? Can you provide an example?
	Would you say that your professional identity made you more likely to adopt AI changes?	
AI	Could you tell me how you would describe AI? What are some tasks you are using AI for? How do you see the advancements of AI affecting or enhancing your profession now? What about the future?	How do you prepare for this? Could you give me some examples of how it could affect your profession? Could you give me some examples of some benefits/drawbacks?
	Has your attitude about AI changed over time?	Why? How?
	What do you think are the limitations of AI? How important do you think is the human component?	Why? Could you elaborate?
	Have you observed any changes regarding you professional identity since you started working with AI?	
	Do you believe that in the future your job could be replaced completely by AI?	Why/why not? Could you elaborate?
Closing	Is there anything you would like to add?	

Appendix C: Exemplary quotes of first-order codes

First order code	Quotes
1a. Driving force behind deciding to become a doctor	I chose to become a doctor because I liked the idea that I could help people and be helpful in this way. I also enjoy being able to communicate with people and patients a lot. (Doc 3) I decided to become a doctor because I wanted to help people. I still believe it is essential to be willing to give something back to the society and not only. The fact that I like to work with people helped me a lot in making this choice, as I like to listen to them and to understand their needs (and here I do not mean only their medical needs). (Doc 4) My family played an important role when I decided to become a doctor. (…) After graduating from medical school and starting to work as a doctor, I realised that being a doctor is not necessarily a vocation. However, I would rather say that it is a job for people who are more inclined to be workaholics and willing to sacrifice. Moreover, some people do it only for their social status, because it sounds good to say you are a doctor. (Doc 6)
1b. Key characteristics of being a professional	First of all, I believe it requires a high level of knowledge, you need to know both the theoretical and the practical part, and here, especially in my job (surgeon), it implies the manual work that you do, the integration of different techniques and the integration of the machines that you use. Secondly, you must always be critical towards yourself and never forget to be humble, even as a doctor. (Doc 11) Every doctor should understand that the patient comes first, before anything else. Then, I believe that to be a good doctor, you need to be committed, communicate properly, and not be afraid to stand up for your patient. (Doc 2) I would say that to be a competent doctor you need to know both the theoretical and the practical things very well. Hence, knowledge is essential, along with being a responsible person. (Doc 7)
1c. Empathy and socio-emotional relationships as a key component that defines who you are as a doctor	Being empathetic helps significantly in this job because putting yourself in the patient's shoes is important to understand their feelings. (Doc 7) Knowing how to work in a team and when to ask for help will always benefit the patient, and at the end of the day a doctor should never put his pride before the well-being of the patient (Doc 8)

	It is important to be a good doctor, to be prepared, but what is super valuable is to be able to have empathy and respect towards your patients, to think what would happen if you were in their place (Doc 9) Medicine should be multidisciplinary, so you can not practice medicine on your own, especially not in a hospital, you would always need the opinion of another colleague from the same or a different department. Therefore, being able to work in a team is critical in our profession (Doc 10)
2a. Flexible & open attitude towards AI	I have always been very curious to see the benefits of using AI. For example, we needed to be patient and wait some time for many trials that used robots that integrated AI to take place to make sure that they are safe to use (…). However, I have never been reluctant to use AI. All the innovative technologies make our jobs easier and help us get a better surgical outcome. Therefore, I have always embraced this part of my profession. (Doc 3) I would embrace everything related to AI and technology in general because it helps us (doctors) decrease the time it takes to manage a patient, decrease the error rates, and improve the medical act overall. (Doc 5) Overall, in radiology there is a general impression that before we get to that point where we can talk about being entirely replaced by AI, it will help us more and more. This is why people should be willing to integrate it as much as possible into our practice. (Doc 1) I was reluctant in the beginning, because there was this hesitation regarding how good it is, how can it replace an experienced professional (…). However, as time passed, I understood what an important role it plays and how much it helps us and since then I started integrating it more. (Doc 13)
2b. AI as an artificial superior brain, but in the foreseeable future, AI will always need the human input	For me, AI is like an extra brain that you can use. It is like a tool that can substitute, for example, the lack of time, and what I mean by this is, for example, when you are in a situation where the time pressure is crucial, you might need to count on AI for some medical diagnosis or help with specific procedures. (Doc 13) AI's capacity to access and use large databases to solve complex tasks highlights one of the main differences between humans and AI's capabilities. (Doc 1) The stakes are too high in this field to be able to give 100% of your trust to AI and to remove the human component altogether. (Doc 14)

