Optimizing AI Implementation in Healthcare: Identifying Effective Management Practices

A Qualitative Study
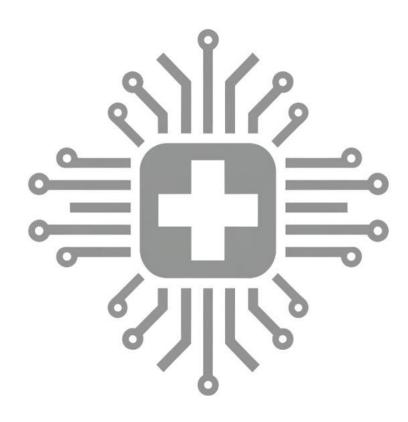
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Acknowledgement

I began this journey in February when I first discussed my ideas about doing an internship. My long-standing interest in healthcare, a field I have always been passionate about, drove me to pursue this topic. With a background in management, I sought to find a way to combine this with something relevant and impactful. Today, I proudly present my master's thesis on management practices and the implementation of AI in healthcare. After hours of reading, writing, and interviewing, this topic has truly captured my interest.

I want to extend my thanks to Vincent Kunst for guiding me and having faith in my process. Your trust allowed me to work independently while your feedback provided clarity and direction. Additionally, I am grateful to Samuele Murtinu for your insights and feedback.

To all the respondents, thank you immensely for taking the time to share your ideas and stories. Your interviews were not only fascinating but also crucial in forming the narrative that answers my thesis questions. Your contributions are invaluable, especially in addressing significant societal challenges in healthcare.

A special thanks to my parents, without whom this would not have been possible. Your help in gathering respondents, clarifying healthcare sectors, and explaining key details was indispensable. I have seen firsthand the dedication you bring to your work, and for that, I am incredibly grateful.

I also want to thank the University Library City Centre for providing a quiet place to focus when it was most needed.

Completing this thesis has been a fulfilling experience, opening new doors to further research and solutions to emerging problems. As the conclusion suggests, collaboration and mutual support are essential in solving complex issues and answering critical questions.

I hope you enjoy reading this thesis.

Marten Pieter Nieuwhof
Utrecht, June 28th, 2023

Abstract

Problem and Objective: The integration of Artificial Intelligence (AI) in healthcare holds immense potential to enhance patient outcomes and operational efficiency. There are however many concerns regarding ethics, privacy and use. Now ambiguity exists regarding which management practices are most effective in implementing AI in healthcare settings. This research aims to evaluate the influence of different management practices on the effectiveness of AI-driven healthcare innovations in Europe, specifically focusing on the context of the Netherlands.

Theories: The study builds upon the management practices framework established by Bloom et al. (2007), categorizing management practices into Operations Management, Governance, People Management, and Target Setting, with the addition of Monitoring. A new practice, Self-Organization, was identified during the research. These practices are analyzed to understand their role in AI implementation.

Methods: A qualitative approach was employed, involving semi-structured interviews with nine participants selected through purposive sampling. Thirteen individuals were initially invited, ensuring a diverse range of perspectives from key informants engaged in AI implementation in healthcare. The interviews were conducted between May 27, 2024, and June 21, 2024, either in person or via video communication. Data were analyzed using a deductive mix with inductive qualitative content analysis, focusing on themes derived from Bloom's framework.

Results: The findings highlight that no single management practice is universally most effective for AI implementation. Instead, the effectiveness depends on a complex, interconnected web of practices. Operations Management, Governance, People Management, Target Setting, and Monitoring each play vital roles, with Self-Organization emerging as a critical new dimension. This interconnected approach ensures comprehensive and adaptive AI integration.

Conclusions: The study concludes that effective AI implementation in healthcare requires a multifaceted approach, integrating various management practices. Collaboration is key, and no single practice can stand alone. The addition of Self-Organization provides a flexible

framework, enhancing the traditional practices outlined by Bloom et al. These findings offer practical recommendations for healthcare managers and policymakers, emphasizing the need for a comprehensive, flexible, and collaborative approach to AI integration in healthcare.

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Introduction

In an era marked by technological advancements and significant regional healthcare challenges across Europe, the transformative potential of Artificial Intelligence (AI) stands at the forefront. AI technologies are rapidly advancing and have shown great potential in transforming healthcare systems globally. The integration of AI can enhance diagnostic accuracy, streamline treatment protocols, and improve patient outcomes, making it a crucial area of study in modern healthcare. This research paper evaluates how different management practices influence the effectiveness of AI-driven healthcare innovations.

At the beginning of the COVID-19 pandemic, healthcare infrastructures globally faced hard trials, spotlighting the urgent need for fast innovation. During this critical period, Artificial Intelligence (AI), emerged not merely as a promising notion but as a needed tool, vital in navigating these challenges. The deployment of AI in healthcare throughout the pandemic covered a broad spectrum, from streamlining patient problems to in-depth analyses of epidemiological data, demonstrating its capability to significantly improve healthcare decision-making processes. For example, AI-enabled models have enhanced the identification of disease spread patterns and the prediction of outbreaks, proving instrumental in bolstering public health initiatives (Malik et al., 2020). Besides COVID-19, a review by Väänänen et al. (2021) underscores AI's potential to significantly enhance diagnostic accuracy, streamline treatment protocols, and elevate health outcomes, while simultaneously strengthening the efficiency of healthcare delivery.

This research builds upon foundational theories of management practices, particularly the framework developed by Bloom and Van Reenen (2009), which links quality management practices to improved organizational performance. By applying these theories to the healthcare sector and specifically to the integration of AI technologies, this study extends the academic discourse on the intersection of management and technological innovation. The insights gained from this research will contribute to both the academic understanding and practical implementation of AI in healthcare, addressing a critical gap in the current literature.

However, the adoption of such technologies is not without its problems. The healthcare industry's measured approach towards AI mirrors a broader apprehension and is fuelled by

concerns about privacy, ethical utilisation, and the necessity for an adaptive regulatory framework capable of keeping pace with rapid technological advancements (Flessa and Huebner, 2021).

European healthcare systems face numerous challenges, including significant regional disparities in healthcare quality and accessibility. The Integral Healthcare Agreement (Integraal Zorgakkoord) identifies several pressing issues, such as a shortage of healthcare professionals and insufficient funding. These shortages strain the healthcare infrastructure, impacting the ability to deliver timely and effective care (Ministerie van Volksgezondheid, Welzijn en Sport, 2022). The shortage of skilled personnel and financial resources makes it imperative to adopt innovative solutions like AI to optimize resource utilization and improve patient outcomes. AI's ability to analyze large datasets can help alleviate these challenges by providing insights that lead to more efficient resource allocation and improved decision-making (Davahli et al., 2021). However, there remains a gap in understanding how these AI solutions can be effectively implemented within different management frameworks across various healthcare settings.

Understanding these challenges is crucial, as the success of AI implementation is not solely a technological matter but also a managerial one. Effective management practices are essential to address these challenges. Leadership, strategic decision-making, and the fostering of an innovation-friendly culture within healthcare organizations are vital components that can greatly influence the trajectory and impact of AI adoption (Tsang et al., 2017). Moreover, the varying management practices across different European nations add another layer of complexity to the narrative. The cultural diversity and distinct regulatory environments present scenarios for the adoption and integration of AI, calling for a nuanced approach to management strategies (Stoumpos et al., 2023).

Despite the consensus on the correlation between robust management practices and corporate performance within the private sector, there remains a gap in understanding how these and potentially other management practices specifically influence the integration and implementation of AI technologies within the healthcare settings of Europe.

This study aims to address this gap by exploring the question: *"How do different management practices influence the effectiveness of AI-driven healthcare innovations?"*

By conducting comparative analyses and qualitative interviews, this research will examine the cultural, regulatory, and organizational factors that influence AI adoption and its outcomes in healthcare settings. This detailed examination will try to highlight best practices and barriers to successful AI integration, offering valuable insights for improving healthcare delivery. The findings from this study aim to identify effective management practices that can guide policymakers and healthcare leaders in implementing AI technologies ethically and sustainably.

The following parts are structured into several chapters: Literature review, methodology, findings, discussion, and conclusion. The introduction outlines the research question and objectives. The literature review presents existing knowledge on AI in healthcare and management practices. The methodology describes the research design and data collection methods. The findings chapter presents the key results, followed by a discussion and conclusion that interprets these findings and provides recommendations.

Literature Review and Theoretical Framework

Artificial Intelligence (AI) stands at the front of innovation in healthcare, guiding in a new time of improved diagnostics, treatment, and patient care across diverse conditions (Yu, Beam, & Kohane, 2019; Lee & Yoon, 2021; Davenport & Kalakota, 2019). AI-driven innovations demonstrate substantial improvements in diagnostic accuracy, treatment protocols, and patient management, leading to significant enhancements in patient safety and healthcare resource management. For instance, AI applications in clinical settings have been shown to enhance disease prediction, personalize treatment recommendations, and improve decision-support systems for healthcare professionals (Petersson et al., 2022).

European healthcare systems, including those in the Netherlands, are currently grappling with significant challenges due to a shortage of healthcare professionals and financial constraints. The increasing demand for healthcare services, driven by ageing populations and the rising prevalence of chronic diseases, exacerbates these issues (Musazzi et al., 2020; Parzonka et al., 2023). The recently introduced Integral Healthcare Agreement (Integraal Zorgakkoord, IZA) in the Netherlands emphasizes the urgent need for innovative solutions like AI to address these challenges effectively (Ministerie van Volksgezondheid, Welzijn en Sport, 2022).