	For example, for the oncologic pathology, there are a lot of therapeutic schemes, many drugs, many pills, that for some patients work, for others do not, for some they can save them, for others they can kill them. There is no way to tell for sure; sometimes it is like a gamble. Indeed, you, as a doctor, can weigh up certain things and specific criteria. However, oncology has not advanced so much that we can say, yes, this drug works for everyone, this therapeutic regimen works for everyone. Moreover, this machine, you give it the patient's data, what diseases they have had, what complications they have had, what treatments they have tried. It did not work, all sorts of things like that, and it tries, with the help of all the information taken from scientific articles, to give you the drug scheme that works the best and has been used for years, based on thousands of articles that have been analysed. It would be almost impossible for you as a person to do this, as it would take you a tremendous amount of time to go through all this information. (Doc 5)
	I believe that the human component will remain extremely important in medicine because even now, considering all the medical advancements, everything is still coordinated by the human being. At this point, the AI component has not reached the level of sophistication that would allow it to perform surgery or anaesthesia independently, so it still needs a doctor. (Doc 7)
	The fact that AI uses this complex mechanism that can process data makes it superior based on this aspect to the human mind, as this is something extraordinary that helps us a lot when doing our jobs. (Doc 6)
	No, I am not afraid of being replaced, as only a computer alone could not do the job that a doctor does. I do not think that AI will reach the type of connection required between a doctor and a patient in the near future or that it will be able to get to that level of interhuman communication required in medicine. (Doc 3)
	I think you can program AI to do the anamnesis and set a diagnosis, but doing the follow-up and seeing how the patient's condition evolves based on that treatment is something humans should do. The final decision should be in the hands of doctors (…). I do not believe that something created by humans will be able to replace humans completely (Doc 2)
	Nowadays the human component is indispensable. I can not tell how things will evolve, but people would never trust a result given only by AI (…). The human component will still be needed. (Doc 1)
2c. AI can make mistakes as well, not	It happened to me to get some false positive results when using AI. For example, it saw some things that were not there, and in the end, the X-ray results from the radiologist differed from

100% reliable – still human involvement	those of the AI software. I am sure it also depends on the software, but I would not completely trust it to give the final result. (Doc 8) The critical eye of the doctor is critical, especially as a doctor gains more experience over time. From my point of view, an important aspect in medicine is the observational part, where you see the patient, interact with him/her and so on (…). So, I believe I could not rely 100% on AI and decide not to see the patient with my own eyes. (Doc 10) For example, once when I was on-call we did an X-ray on a patient and the AI software said that there was something there but the attending specialist said there was not (…). So indeed, the fact that AI still makes mistakes, I believe is a limitation, but the more it is used and the more it learns from the mistakes, the better it will be in the future (Doc 1) Because cases are so varied, and anatomy and people are so different, there are cases in which what we use, where the system still does not work correctly all the time. It lacks precision and sometimes it feels like it does not have the experience required to make final decisions (Doc 13)
2d. Always counting on technology can be dangerous	If we rely too much on AI and technology, when there is going to be a blackout, for example, because it happens even here, we had blackouts…what will we do then? Indeed, there are generators and so on, but maybe they break down. What do you do then if you are used to AI, which helps you do certain things? I am just saying. I think it would be pretty difficult when you do not have this device, this software, this artificial intelligence at hand to provide you the help you are used to getting. (Doc 5) I believe that counting on technology could be distracting doctors from patients, so I do not believe it would be a good thing to rely only on it. (Doc 6) AI is using a learning curve, and nowadays, you can still see mistakes occasionally even if the technology advances. It already helps us and it will definitely help us even more in the future, but at the moment there is still much room for improvements (Doc 14) In my field, it is challenging to work without technology nowadays. It is not impossible, but returning to how things were done a long time ago is pretty difficult. (Doc 7)
2e. Passion and dedication that AI can not replicate	Being a doctor represents more than half of my life, because when I am not physically at the hospital I am on-call from home (…). Therefore, even if you want it or not, you always think about your patients, even when you are at home, and this is not an easy thing to do, it requires an unquestionable dedication and passion to sustain this type of life for a long time. (Doc 7)