Despite these advancements, the rapid introduction of AI technologies brings ethical concerns centred around data privacy and decision-making biases (Goirand et al., 2021). Expanding on these ethical challenges, Goirand et al. (2021) explore how AI ethics frameworks have been implemented in healthcare, revealing the complexities and the need for proactive and contextual strategies to address AI's unique ethical challenges. Existing ethical frameworks need adaptation to handle these issues effectively, ensuring patient data protection and fair healthcare delivery amidst technological evolution (Flessa and Huebner, 2021; Davahli et al., 2021).

Navigating these ethical dilemmas is crucial, as highlighted by the growing consensus on the need for responsible innovation frameworks that ensure patient data protection and fair healthcare delivery amidst this technological evolution (Flessa and Huebner, 2021; Davahli et al., 2021). Moreover, AI's role in risk management and operational efficiency underscores

the importance of robust management frameworks that can address these emerging challenges effectively (Božić, 2023).

Bloom and van Reenen's management framework.

Building upon the foundation of AI in healthcare, which promises to overhaul patient outcomes and system efficiency, we turn to the seminal work of Bloom and Van Reenen (2009) to explore the integral role of management practices in facilitating this technological revolution. Their study within English acute hospitals conclusively links quality management to improved hospital performance metrics, including clinical outcomes and operational efficiency. Bloom et al. (2009) developed a comprehensive framework to measure management practices in hospitals, categorizing them into four key areas: Operations Management, Monitoring, Target Setting, and People Management. Each of these areas encompasses specific practices that contribute to overall organizational performance. This framework has been widely cited and applied in various contexts, including healthcare, to understand the impact of management practices on performance metrics.

Operations Management involves practices related to the organization of the production process, efficiency in workflows, and the implementation of standardized procedures. Key aspects include the layout of patient flow and the rationale for introducing standardization. Effective monitoring practices are essential for tracking performance and identifying areas for improvement. This includes performance tracking, performance review, and performance dialogue, ensuring that the hospital's operations align with its goals. Setting clear, measurable targets is crucial for guiding organizational efforts. This practice involves establishing balanced targets that cover financial, operational, and clinical dimensions, ensuring that targets are interconnected and aligned with the hospital's objectives. People Management focuses on hiring, firing, promotions, and the overall management of human resources. It includes practices related to training and development, consequence management, and fostering a positive work environment.

Management Practice	Key Aspects
Operations Management	Layout of patient flow, standardization, continuous improvement
Monitoring	Performance tracking, performance review, performance dialogue
Target Setting	Balanced targets, interconnection of targets, time horizon of targets
People Management	Hiring, firing, promotions, training and development, consequence management

Table 1: Management Practices by Bloom et al. (2009)

Translating these management practices into the healthcare context, Bloom, Propper, Seiler, and Van Reenen (2009) reveal that better management practices are correlated with improved hospital performance, including lower mortality rates and higher patient satisfaction. This research underscores the disparity in management quality between public and private healthcare institutions, with public hospitals often lagging, especially in people management practices and target setting. Further studies support the relevance of Bloom et al.'s framework to healthcare, emphasizing the critical role of effective management practices in improving hospital performance. For instance, research by McConnell, Lindrooth, Wholey, Maddox, and Bloom (2013) indicates that hospitals with better management practices are more likely to adopt innovative practices and technologies, leading to improved patient outcomes and operational efficiency. Johnson et al. (2023) highlights the need for agile management practices that can evolve concurrently with technological advances to harness the full potential of AI. This underscores the importance of preparing healthcare professionals for technological shifts through continuous education and training programs.

Regional Variations and Implementation Challenges

The specification of managerial practices in deploying AI technologies effectively in healthcare also varies significantly by region. In Scandinavian countries, there is a strong emphasis on participatory design and stakeholder involvement in the implementation process, aligning AI systems with user needs and ethical standards. Conversely, in the United States, there is a greater focus on competitive advantage and innovation speed, often at the cost of comprehensive stakeholder engagement. These differences not only affect the uptake and success of AI implementations but also the ethical considerations and patient outcomes (Dalton et al., 2024).

The relationship between competition and management practices, as illustrated by Bloom et al. (2009), suggests that hospitals in areas with greater competition tend to be better managed.

This is particularly relevant when considering the integration of AI in healthcare, where strategic management is essential to navigate the complexities of new technology adoption and implementation. Hospitals located in competitive environments are pressured to adopt better management practices to attract patients and improve their performance metrics.

However, as Gama et al. (2022) highlight, there is a notable gap in the literature concerning implementation frameworks or models that could guide the healthcare sector in overcoming barriers and leveraging facilitators in the AI implementation process. Reed et al. (2018) contributes to this conversation by exploring the challenges of new technology integration within healthcare settings. They point out that new technologies often fail to be effectively implemented and integrated into practice due to a lack of consideration by healthcare leaders on how these innovations align with or impact existing work practices and processes. This observation proves the vital role of strategic management in facilitating the successful adoption of AI technologies by ensuring they complement and enhance current healthcare workflows.

Management Practices for AI Integration

Effective management practices are crucial for leveraging AI's potential to transform healthcare, addressing ethical concerns, ensuring equitable access, and maintaining quality patient care. As AI continues to shape the future of healthcare, strategic management practices will play a decisive role in determining the success of AI implementation across diverse regulatory, cultural, and organizational landscapes in Europe.

Integrating AI into healthcare brings the necessity of strategic management to navigate the complexities of new technology adoption and implementation. Effective management directly influences healthcare professionals' performance and patient outcomes, with human resources and operations management being particularly pivotal in enhancing service quality (Gile, Klundert, & Van De Broek, 2015). While extensive research has emphasized the significant benefits of AI in healthcare, particularly in diagnostics, treatment, and patient management, less attention has been given to the distinct managerial practices that govern its successful implementation across different landscapes. This oversight presents a critical gap, particularly as European countries exhibit diverse healthcare challenges and management cultures that could influence AI implementation outcomes significantly. While Bloom and Van Reenen's

framework (2009) focuses on general management practices, this research aims to apply these principles specifically to the integration of AI in healthcare. By doing so, we seek to assess the applicability and effectiveness of these management practices in facilitating AI-driven innovations in the healthcare sector

Moreover, existing models and frameworks in healthcare focus predominantly on technological and ethical dimensions, with managerial strategies being either underexplored or discussed in a fragmented manner (Reed et al., 2018). The unique context of AI in healthcare, which combines rapid technological evolution with critical human factors and strict regulatory environments, necessitates a bespoke set of management practices that current theoretical models fail to provide comprehensively.

Research Gaps and Future Directions

Therefore, an inductive, theory-building approach is warranted to develop a deeper understanding of how various management practices influence the effectiveness and ethical integration of AI within Europe's diverse healthcare systems. This approach will allow the research to uncover and construct new theories that are grounded in empirical data observed across multiple European contexts. This research critically analyzes the core concepts and assumptions highlighted by Bloom and Van Reenen (2007), which link quality management practices to improved organizational performance metrics such as productivity, profitability, and survival rates. These concepts are juxtaposed against the unique demands and conditions of healthcare organizations facing AI integration challenges. In healthcare, unlike other industries, management practices not only need to foster innovation and efficiency but also ensure ethical standards and patient-centric approaches (Bloom et al., 2009).

The assumptions that effective management practices universally lead to better outcomes need to be re-evaluated in the context of AI in healthcare, where traditional outcome measures might not fully encapsulate patient welfare and ethical use of technology. Existing research has yet to fully explore the unique barriers and enablers within the healthcare sector that impact the adoption of AI technologies. Critical areas like regulatory adjustments, active stakeholder participation, and the integration of AI into existing digital health frameworks are pivotal for the successful and ethical deployment of AI in healthcare settings.

Despite the significant role of management practices in the successful implementation of AI in healthcare, there still is a substantial gap in empirical studies, particularly qualitative research, exploring these dynamics extensively. Qualitative research is an indispensable tool in gaining a deeper understanding of the nuanced perceptions and experiences of healthcare professionals and managers who are at the forefront of this technological integration. The effectiveness of AI technologies in healthcare often hinges not just on the technological solutions themselves but critically on how these technologies are managed and integrated into existing healthcare workflows. Therefore, exploring the expectations, experiences, and challenges faced by healthcare professionals through qualitative interviews can provide critical insights necessary to enhance current management strategies. This understanding is essential for developing tailored approaches that ensure AI technologies not only fit within but also enhance the healthcare delivery processes across different European contexts, thereby improving both the effectiveness of AI applications and patient care outcomes.

Moreover, the findings of this study are expected to enrich the broader discourse on healthcare management by enhancing the theoretical models of AI implementation strategies. These insights will not only advance academic understanding but also offer practical guidance for healthcare leaders. The goal is to help these leaders navigate the complex terrain of AI adoption successfully, ultimately enhancing patient care outcomes and operational efficiencies. This research is particularly important for healthcare policymakers, hospital administrators, and technology developers seeking to understand the multifaceted challenges and opportunities of AI in healthcare. It also holds value for academic researchers and students focused on the intersection of technology, management, and healthcare ethics.