	This is my passion. I fell in love with surgery from the very beginning. It is a job that gives you much satisfaction, seeing that we manage to save the patients' lives. (Doc 14)
	Being a doctor means that you have to be willing to sacrifice many things, be dedicated and offer everything that you have (…) For my specialty everything is like a complicated puzzle. Unfortunately, I work with people who end up being in ICU, people who are incredibly sick and who sometimes can not be saved. Therefore, you need to like everything this job entails; otherwise, you could not do it. (Doc 6)
	You should be passionate about what you are doing, and I know it will sound like a cliché, but when you like what you are doing, you will not feel like you are working. Especially in the specialty I am following, I believe that if you are not dedicated and passionate about your job, you will not make it physically and mentally, as we go through very tense situations. (Doc 8)
3a. Higher chances of using AI for certain specialties& increased usage of AI in daily tasks	AI is a massive help for me as a surgeon, it is integrated in many of the procedures I have to do when I am operating and it makes our lives easier (…) I do not think that we could do what we do now without AI and technology. (Doc 3)
	Nowadays, there is a tendency to use AI more, and anesthesiology is one of the medical specialties that has benefited from this trend. The machines that we use and that in turn use AI help us a lot and improve the monitoring process. (Doc 9)
	Right now, some of the robots we use when we operate use AI, which is already part of our practice. (Doc 14)
3b. Not all medical specialties feel safe, increasing concerns for radiology	I believe that for people working in radiology, there is a more significant concern of being replaced. (Doc 11)
	I believe for this specialty (radiology) there are more discussions regarding this topic (being replaced) than for others (…) I noticed that also at Congresses people mention this topic a lot. (Doc 12)
	If I followed this specialty (radiology), I believe I would be more concerned about being replaced. (Doc 7)
3c. Being accountable for AI's decisions	For example, if something bad happens based on the decisions made by AI and the patient's family wants to sue you, I think it would be pretty bad for the doctor to get sued for a decision made by AI. This is why I do not believe that someone would take full responsibility for the

	decisions made by AI, especially when it can still make quite big mistakes because, in the end, it can influence your career and your future. (Doc 8) Counting only on the results given by AI could distract us from the patient, which I believe is dangerous. (Doc 6) Being afraid of technology is a physiological fear, and it has been present for some time already (…). There is a particular fear of counting too much on technology, of letting it make decisions for you, because in the end we are responsible for a person's life. Therefore, there is a level of reluctance when you have to let someone else, or something else in this case, decide for you. (Doc 14) There are life-and-death situations, very complex cases where you can not let technology decide for you, and your expertise as a doctor is the most important factor (Doc 11).
3d. High levels of confidence of doctor's role in the decision-making process	You need an actual human being when you have to make important decisions (Doc 6) I find it almost impossible in my specialty to remove completely the human component, as in anesthesiology the decision-making process is very complex (…). As smart as AI can get, it is highly unlikely that a software can take this kind of decision. (Doc 8). No matter how much things evolve, you still need a human when making important decisions, especially in critical circumstances; therefore, I do not believe AI can completely replace me. (Doc 9)
4a. AI taking over the tedious and repetitive tasks	It is reassuring to know that, for example, in the future, when you are operating, you do not have to take one of the doctors out of the surgery, so this person can go and maybe check some things (e.g. something regarding the medical record). However, rather than a robot can go and do this for you, these kinds of tasks would prove helpful to be taken over by AI. (Doc 14) AI takes over the repetitive part, which is an extraordinary aspect because we (doctors) can use that time to specialise more in other directions, evolve, and do something more valuable for the patient with the time we gain. (Doc 3) AI helps with the painstaking tasks, as it takes over these and gives me, as a doctor more time to focus on other tasks. (Doc 1)