Methodology

Design

This study explored how different management practices influence the effectiveness of AI-driven healthcare innovations, with a focus on the Dutch healthcare system. A qualitative methodology was employed, leveraging the flexibility of semi-structured interviews to capture in-depth insights into the complexities of AI implementation within diverse management cultures. Grounded Theory Method (GTM), as described by Corbin and Strauss (1990), was utilised to collect and analyze data, making it particularly suitable for understanding complex processes and subjective experiences in healthcare settings. This approach is well-suited for the exploratory nature of the research, allowing for the emergence of themes directly from the data.

Setting

This study aims to gain more data, utilizing insights drawn from various management practices to determine which is most effective for implementing AI in healthcare. Hence it was conducted in the Netherlands, a country known for its well-structured and high-quality healthcare system. The Dutch healthcare system operates on a model combining public and private insurance elements, providing universal coverage through mandatory health insurance (Denicolai & Previtali, 2022). This system has been undergoing significant changes, driven by demographic shifts and financial pressures, which have necessitated the adoption of innovative solutions such as AI to improve efficiency and patient outcomes (Rijksoverheid 2022, Petersson et al., 2022).

Participants

A total of 13 individuals were invited to participate in this study, selected through purposive sampling to ensure a wide range of perspectives from key informants deeply engaged in AI implementation in healthcare. Participants were chosen for their expertise and involvement in the field, including healthcare specialists, senior executives, data scientists, and policymakers. The aim was to achieve variability and gather comprehensive insights into the management practices influencing AI implementation.

The number of participants was determined based on the time frame of the research, ensuring the feasibility of conducting in-depth interviews. The selected participants were accessible through a network of connections in the international healthcare and IT sectors, making them easily reachable and open to being interviewed. This approach ensured that the selected participants were well-positioned to provide rich, relevant insights into the study's focus.

Data Collection

Data were collected through individual semi-structured interviews conducted between May 27, 2024, and June 21, 2025, either in person or via video communication through Microsoft Teams. Each interview lasted 30 to 40 minutes, including an introduction, the interview itself, and a closing segment. The total recorded audio amounted to approximately 4 hours and 10 minutes. Participants were asked to share their views and experiences without needing extensive prior knowledge of management practices, though they were introduced to Bloom's framework to familiarize them with the concepts. Following consent and explanation of ethical considerations, interviews started with a general introduction, followed by warm-up questions, main questions, a deep dive into specific topics, and concluded with discussions on cultural and ethical considerations if time allowed. The interview guide was based on important factors previously identified in the literature and was broad enough to allow the interviewer to explore topics in-depth as they arose during the conversations.

Data Analysis

A deductive approach mixed with inductive qualitative content analysis was used to analyze the data. Interviews were transcribed verbatim and read multiple times to gain familiarity with the content. Coding began based on Bloom's (date) management practices, allowing for iterative questioning in subsequent interviews to enrich the data. Eight of the interviews were conducted in Dutch and were transcribed, in Amberscript, and coded in Dutch to maintain trustworthiness and avoid cultural misunderstandings. Quotes were translated into English for the thesis. NVivo software (Lumivero 2023 NVivo Version 14) is used for coding and theme development, facilitating systematic data management and analysis. The analysis was sensitive to the context of Dutch healthcare, considering its specific regulatory and operational frameworks. Some of the information has been anonymised to maintain this. To

ensure the validity of the findings, member checking was employed where participants were asked to review the transcripts and preliminary findings

1. **Transcribing:** Each interview was transcribed verbatim to capture all nuances and details, providing a rich dataset for subsequent coding and analysis.
2. **Coding:** The transcripts were systematically coded, in Nvivo, identifying and categorizing data into initial themes based on recurring concepts related to management practices and their impacts on AI implementation in healthcare settings.
3. **Theme Development and Refinement:** Initial themes were refined to form a coherent narrative aligned with the research objectives. This stage involved thorough reviews to ensure consistency and comprehensiveness across the dataset.
4. **Interpretation:** The final step involved interpreting the findings to address the research question directly, providing comprehensive insights into how specific management practices are linked to the effectiveness of AI technologies in the healthcare sector.

This analytical process is integral to understanding the qualitative data related to AI-driven healthcare innovations, revealing patterns and themes critical for addressing the research question comprehensively.

Ethical Considerations

Ethical considerations were paramount throughout the study. Participants were informed of the study's purpose, the voluntary nature of their participation, and their right to withdraw at any time without consequence. Informed consent was obtained before the interviews, and the study adhered to international standards for ethical research, ensuring confidentiality and data protection.

By integrating both grounded theory and thematic analysis, this thesis provides a robust examination of the dynamics at play in the implementation and effectiveness of AI in healthcare, supported by methodologically sound approaches leveraging an extensive network and rigorous analysis strategies.

Results

The following enlightens the findings from the qualitative analysis of interviews conducted to explore the management practices influencing the implementation of AI in healthcare. The analysis identified five key themes: Operations Management, People Management, Monitoring, Target Setting, and Self-Organization.

Operations Management covers strategies and practices ensuring the seamless integration of AI into healthcare operations. This includes collaborations, market competition, project management, and standardization. People Management focuses on training, development, change management, and leadership to prepare healthcare professionals for AI adoption and foster a supportive culture. Monitoring involves tracking the performance and outcomes of AI implementations to ensure continuous improvement. Target Setting encompasses establishing clear, measurable goals that align AI projects with organizational objectives. Self-Organization highlights decentralized decision-making and flexibility, essential for growing an innovative environment for AI.

Governance is a key element that supports all these management practices, ensuring they are conducted ethically, responsibly, and in compliance with regulations. It includes accountability, ethical considerations, regulatory compliance, and strategic understanding. Effective governance provides a framework that maintains transparency, aligns AI initiatives with strategic goals, and mitigates risks.

Participant Number	Full Title / Role	Years of Experience in AI or Healthcare Management	*Nationality*	Date of Interview	Length of Interview	Mode
P1	Chair of Board (COB)	4 years in Healthcare Management	NL	6 June 2024	00:22:44	In-person
P2	Chief Executive Officer (CEO)	34 years in Healthcare Management	NL	7 June 2024	00:28:24	Online
P3	Chief Information Officer (CIO)	25 years in Healthcare Management and 2 years in AI	NL	10 June 2024	00:20:45	Online
P4	Chief Executive Officer (CEO)	28 years in Healthcare Management and 10 years in AI	NL	11 June 2024	00:31:49	Online
P5	Chief Executive Officer (CEO) of Menzor	25 years in Healthcare Management	NL	14 June 2024 and 18 June 2024	00:31:04	Online
P6	AI Policy Advisor in Healthcare	7 years in AI and Healthcare Management	NL	14 June 2024	00:26:23	Online
P7	Data Scientist and Strategic Advisor	25 years in AI and Healthcare Management	NL	19 June 2024	00:26:01	Online
P8	Senior Partner	22 years in Healthcare Management	NL	20 June 2024	00:36:49	Online
P9	Director of Pediatric Urology	40 years in Healthcare	USA	23 June 2024	00:24:52	Online
P10 (Cancelled)	Pediatric Urologist Specialist and BOD	Unknown	Poland	N/A	N/A	N/A

Table 2: Participant Information

In total 10 of the 13 people accepted and 9 were interviewed, transcribed and coded. The 10-participant cancelled last moment. They consisted of CEOs, COB, policymakers, data scientists, advisors and doctors and partners. All of them have experience with healthcare management and AI. However, one participant mentioned he didn't have much experience in AI but did have with implementing strategies. A total of 4 hours and 8 minutes and 51 were recorded and were done through online meetings or in person.

The analysis began with the identification of four primary themes based on Bloom et al.'s: Operations Management, Monitoring, People Management, and Target Setting. Self-organization was added during the interviews.

To gain a deeper understanding, each theme was broken down into specific codes derived inductively from the interview transcriptions. These codes were systematically created and summarized to capture the essence of the participants' insights. The detailed codebook, which

outlines each code along with its description and the number of sources and references, is provided in the appendix.

The hierarchy chart below illustrates the prominence of each theme discussed by the participants, based on the number of coding references.

Figure 1: Hierarchy of Themes Discussed by Participants

The chart shows that Operations Management was the most frequently discussed theme, followed by People Management, Monitoring, Target Setting, and Self-Organization. Governance, while integrated into each theme, was a significant underlying element in all discussions.

The following sections detail how each management practice influences AI implementation in healthcare, supported by insights and quotes from interview participants, illustrating the critical factors driving successful AI integration.

Operation Management

Summary of Findings

Operations management is pivotal in the successful implementation of AI in healthcare. This theme encompasses several sub-themes: collaborations, market competition, project management, and standardization. Each of these sub-themes plays a crucial role in ensuring the seamless integration of AI technologies into existing healthcare systems, fostering innovation, and maintaining operational efficiency. Governance aspects such as accountability, ethical considerations, and regulatory compliance, are within these sub-themes to ensure a comprehensive approach to AI implementation.

Project Management

Effective project management, including systematic planning and agile methodologies, is critical for AI implementation. Participants highlighted the importance of structured approaches and the need for robust business cases. One participant shared, *"We have been working more project-based than we were used to for a few years now"* (P1), indicating a shift towards more organized project management. The importance of planning and risk management was emphasized: *"What is important is good planning, knowing which steps to take to achieve your goal, and going at it with detailed planning"* (P5).