	Not to mention that many routine, simple tasks take much time, and AI can do that, which gives the doctor more time to focus on the important things, on the stuff that can only be done by humans. (Doc 14)
4b. Having more time to focus on the human side, patients and profession	AI is like some extra help that we can get, something that helps us do things faster and more efficiently and leaves us enough time to focus more on better understanding the patient and on developing this human side that has proven to be so important over the years and that AI, a robot, or technology can not replicate (Doc 13). Using AI helps us focus on what is truly important. It helps us be more involved with the patient, spend more time with him/her, try to understand the patient better. I see this as an evolution for the better. (Doc 12) I think we need to keep increasing the percentage of AI use to make our jobs easier and for the greater good of the patient. We need to implement and use any available technology to offer an advantage to both the patients and the doctors. (Doc 3)
4c. AI as a second opinion for some specialties	In emergency care, we use it as a second opinion, mainly because we are always against the clock, and sometimes, we might not have time to wait for the radiologist to interpret the X-Ray, the CT, etc. So, we are trained to interpret them in these circumstances and use AI software to double-check. (Doc 5) Having AI as a second opinion helps you be more relaxed and offers extra certainty about the diagnosis you give to the patients. It also helps with increasing the number of patients you consult daily, the flexibility of work and the attention to detail. (Doc 1) The software we are using helps me be more confident about the diagnosis I put (…) especially because I am a resident and sometimes we are not that sure, using AI to double-check is useful. (Doc 13) In radiology, we can use it [AI] as a second opinion. I participated in research where both AI and I would interpret some X-rays, and I was pleasantly surprised to see that we had the same interpretation and results in 99,9% of the cases, which I believe is fantastic. (Doc 2)
5a. Staying up to date by attending courses, trainings, workshops on using AI	New drugs and new studies are coming out all the time and, in this field, we always need to update ourselves about these changes; you can not get stuck in the past (…). Especially now, it has proven to be very interesting for me how since we moved to a new hospital with state-of-the-art technology, we had training regarding how to use specific machines and specific AI software in order to be able to do our jobs properly. (Doc 14)

	A doctor's learning process never ends because new treatment regimens always appear. You must always be up to date with everything, especially now considering the rapid developments of AI and how important these are for anaesthesiology. By this, I mean not only to know what is happening in the hospital where you work, but also at an international level. You always need to strive to be one of the best, and you can only do this by constantly being open to learning. (Doc 8)
	It is nice that we talk about these changes at the congresses that we attend, because in this way it is easier for us to integrate these intelligent software into our daily jobs, it increases the possibility of using it more and in the end, it benefits both the doctors and the patients. (Doc 12)
	Training is essential, both theoretical and practical. Being a doctor implies always learning new things and adapting to changes. (Doc 10)
5b. There is a never-ending learning process &. Distinction between young doctors and more experienced doctors	We, as doctors, are open to change as this is something that we are taught to do ever since we were students. We always need to adapt to and embrace changes; honestly, I believe that in most cases, change is good. (Doc 8)
	I have observed that there is a trend, especially among younger doctors. They are more familiar with using AI, are more inclined to make steps towards the future, be more efficient, and count on the help of technology (…). As I have mentioned, I believe this (AI) will be the future and it could prove more difficult for us, older people to adapt, but I am sure we will succeed (Doc 4)
	The fact that we have used machines that use AI from the beginning helps us to be more open to it. This helps with optimising the process and the procedures that we do, which is a good thing for both the patient and the doctor. However, when integrating all these new technologies, we need to ensure that people are adequately trained to use these machines, regardless of age or if they are doctors, nurses, or other medical personnel. (Doc 9)
5c. Increasing the utilisation of technology in medicine is the future	No matter what happens in the end, in the medical field, the responsibility lies with the doctor. I do believe that AI plays a significant role in our field. I have observed a clear evolution of how things were when I started my residency compared to how they are now. Honestly, working with AI helped me better comprehend this technological part and understand at the same time that this is indeed the future. (Doc 5)