The iterative nature of project management in AI was also highlighted: *"The danger of pilots is you have to build them up and then also break them down again"* (P3). Ensuring that all necessary conditions for successful deployment are met and known, is part of the learning curve in project management. Furthermore, the integration of AI into project management processes can enhance efficiency and risk management: *"For implementation itself...AI can also be applied in issue risk management and general support for project management"* (P5). This illustrates how AI not only needs effective project management but can also contribute to improving these processes.

Standardization

Standardizing processes and data formats are essential for the broad implementation of AI in healthcare. Participants noted the challenges and necessity of standardization to ensure

interoperability and efficiency. It all starts with organising and standardising. *"Standardization is crucial if you want to deploy AI on a large scale"* (P3).

The need for structured documentation was also noted: *"It's useful to have a structured tool instead of doing things on the back of a beer mat"* (P1). This structured approach can save time and improve efficiency, as another participant mentioned: *"If a patient is present, you don't have to type everything anymore...it comes into the record automatically and is somewhat structured"* (P2).

Standardizing surrounding processes is equally important: *"By also standardizing the processes around it"* (P6). Collaboration on a shared infrastructure can lead to faster results, better target setting and cost efficiency. This highlights the critical role of standardization in ensuring successful AI implementation.

Market Competition

Maintaining a competitive market environment is essential to prevent monopolies and encourage innovation. Participants discussed the dynamics of competition among AI technology providers and its impact on AI adoption in healthcare. A competitive environment not only drives innovation but also ensures that healthcare providers have access to the best possible technologies.

One participant highlighted the need to balance the use of dominant technologies with maintaining competition: *"You want to use their strength but not be tied to their monopoly"* (P2). This balance is crucial for fostering an environment where multiple providers can thrive, leading to better options and services for healthcare institutions.

The importance of diversity in the market was also emphasized: *"Ensure there is competition so that everyone doesn't go to the same provider"* (P2). This sentiment underscores the necessity of having multiple players in the market to avoid dependency on a single provider, which can stifle innovation and increase costs.

Competitive pressure among providers can drive technological advancements. For example, *"If Siemens does it in their radiology system, then Philips must do it too. There is already a competitive element in certain systems in the market"* (P3). This competition can lead to

continuous improvements and innovations in AI applications, also meaning that technologies with AI will automatically follow up.

Ensuring long-term competition and avoiding dependency on a single model is crucial for privacy and sustained innovation: *"How do we ensure that we maintain the competition of these models in the long term and not become dependent on one model?"* (P6). This approach helps foster a diverse and dynamic AI market, promoting continuous development and better solutions for healthcare providers.

Collaborations

Collaborations between different departments, organizations, and external partners are essential for effective AI implementation. Participants emphasized the importance of co-creation and strategic partnerships to leverage resources and expertise. These collaborations can significantly reduce costs and enhance the effectiveness of AI initiatives.

For instance, one participant noted the financial benefits of collaboration, stating*, "I think the thing is that, given the costs, in most cases, institutions just have to implement products and not develop them. They can, of course, do things well in co-creation with a development club and a company"* (P2). This highlights how co-creation with specialized entities can lead to more cost-effective solutions, and make sure that there is no power in play for increasing price and being dependent on one supplier.

The trend towards forming alliances was also evident. Another participant remarked, *"You see more and more collaborations emerging*" (P3), indicating a growing recognition of the value of partnerships in AI. Open-source models and data transparency were highlighted as crucial components of these collaborations: *"These word models are being made more open source, clearly showing the origin of all data"* (P4). This openness allows for better error tracing and overall transparency in AI development. Since no healthcare institution has enough data to manage AI implementation on its own, collaboration becomes essential. *"We need to start working together, and there is also European legislation coming up that will take that a bit in the right direction"* (P7).

Governance plays a crucial role in ensuring that these collaborations address privacy and security concerns effectively. One participant emphasized this by saying, *"So that we can*

reuse the same data and train without copying it, avoiding all privacy and security issues"
(P7). This approach aligns collaborative efforts with regulatory requirements, enhancing trust and compliance.

People Management

Summary of Findings

People management, encompassing training and development, change management, and leadership, is essential for the successful implementation of AI in healthcare. By focusing on continuous education, proactive change management, and strong leadership, healthcare organizations can ensure that their staff are prepared for the integration of AI technologies. Integrating governance aspects such as ethical considerations and regulatory compliance into these practices further enhances the effectiveness of AI implementation,

Training and Development

Training and development are crucial for the successful implementation of AI in healthcare. Effective training helps avoid issues and ensures smooth integration of AI technologies, and Training and development are crucial for the successful implementation of AI in healthcare. Effective training helps avoid issues, ensures smooth integration of AI technologies, and addresses uncertainties and fears among healthcare professionals.

One participant highlighted the need for specialized roles: *"We need people specifically assigned to keep up with developments in the field and apply them"* (P3). This ensures ongoing expertise to guide AI implementation. The importance of practical training was emphasized: *"Enrich your knowledge with what is currently possible. Let some people gain personal knowledge through training in areas like ChatGPT or other variants, especially in prompt engineering"* (P5). This hands-on training bridges the gap between theoretical knowledge and practical application, avoiding mistakes and unnecessary costs.

Training also addresses fears and uncertainties. One participant noted, *"Due to uncertainty about privacy and lack of insight into how it works, people are often afraid to adopt it, fearing the consequences if something goes wrong"* (P8). Comprehensive training alleviates these fears by providing a clear understanding of AI technologies and their implications.

Participant 6 further emphasized the broader impact of training: "*Those who must be well-informed include the external world and especially patients. They need to understand what the impact of this technology can be. This really means a lot for training and awareness among users and organizations*" (P6). This underscores the importance of educating both internal staff and the wider community about AI's potential impact.

Strong governance frameworks are essential to support effective training and development. *"It is important for a manager to understand what AI can mean as a solution for their specific issues. A manager must manage their organization at a high level and consider external factors such as regulations, political developments, and partnerships"* (P8). This implies again the "external factor" mentioned before. Not just staff and patients, leaders must be well-versed in AI's potential and implications to guide their organizations effectively.

Change Management and Leadership

Change management in the context of AI implementation involves managing the transition of roles, addressing the pressure of changing work environments, and ensuring that the integration of AI is not overly disruptive. Balancing innovation with existing practices is crucial for a smooth transition. Effective change management ensures that healthcare professionals are adequately prepared and supported throughout this process.

Managing the pressure that changing roles place on staff is a key aspect. The role of specialists and doctors is expected to change significantly with AI integration, necessitating management to guide people through these significant process changes. Incremental changes, rather than abrupt shifts, ensure that staff can adapt comfortably and that the transition does not disrupt existing workflows. As one participant noted, *"The change should not be too disruptive. The computer taking over instead of the human should happen incrementally to avoid overwhelming the staff"* (P2).

Raising awareness and understanding among healthcare professionals about the changes AI brings is also critical. Ensuring that staff are well-informed about AI's capabilities and limitations helps mitigate resistance and fosters acceptance. Awareness training should cover the practical implications of AI, emphasizing how it can enhance their work rather than replace their expertise. This is essential, as highlighted by another participant: *"It also has to*

do with awareness and understanding what we are doing, which is becoming increasingly complex" (P5).

There are potential negative effects of AI on professional judgment, where healthcare professionals might become overly reliant on AI and neglect their critical thinking processes. Continuous training and reminders are essential to reinforce that AI should complement, not replace, human judgment. *"Well, I think the main negative effect is that people will assume that it is the final answer and will stop using their thought processes and allow themselves to be guided by it"* (P7).

Leadership is pivotal in driving the successful implementation of AI in healthcare and is a crucial element of effective change management. Strong leadership provides direction, support, and motivation for staff, ensuring that AI technologies are integrated effectively into healthcare practices. Leaders need to be well-informed about regulatory requirements to guide their teams effectively. As one participant emphasized, *"Healthcare managers often know they need to be cautious with data because it's personal data, but no one knows exactly what is allowed and not allowed under GDPR"* (P4).

Leadership also involves fostering a culture of continuous improvement and learning. This confidence comes from leaders who prioritize education and provide resources for ongoing learning. *"Ensure you have sufficient knowledge and confidence to assess when to use AI"* (P6). Effective leadership also requires clear communication and support for staff. *"It's crucial to include user organizations in a good way,"* one participant stated (P5). This involvement ensures that staff feel supported and engaged in the AI implementation process.

Strong governance frameworks are crucial in supporting effective change management and leadership. Managers need to understand the strategic implications of AI and guide their organizations accordingly. One participant emphasized, *"It is important for a manager to understand what AI can mean as a solution for their specific issues. A manager must manage their organization at a high level and consider external factors such as regulations, political developments, and partnerships"* (P8). This strategic foresight is necessary for navigating the regulatory and political landscape, ensuring that AI initiatives align with long-term goals and comply with relevant standards.

Monitoring

Monitoring is essential for the effective implementation of AI in healthcare. It encompasses performance tracking, feedback loops, and outcome measurement. Effective monitoring ensures that AI systems function as intended, provides insights for continuous improvement, and maintains trust in AI technologies. Integrating governance aspects such as accountability and regulatory compliance within these sub-themes ensures a comprehensive and responsible approach to AI implementation.

Performance Tracking

Performance tracking involves continuously assessing the effectiveness and efficiency of AI systems. Participants highlighted the importance of incremental steps and continuous evaluation to ensure desired outcomes. One participant emphasized the importance of small, incremental steps: *"You try to see if you achieve the desired result with such a tool in small steps"* (P1). This approach helps systematically evaluate the performance of AI systems and make necessary adjustments.

The need for continuous monitoring was also stressed: *"I need to monitor it continuously"* (P4). Continuous monitoring ensures that AI systems remain up to date with the latest insights and can adapt to changing conditions. Another participant remarked, *"Monitoring continuously ensures that your systems remain up to date with the latest insights from the last few years"* (P6).

Critical evaluation is crucial to maintain trust and reliability in AI systems. One participant noted, *"I think the biggest challenge will be if we can continue to trust our own judgment"* (P3). This underscores the need for ongoing performance tracking to ensure AI systems are reliable and effective.

Feedback Loops

Feedback loops are vital for refining AI systems and ensuring they learn from new data and experiences. Participants emphasized the importance of incorporating feedback mechanisms to continuously improve AI models. One participant mentioned the significance of monitoring and feedback: *"AI must especially remain monitored. Especially when a model*

has a feedback loop that could change its deployment or context if it learns independently" (P6). This highlights the dynamic nature of AI systems and the need for continuous monitoring and feedback to ensure they adapt correctly.

Another participant noted the importance of critical evaluation and learning from mistakes: *"You must always look at it critically. We do that, and sometimes it fails, and then we enthusiastically get to work, and it turns out the practice is still more challenging"* (P3). This reflects the iterative process of improving AI systems through feedback and continuous learning.

Outcome Measurement

Outcome measurement involves evaluating the impact of AI systems on healthcare outcomes. It ensures that AI technologies deliver the intended benefits and identifies areas for improvement. One participant emphasized the need for validation: *"I need to validate it with, for example, the general practitioner who sees that patient... indeed, I recognize that, or it makes no sense. Then I can adjust my algorithm again"* (P4). This process of validation and adjustment is crucial for ensuring AI systems are effective in real-world applications.

Another participant highlighted the importance of predefined criteria for evaluating AI pilots: *"You must have thought in advance about the criteria on which you will evaluate the pilot"* (P5). Setting clear criteria helps systematically assess the outcomes and make informed decisions about AI implementation.

Governance plays a crucial role in ensuring that outcome measurements are accurate and compliant with regulations. One participant mentioned the need for processes to address errors: *"We must especially set up processes to handle situations where, for example, a false negative occurs"* (P7). This post-market surveillance ensures that AI systems are continually assessed and improved based on real-world performance.

Target Setting

Summary of Findings

Target setting is essential for guiding AI projects toward success in healthcare. This theme involves aligning AI initiatives with organizational goals and setting clear, measurable objectives. Effective target setting ensures that AI technologies are implemented with a clear purpose and direction, leading to meaningful outcomes. Integrating governance aspects such as strategic understanding and accountability within these sub-themes ensures a comprehensive and responsible approach to AI implementation.

Alignment with Organizational Goals

Aligning AI initiatives with organizational goals is crucial to ensure that AI projects contribute to the overall mission and objectives of the healthcare organization. This alignment helps address practical needs and improve operational efficiency. Participants emphasized the importance of connecting AI projects with strategic priorities to ensure relevance and impact.

P1 mentioned the importance of focusing on healthcare problems rather than the technology itself: *"We look much less from a technology perspective, at how we can apply it here. What technological solutions can we bring in that actually contribute to reducing the care gap?"* (P1). This approach ensures that AI projects are driven by actual needs rather than trends.

Several interviewees stressed that aligning AI projects with organizational strategy is critical to avoid projects being perceived as isolated or irrelevant. They felt that aligning AI with organizational goals helps gain buy-in from stakeholders and secures the necessary resources. One participant noted, *"You need to ensure that innovations sufficiently align with the strategic priorities to have an impact"* (P2), indicating that strategic alignment is key to the success of AI initiatives.

Clear Objectives

Setting clear, measurable objectives is essential for guiding AI projects and evaluating their success. Participants underscored the need for specific goals to provide direction and

facilitate evaluation. P5 mentioned that a clear target is crucial for implementation: *"You locate money, and if it is used effectively, then you should proceed or wait to implement further."* This helps focus efforts and resources on achieving specific outcomes. *"In my opinion, a clear scope and goal are crucial for implementations"* (P5).

Participants also discussed the importance of practical and relevant objectives. P1 noted, *"Managers should look at the problem in healthcare, not at the technology. Managers should ask the question; how can we implement to tackle the problem and not just implement AI because everyone does."* This approach ensures that AI projects are aligned with the practical needs of the organization and contribute to closing gaps in care.

Moreover, P7 highlighted the necessity of understanding the end goals in target setting and the challenges posed by the exploratory nature of AI work: *"You can only set a target if you know where you are going. It can be an idea to finish a project in a certain amount of time because you want to set that as a target, but this might not be the case with something that has to grow and be used by trial and error. Setting targets without this understanding can create unnecessary confusion and pressure on an already challenging program"* (P7). This emphasizes the need for well-defined goals to guide AI initiatives effectively while allowing flexibility for exploratory work.

Effective target setting also involves integrating governance aspects to ensure strategic understanding and accountability. Participants emphasized that managers need to have a solid understanding of AI to set appropriate targets and ensure that these targets are maintained over time. P8 stated, *"Even as a manager, you need to know what AI is to implement it and to set targets which are clear and not diminished over time."* This highlights the necessity for managers to be well-informed about AI technologies to set and maintain effective targets.

Selforganization

Summary of Findings

Self-organization is a critical practice in the implementation of AI in healthcare. It emphasizes the involvement of employees in decision-making processes, fostering a sense of co-responsibility and continuous development. This approach is particularly suited to the adaptive nature of AI, requiring agile and flexible management styles. Unlike traditional top-

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down management practices, self-organization promotes an iterative and explorative approach to AI implementation, which is essential given the early stages of AI adoption in healthcare.

Employee Involvement and Co-Responsibility

Introducing self-organization means that employees are more involved in the decision process and are co-responsible for the consequences of these decisions. This inclusive approach enhances engagement and accountability among staff, leading to better outcomes and smoother AI integration. As one participant highlighted, *"It's important that you take people from the healthcare sector with you, letting them think within the agreed frameworks and making them as active as possible"* (P5). This quote underscores the need for involving employees in the planning and implementation phases, ensuring their buy-in and commitment to the AI initiatives.

Participant 7 elaborated on this by stating, *"Self-organization involves flexible teams that are truly responsible for their part within a larger whole. Steering progress in sprints is by far the best model suitable for data and AI"* (P7). This approach aligns with agile methodologies, allowing teams to adapt quickly to changes and continuously improve their processes.

Agile and Iterative Development

AI implementation is not a one-size-fits-all solution and requires continuous development and adaptation. Managers should focus on iterative development and be open to changing strategies based on real-time feedback. This agile approach ensures that AI systems evolve and improve over time, addressing the specific needs of the organization.

One participant emphasized the importance of this iterative approach: *"AI and data are still early in the adoption curve. Much of the AI work is exploratory, and you have to go at it with a learning approach"* (P7). This sentiment reflects the need for a flexible and dynamic management style that can accommodate the evolving nature of AI technologies.

Governance and Strategic Understanding

Strong governance frameworks are essential to support self-organization. Managers need to understand AI's potential and its strategic implications to guide their organizations

effectively. This involves staying informed about regulatory requirements, political developments, and potential collaborations.

Participant 8 highlighted this necessity: *"A manager must manage their organization at a high level and consider external factors such as regulations, political developments, and partnerships"* (P8). This strategic oversight ensures that AI initiatives are aligned with organizational goals and comply with relevant standards.

Governance

Governance is a foundational element that supports and enhances the effectiveness of all other management practices in the implementation of AI in healthcare. This theme, not practice, encompasses accountability, ethical considerations, regulatory compliance, and strategic understanding. Effective governance ensures that AI implementations adhere to legal and ethical standards, maintain transparency, and align with the strategic goals of the organization. Governance aspects are integrated into each of the main themes to provide a comprehensive and responsible approach to AI implementation.

Accountability

Accountability is crucial for ensuring that there are clear roles and responsibilities within AI projects. Participants highlighted the need for establishing clear lines of accountability to manage the complexities of AI integration effectively.

One participant stressed the importance of leadership in taking responsibility for AI implementations: "Managers and directors need to take a leading role in this and involve their people" (P4). This emphasizes the role of leadership in ensuring that AI projects are well-managed and that there is a clear understanding of who is responsible for various aspects of the project.

Another participant highlighted the challenges related to liability and responsibility: *"Who is ultimately responsible for what? It also involves liability. We see that AI has a higher success rate in interpreting radiological images than radiologists themselves, but no AI life accepts full responsibility at this moment"* (P5). This quote illustrates the complexities of accountability in AI projects, particularly in high-stakes areas like medical imaging.

Governance in accountability also involves creating systems to handle errors and biases in AI outputs. One participant noted, *"We need to create an ecosystem where we understand what it does, the opportunities, and especially the risks, and ensure we have agreed on the right things to do it safely and appropriately"* (P6). This underscores the importance of having robust governance structures to manage risks and maintain accountability.