	I observed an increase in the use of technology in radiology, and I believe that as a doctor, I will have to learn to work with this software even more in the future and adapt to its use. They have already proven useful to us, but I believe that in the future they will help us (doctors) save more time, increase the number of patients we see in a day, focus more on the medical part and somehow have a better yield. (Doc 12) Initially, I was not such a big fan of integrating and using technology, as I believed that we (as people) would become lazier. However, my perspective has changed, and I now see it as a higher form of knowledge. I believe we could not survive without it, neither now nor in the future. (Doc 6) Nowadays, there are no conferences where you would not have at least one lecture about AI. Somehow it feels like it is present everywhere now, and I have seen the amplitude it has gained during the past 10 years. (Doc 2)
5d. Values and emotional change when working with AI	Initially, I saw AI as an 'enemy'; I perceived using it as somehow cheating and choosing the easy way. I had an intense internal conflict about this, I believed it was way too easy to get access to basically everything. I was like this until I understood how broad knowledge is nowadays and how many things we can learn and know with the help of AI. After this, my perspective changed entirely now, and I believe you can not do your job correctly now as an anesthesiologist without using the benefits of AI. (Doc 6) Yes, at the beginning, I was more reluctant; I was thinking about how efficient a system could be. My attitude changed because I realized it can evolve faster than humans. It doesn't replace an experienced, trained eye, but working with it, I saw it's beneficial. I realized it, especially when it broke down, and I worked without it for an evening, and I was on call, and I felt the difference between how fast I was doing things with it and how it is without it. (Doc 13) I believe the level of confidence that I had in AI increased, together with the level of confidence that I had in myself when I saw that my results and the robot's results overlapped around 99% regarding the results of those X-rays. (Doc 2) I was lucky enough to work with technology as much as possible from the beginning, so I cannot say that I observed a change when I started to integrate AI more. However, after finishing my residency and I started working at a hospital in a smaller city, I observed when interacting with more experienced (older) doctors that there was a certain reluctance to use technology, it was like they were scared of something, so I believe that for them AI would have been something shocking. I want to say that being exposed to technology from the

	beginning played a role in how open I was to start working with AI and integrating it. (..) As we integrated more at work, I observed other doctors in the hospital who, after understanding how AI works and what its benefits are, started to use it more. It was like a switch was made, and from being reluctant in the beginning, they moved to using AI almost on a daily basis (Doc 7)
6a. AI implementation method in the workplace	I think what was beneficial for me was the fact that even from the early beginning, the place where I worked was up to date with the newest technologies and procedures used in modern hospitals. (…) I believe an important role in this was also played by the medical specialization that I have chosen, but overall, it had an important role (Doc 7) When I chose to work at the hospital where I work now, the implementation of the technology and the way it was presented to us were important to me. It's important to feel that you are part of the process, not that you are forced to use something without first understanding its implications. (Doc 2) I think it is really important that whenever we start using new technologies, so in the testing phase, we are always asked to give feedback after using them for a certain period of time. In this way we can make sure that the machines are really suited for what we have to do. If they prove good and fitting, we will continue to use them, but if this is not the case, nothing is forced onto us. (Doc 9) After working with new technologies and being one of the people who always tries to implement new things, I observed that it is important how you implement it. I would say that this process plays a very important role because if people understand why we would need to use these and how they can help, they will be more willing and open to changes in the future. (Doc 11)
6b. Level of adoption of AI	I have been working with AI from the beginning of my residency, the machines and the software that we need, they all work based on AI, so I believe this indeed was important regarding how open I was about this and how easy it is for me to work with it and integrate it into my daily practice. (Doc 8) We have high-tech ORs now, which not only improve the medical outcome, but they play an important role in doing more non-invasive procedures for the patient. In these ORs we have a lot of technology, machines and AI software integrated, which is going to prove to be useful for the doctors that will follow and that will be able to use these technologies from the beginning. (Doc 11)

	After finishing my residency, I moved to a smaller hospital that was less modern and I observed a real difference regarding other doctors' attitudes towards using more modern machines and techniques. It took some time to try to get closer to the level of usage of technology that I was used to and to try to bring these changes here. (Doc 7)