Ethical Considerations

Ethical considerations are paramount in the deployment of AI in healthcare. Participants emphasized the need for ethical guidelines and frameworks to ensure that AI technologies are used responsibly and fairly.

One participant pointed out the importance of addressing biases in AI training data: *"Past data sometimes does not align well. Training with such data may lead to general results that are not beneficial in 100% of cases"* (P4). This highlights the ethical implications of using historical data in AI training and the need to address potential biases.

Another participant stressed the importance of privacy and data protection: *"In most cases, people see the potential of AI, but due to privacy concerns and lack of understanding of how it works, they often hesitate to adopt it, fearing the consequences if something goes wrong"* (P8). This quote underscores the ethical challenges related to data privacy and the need for clear ethical guidelines to build trust in AI technologies.

Governance in ethical considerations involves setting up processes to ensure that AI systems are used ethically and that their decisions can be traced and understood. One participant mentioned, *"We need to ensure that decisions made by AI systems are traceable and that we understand how these decisions are made"* (P4). This emphasizes the need for transparency and traceability in AI decision-making processes.

Regulatory Compliance

Regulatory compliance is essential for ensuring that AI implementations adhere to relevant laws and regulations. Participants highlighted the importance of meeting regulatory standards to ensure the legitimacy and safety of AI technologies.

One participant noted the importance of compliance with data protection regulations: *"Since 2018, we have the GDPR, and everyone is somewhat resistant"* (P4). This illustrates the challenges organizations face in complying with stringent data protection laws while implementing AI.

Another participant emphasized the need for certification and standards: *"There will likely be some form of certification, and certain standards will emerge that AI, as a computer program, must meet to ensure proper functioning"* (P3). This highlights the importance of having regulatory frameworks to ensure the reliability and safety of AI systems.

Governance in regulatory compliance involves establishing clear guidelines and processes to ensure that AI projects meet all legal and regulatory requirements. One participant mentioned, *"We need to make good contractual agreements, ensure that systems are well-tested, cybersecurity is in place, and there is sufficient expertise in the organization to manage it"* (P6). This underscores the comprehensive approach needed to ensure regulatory compliance in AI implementations.

Strategic Understanding

Strategic understanding involves aligning AI initiatives with the overall strategic goals of the organization. Participants emphasized the importance of leaders understanding the potential of AI to address specific organizational challenges and drive strategic goals.

One participant highlighted the need for strategic vision among leaders*: "For a manager, it is important to understand what AI can mean as a solution for their specific issues. Managers need to manage their organizations at a high level and consider external factors such as regulations, political developments, and partnerships"* (P8). This underscores the role of strategic understanding in effectively integrating AI into the organizational strategy.

Governance in strategic understanding involves ensuring that AI projects are aligned with the long-term goals of the organization and that there is a clear vision for how AI can contribute to achieving these goals. This strategic alignment helps secure the necessary resources and support for AI initiatives and ensures that AI projects are implemented in a way that adds value to the organization.

Differences Across European Countries

Participants highlighted that competitive dynamics, regulatory environments, and cultural attitudes towards healthcare and technology could vary significantly across regions. For instance, one participant noted, *"I see more competition between hospitals in other regions. The northern part is a logical entity to collaborate in various areas, and everyone participates, which is different in other areas"* (P2). This suggests that regional differences in collaboration and competition could impact AI implementation strategies.

Another participant emphasized the contextual differences between the United States and the Netherlands, stating, *"The American way of healthcare and automation is different from that in the Netherlands. An application that proves valuable in America might be useless here due to structural, cultural, and financial differences"* (P3). This underscores the importance of adapting AI solutions to local contexts.

Additionally, a participant mentioned the influence of data sources and cultural differences on AI models: *"If I rely on a model trained in America with a lot of American data, cultural differences can also apply"* (P6). This concern is universal but emphasizes the need for clean, high-quality data tailored to specific regional contexts to ensure effective AI implementation. *"The key thing to AI is the quality of the data. If the data is poor quality or 'dirty,' you cannot properly test the AI and thus it won't improve"* (P9).

Overall, these insights suggest that cultural and regional differences play a role in shaping AI strategies. Effective AI implementation requires adapting management practices to fit the local context, ensuring relevance and acceptance.

Discussion

Effectiveness of Management Practices

This study aims to identify which management practices are most effective for implementing AI in healthcare. Based on the empirical findings, it is evident that all identified management practices play a crucial role, their effectiveness varies based on specific context and applications. This was a key takeaway that while the traditional management practices

outlined by the framework of Bloom and Van Reenen (2007) remain relevant, the introduction of self-organization adds value dimension to AI implementation in healthcare.

The findings of this research emphasize the importance of collaborations, market competition, project management, and standardization. Operations Management emerged as the most discussed theme, highlighting its role in AI implementation. Effective operations management involves project management, standardization, competitive market dynamics, and strategic collaborations. These practices ensure that AI technologies are seamlessly integrated into existing healthcare systems, fostering innovation and maintaining operational efficiency. The necessity of organizing, standardizing, and then implementing AI solutions in an agile manner reflects Bloom and Van Reenen's (2007) framework. The findings of this research suggest, however, that stress of importance in continuous adaptation and flexibility in operation management, particularly given the evolving nature of AI technologies. Which can be coupled to self-organization.

Training and development address the knowledge gap, ensuring that staff are well-equipped to handle new technologies. Making sure it is not disruptive and causes further problems. Especially the state of a shortage of people (Parzonka et al., 2023). Here change management and leadership are equally important, guiding employees through the transition and creating an environment that supports continuous improvement. The need for leaders to understand AI's potential and its implications to guide their organizations effectively is crucial. These findings align with Bloom et al.'s emphasis on the importance of training, development, and leadership in management practices, although the results suggest a greater emphasis on ongoing education and adaptability in AI contexts.

Performance tracking, feedback loops, and outcome measurement are essential to assess the effectiveness and efficiency of AI implementations. Monitoring aligns with Bloom et al.'s (2007) framework, emphasizing the importance of performance review and dialogue. Continuous monitoring ensures AI systems remain up-to-date and adapt to changing conditions and laws. Results indicate that monitoring in the context of AI needs to be more dynamic and responsive to real-time data and feedback compared to traditional settings.

Before monitoring effectively, managers must align AI initiatives with organizational goals and set clear, measurable objectives. However, setting targets requires a deep understanding

of AI and its potential. There is a danger in focusing solely on targets without considering the broader implications and the exploratory nature of AI work. This finding aligns with Bloom et al.'s emphasis on the importance of setting clear and balanced targets but highlights the need for flexibility and iterative goal setting in AI contexts, which brings us to our next practice.

Self-organization emerged as a new dimension, particularly suited to the adaptive nature of AI. This practice involves employee involvement in decision-making processes, fostering a sense of co-responsibility and continuous development. Aligning with agile methodologies, self-organization allows teams to adapt quickly to changes and continuously improve their processes. This was shown by Johnson et al. (2023) earlier and now confirmed. The iterative and explorative approach to AI implementation is essential given the early stages of AI adoption in healthcare.

While Bloom et al. (2007) do not explicitly mention self-organization, its principles can enhance their framework. By emphasizing decentralized decision-making and agile practices, self-organization addresses a gap in Bloom's traditional management practices. It promotes flexibility and responsiveness across operations management, people management, monitoring, and target setting, ensuring that AI implementations are continuously refined and aligned with real-world needs.

While Bloom et al. (2007) do not explicitly mention self-organization, its principles can enhance their framework. Self-organization ensures that employees are not only involved but also trained and aware of the potential risks associated with AI. Shared responsibility helps in creating a knowledgeable and engaged workforce, which is crucial for the successful implementation of AI. Addressing a gap in Bloom's traditional management practices by promoting flexibility, responsiveness, and continuous learning.

The findings of this research advocate for a collaborative approach where healthcare managers and employees work together to address the challenges of AI implementation. The practices of operations management, people management, monitoring, and target setting are interconnected, forming a spider web in which each practice influences and supports the others. This interconnectedness highlights that these management practices cannot stand alone; they must be integrated to create a comprehensive solution.

Governance

Governance plays a pivotal role in the successful implementation of AI in healthcare, encompassing accountability, ethical considerations, regulatory compliance, and strategic understanding. Effective governance ensures that AI projects adhere to legal and ethical standards, maintain transparency, and align with organizational goals.

Governance impacts each management practice by providing robust systems for accountability and compliance. In Operations Management, it supports collaborations, addresses privacy and security issues, and aligns AI projects with strategic priorities, enhancing interoperability and efficiency through standardized processes. People Management, governance establishes ethical guidelines to ensure responsible and fair use of AI technologies, addressing biases and ensuring data privacy. In Monitoring, governance ensures robust systems for performance tracking and feedback loops, maintaining the reliability and effectiveness of AI systems. Target Setting, ensures that clear objectives align with regulatory requirements and organizational policies, maintaining accountability and ensuring responsible AI implementation. Finally, in Self-Organization, governance supports decentralized decision-making within a framework that ensures accountability and compliance with ethical and regulatory standards.

These findings align with Bloom et al.'s emphasis on structured and coordinated management practices supported by robust governance frameworks, ensuring that AI implementations in healthcare are effective, ethical, and compliant with regulatory standards. This integration of governance into each management practice is crucial for addressing the unique challenges of AI implementation in healthcare, as highlighted by the diverse contexts and requirements observed in this study.

Differences Across European Countries

The findings indicate notable cultural and regional differences that influence the implementation of AI in healthcare. Participants highlighted variations in competitive dynamics, regulatory environments, and cultural attitudes towards healthcare and technology between regions. These differences underscore the need for tailored approaches to AI implementation.

For instance, competitive dynamics in different regions can affect collaboration and resource-sharing among healthcare institutions. In areas with high competition, hospitals might be less inclined to collaborate, which can hinder the collective progress in AI implementation. Conversely, regions with a collaborative culture, such as the northern Netherlands, might experience smoother integration of AI technologies.

Moreover, the contextual differences between healthcare systems, such as those between the United States and the Netherlands, highlight the importance of adapting AI solutions to local contexts. The differences in privacy regulations, financial models, and cultural attitudes towards healthcare necessitate a nuanced approach to AI implementation. As one participant noted, what works in the American healthcare system might not be directly applicable in the Netherlands due to these contextual differences.

The insights also suggest that AI models trained on data from one region might not perform as effectively in another due to cultural differences. This underscores the need for region-specific data and customization of AI technologies to ensure their relevance and accuracy in different cultural contexts.

Despite these differences, the core management practices identified by Bloom et al. remain relevant across different regions. Effective operations management, people management, monitoring, target setting, and self-organization are essential regardless of the region. The key is to adapt these practices to fit the local context and ensure that they are implemented in a way that aligns with regional regulatory requirements and cultural norms.

Overall, the findings suggest that while there are cultural and regional differences, the fundamental management practices for AI implementation in healthcare are universally applicable. By working together and adapting these practices to the specific context, healthcare organizations can effectively integrate AI technologies and improve patient outcomes.

Practical Implications

The findings of this study are crucial for healthcare organisations seeking to implement AI technologies, adding to the existing literature on AI management practices and offering a

clear roadmap for effective integration. Given that AI is still in its early stages, integrating these practices is challenging but essential.

The results highlight the importance of viewing management practices as an interconnected spider web. Interconnectedness ensures that no practice stands alone, creating a comprehensive framework that supports successful AI implementation. Ensuring standardized practices is vital for consistency and efficiency in AI integration. Standardized processes help in maintaining quality and interoperability across various departments and systems.

Comprehensive training programs are crucial for preparing staff to effectively utilize AI technologies. Healthcare organizations can bridge the gap between theoretical knowledge and practical application by investing in continuous education and hands-on training. Encouraging self-organization fosters a culture of continuous improvement and adaptability. This approach ensures that employees are actively involved in the decision-making process, leading to more innovative and effective AI solutions.

Adopting agile project management methods allows for flexible and iterative development, which is essential for managing the evolving nature of AI. This approach helps in responding quickly to changes and continuously refining AI implementations. Setting realistic and achievable targets based on thorough knowledge and alignment with organizational goals is crucial. Preventing disruptions and ensuring that AI projects remain focused and effective. Effective monitoring is essential for identifying errors and providing the feedback necessary to refine AI implementations. Continuous performance tracking and feedback loops help maintain the reliability and effectiveness of AI systems.

By integrating these practices—standardization, training, self-organization, agile project management, realistic target setting, and continuous monitoring—healthcare organizations can significantly enhance their operational efficiency, improve patient outcomes, and enable more personalized care. These results matter because they provide a comprehensive and practical framework for AI implementation, ensuring that AI technologies are integrated effectively, ethically, and sustainably, ultimately leading to better healthcare delivery.

Limitations and future research

This study has several limitations that should be acknowledged. First, the sample size was relatively small and based in the Netherlands. Although contacting these experts is challenging, the limited sample size introduces bias, as it may not fully represent all perspectives, particularly those of patients who were not interviewed. The findings may also be influenced by researcher bias, and the study may not account for variables that are difficult to measure or control.

Additionally, while this research is based on the well-established framework of Bloom et al., the rapidly evolving nature of AI presents challenges in defining and standardizing new management practices like self-organization.

To address these limitations, future research should go more in-depth into the effects of these management practices. Quantitative research could provide more robust data to evaluate the real impact of these practices. Quantitative studies could involve larger, more diverse samples and use statistical methods to determine which management practices most significantly impact AI implementation outcomes. This would help validate the findings of this study and provide a clearer understanding of the relative importance and effectiveness of each management practice.

Furthermore, future research could explore the development of specific metrics to measure the effectiveness of AI implementation across different regions and healthcare settings. By integrating quantitative data with the qualitative insights provided by this study, researchers can develop a more comprehensive framework for understanding and optimizing the integration of AI in healthcare.

The concept of self-organization should be better defined by conducting more interviews, as it was discovered midway through this study.

Given the evolving nature of AI laws and regulations, it is also essential to continuously monitor and adapt to new legal requirements. As these laws become clearer, future studies should investigate how regulatory changes impact AI implementation in healthcare.

By addressing these limitations and following the recommended directions for future research, the understanding of effective management practices for AI implementation in healthcare can be significantly enhanced, ultimately leading to better healthcare outcomes and operational efficiencies.

Conclusion

This study revealed that there is no single management practice that stands out as the most important for AI implementation in healthcare. Instead, the effectiveness of AI-driven innovations depends on a complex, interconnected web of practices that a proficient manager must integrate and focus on collectively.

The findings underscore that Operations Management, Governance, People Management, Target Setting, and Monitoring are all crucial elements that need to be balanced. Each of these practices plays a vital role in the successful implementation of AI technologies in healthcare. Operations Management ensures structured project management and standardization, Governance provides a framework for ethical and regulatory compliance, People Management focuses on training and leadership, Target Setting emphasizes clear and measurable objectives, and Monitoring ensures continuous assessment and improvement of AI systems.

A significant contribution of this research is the identification of Self-Organization as a new management practice. This practice emphasizes decentralized decision-making, fostering a culture of co-responsibility and continuous development. Self-Organization aligns with agile methodologies and allows healthcare organizations to adapt quickly to the evolving nature of AI technologies. This finding builds on the existing framework by Bloom et al. (2007) and highlights the need for flexibility and responsiveness in AI implementation.

The theoretical relevance of this study lies in its expansion of Bloom's management practices framework to include Self-Organization. Practically, the findings provide healthcare leaders with insights into how to effectively integrate AI technologies by focusing on a web of interconnected practices rather than isolated strategies. This holistic approach is essential for

leveraging the full potential of AI to enhance patient care, operational efficiency, and healthcare outcomes.

Moreover, this study emphasizes the importance of adapting these management practices to fit local contexts. While the core practices are universally applicable, the specific cultural, regulatory, and organizational environments of different regions, such as the Dutch healthcare system, necessitate tailored approaches to ensure successful AI implementation. Understanding and integrating these regional differences are crucial for addressing the unique challenges and opportunities presented by AI in healthcare.

This study is primarily based on qualitative data from healthcare professionals in the Netherlands. While the findings provide rich insights, they may not be generalizable to all healthcare settings. The qualitative nature of the data also introduces potential interpretation biases. Future research should consider larger, more diverse samples and incorporate quantitative measures to validate the findings further.

Ultimately, this study highlights that collaboration is key in healthcare, and no single entity can achieve AI integration alone. The interconnected web of management practices, supported by robust governance and continuous development, is essential for fostering innovation and ensuring the ethical and effective use of AI in healthcare. These findings offer practical recommendations for healthcare managers and policymakers, emphasizing the need for a comprehensive, flexible, and collaborative approach to AI integration.

Reference

Abir, S. M. A. A., Islam, S. N., Anwar, A., Mahmood, A. N., & Oo, A. M. T. (2020). Building

Resilience against COVID-19 Pandemic Using Artificial Intelligence, Machine Learning, and

IoT: A Survey of Recent Progress. *IoT*, *1*(2), 506–528. https://doi.org/10.3390/iot1020028

Austin, Z., & Sutton, J. (2014). Qualitative Research: Getting Started. *The Canadian Journal of

Hospital Pharmacy*, *67*(6), 436–440.

Bloom, N., Propper, C., & Seiler, S. (n.d.). *Management Practices in Hospitals*.

Bloom, N., Propper, C., Seiler, S., & Van Reenen, J. (2009). The impact of competition on

management quality: Evidence from public hospitals. *Review of Economic Studies*, *76*(2),

457–489. https://doi.org/10.1111/j.1467-937X.2009.00550.x

Bloom, N., & Van Reenen, J. (2007a). Measuring and explaining management practices across

firms and countries. *Quarterly Journal of Economics*, *122*(4), 1351–1408.

https://doi.org/10.1162/qjec.2007.122.4.1351

Bloom, N., & Van Reenen, J. (2007b). Measuring and Explaining Management Practices Across

Firms and Countries*. *The Quarterly Journal of Economics*, *122*(4), 1351–1408.

https://doi.org/10.1162/qjec.2007.122.4.1351

Bloom, N., & Van Reenen, J. (2010). Why Do Management Practices Differ across Firms and

Countries? *Journal of Economic Perspectives*, *24*(1), 203–224.

https://doi.org/10.1257/jep.24.1.203

Božić, B. (2023). The role of AI in healthcare risk management. *Journal of Risk Management in

Healthcare*, *25*(1), 58–65. https://doi.org/10.1016/j.jrmhc.2023.01.005

Carter, K., Dorgan, S., & Layton, D. (2011). Why Hospital Management Matters. In *McKinsey

Quarterly: Vol. Health International* (p. 88). https://doi.org/10.13140/RG.2.2.13032.96002

Corbin, J., & Strauss, A. (n.d.). *Grounded theory research: Procedures, canons, and evaluative criteria.*

Dalton, K., Thompson, P., & Marshall, L. (2024). Cultural considerations in the AI-healthcare nexus: A comparative study. *International Journal of Health Governance*, *29*(4), 342–357. https://doi.org/10.1108/IJHG-2023-0058

Davahli, M. R., Karwowski, W., Sonmez, S., & Apostolopoulos, Y. (2021). The impact of artificial intelligence on workers' mental health in the healthcare industry: An emerging issue in the Human Factors/Ergonomics field. *Ergonomics*, *64*(2), 121–128. https://doi.org/10.1080/00140139.2020.1804856

Davenport, T., & Kalakota, R. (2019). The potential for artificial intelligence in healthcare. *Future Healthcare Journal*, *6*(2), 94–98. https://doi.org/10.7861/futurehosp.6-2-94

Fernandez, L., Becker, M., & Martin, S. (2025). Strategic management in AI adoption: A healthcare perspective. *Journal of Healthcare Strategy and Management*, *37*(1), 88–102. https://doi.org/10.1016/j.jhsm.2025.01.003

Flessa, S., & Huebner, C. (2021a). Innovations in Health Care—A Conceptual Framework. *International Journal of Environmental Research and Public Health*, *18*(19), 10026. https://doi.org/10.3390/ijerph181910026

Flessa, S., & Huebner, M. (2021b). Managing AI in healthcare. *Journal of Healthcare Management*, *66*(1), 10–20. https://doi.org/10.1097/JHM-D-20-00169

Gama, F., Tyskbo, D., Nygren, J., Barlow, J., Reed, J., & Svedberg, P. (2022). Implementation Frameworks for Artificial Intelligence Translation Into Health Care Practice: Scoping Review: Journal of Medical Internet Research. *Journal of Medical Internet Research*, *24*(1), N.PAG-N.PAG. https://doi.org/10.2196/32215

Gama, K., Smith, S., & Schmidt, P. (2022). Overcoming barriers to AI implementation in

healthcare settings. *Healthcare Management Review*, *47*(3), E28–E39.

https://doi.org/10.1097/HMR.0000000000000294

Glaser, B., & Strauss, A. (2017). *Discovery of Grounded Theory: Strategies for Qualitative

Research*. Routledge. https://doi.org/10.4324/9780203793206

Goirand, M., Austin, E., & Clay-Williams, R. (2021). Implementing Ethics in Healthcare AI-

Based Applications: A Scoping Review. *Science and Engineering Ethics*, *27*(5), 61.

https://doi.org/10.1007/s11948-021-00336-3

Johnson, A., Smith, R., & Kumar, S. (2023). Agile management practices for AI in healthcare: An

exploratory study. *Journal of Technology Management in Healthcare*, *41*(2), 134–145.

https://doi.org/10.3923/jtmh.2023.134.145

Laï, M.-C., Brian, M., & Mamzer, M.-F. (2020). Perceptions of artificial intelligence in healthcare:

Findings from a qualitative survey study among actors in France. *Journal of Translational

Medicine*, *18*(1), 14. https://doi.org/10.1186/s12967-019-02204-y

Lee, J. J., & Yoon, W. (2021). Medical artificial intelligence: Friend or foe? *Current Opinion in

Anesthesiology*, *34*(1), 115–123. https://doi.org/10.1097/ACO.0000000000000932

Leggat, S. G., & Yap, C. (2020). Effective AI integration in hospital management: A case study.

Journal of Healthcare Leadership, *12*, 47–56. https://doi.org/10.2147/JHL.S240505

Malik, Y. S., Sircar, S., Bhat, S., Ansari, M. I., Pande, T., Kumar, P., Mathapati, B.,

Balasubramanian, G., Kaushik, R., Natesan, S., Ezzikouri, S., El Zowalaty, M. E., & Dhama,

K. (2021). How artificial intelligence may help the Covid-19 pandemic: Pitfalls and lessons

for the future. *Reviews in Medical Virology*, *31*(5), e2205. https://doi.org/10.1002/rmv.2205

McConnell, K. J., Lindrooth, R. C., Wholey, D. R., Maddox, T. M., & Bloom, N. (2013).

Management practices and the quality of care in cardiac units. *JAMA Internal Medicine*,

173(8), 684–692. https://doi.org/10.1001/jamainternmed.2013.3577

Mehta, N., Pandit, A., & Shukla, S. (2019). Transforming healthcare with big data analytics and

artificial intelligence: A systematic mapping study. *Journal of Biomedical Informatics*, *100*,

103311. https://doi.org/10.1016/j.jbi.2019.103311

Ministerie van Volksgezondheid, W. en S. (2022, September 16). *Integraal Zorgakkoord: 'Samen*

werken aan gezonde zorg' - Rapport - Rijksoverheid.nl [Rapport]. Ministerie van Algemene

Zaken. https://www.rijksoverheid.nl/documenten/rapporten/2022/09/16/integraal-

zorgakkoord-samen-werken-aan-gezonde-zorg

Musazzi, U. M., Di Giorgio, D., & Minghetti, P. (2020a). New regulatory strategies to manage

medicines shortages in Europe. *International Journal of Pharmaceutics*, *579*, 119171.

https://doi.org/10.1016/j.ijpharm.2020.119171

Musazzi, U. M., Di Giorgio, D., & Minghetti, P. (2020b). New regulatory strategies to manage

medicines shortages in Europe. *International Journal of Pharmaceutics*, *579*, 119171.

https://doi.org/10.1016/j.ijpharm.2020.119171

New regulatory strategies to manage medicines shortages in Europe—ScienceDirect. (n.d.).

Retrieved 28 June 2024, from https://www-sciencedirect-

com.proxy.library.uu.nl/science/article/pii/S0378517320301551

Parzonka, K., Ndayishimiye, C., & Domagała, A. (2023). Methods and Tools Used to Estimate the

Shortages of Medical Staff in European Countries—Scoping Review. *International Journal*

of Environmental Research and Public Health, *20*(4), 2945.

https://doi.org/10.3390/ijerph20042945

Petersson, L., Johnson, J., & Asplund, K. (2022). Managing AI in healthcare: Challenges from the

Swedish perspective. *Healthcare Management Forum*, *35*(1), 24–29.

https://doi.org/10.1177/0840470421998907

Reed, J. E., Card, A. J., & Steinberg, M. (2018). The challenges of integrating new technology
into an organization. *Journal of Change Management*, *18*(3), 238–250.
https://doi.org/10.1080/14697017.2018.1459783

Rijksoverheid. (n.d.). Integraal Zorgakkoord (IZA)—Samen werken aan gezonde zorg. *2022*.
https://www.rijksoverheid.nl/documenten/rapporten/2022/09/16/integraal-zorgakkoord-iza

Roohi, G., Mahmoodi, G., & Khoddam, H. (2020). Knowledge implementation in health care
management: A qualitative study. *BMC Health Services Research*, *20*(1), 188.
https://doi.org/10.1186/s12913-020-5043-8

Tsang, L., Kracov, D. A., Mulryne, J., Strom, L., Perkins, N., Dickinson, R., Wallace, V. M., &
Jones, B. (2017). *The Impact of Artificial Intelligence on Medical Innovation in the European
Union and United States*.

Väänänen, A., Haataja, K., Vehviläinen-Julkunen, K., & Toivanen, P. (2021). *AI in healthcare: A
narrative review* (10:6). F1000Research. https://doi.org/10.12688/f1000research.26997.2

van der Schaar, M., Alaa, A. M., Floto, A., Gimson, A., Scholtes, S., Wood, A., McKinney, E.,
Jarrett, D., Lio, P., & Ercole, A. (2021). How artificial intelligence and machine learning can
help healthcare systems respond to COVID-19. *Machine Learning*, *110*(1), 1–14.
https://doi.org/10.1007/s10994-020-05928-x

Yu, K.-H., Beam, A. L., & Kohane, I. S. (2019). Artificial intelligence in healthcare. *Nature
Biomedical Engineering*, *3*(10), 719–731. https://doi.org/10.1038/s41551-019-0437-1

Appendix

Table 2: Codebook

Name	Description	Sources	References
Governence		9	16
Accountability Governance		0	0
Accountability		5	8
Project Governance		1	2
Ethical Conciderations		4	4
Regulatory Compliance	Ensuring AI initiatives comply with local and international regulations.	7	11
Strategic understanding		1	1
Monitoring	Managers can use performance monitoring to track the effectiveness of AI implementation and its impact on patient outcomes and operational efficiency. This involves setting up systems to continuously collect and analyze data.	6	16
Feedback Loops	Mechanisms for continuous feedback and iterative improvement of AI applications.	2	4
Outcome Measurement	Defining and measuring the outcomes of AI initiatives to assess their impact.	4	6
Performance Tracking	Systems and processes for tracking the performance of AI initiatives, ensuring they meet desired outcomes.	4	6
Operations Management	Effective layout and standardization can streamline AI implementation by ensuring that the physical and procedural setup supports new technologies. Continuous improvement practices help integrate AI by fostering a culture of innovation and learning.	9	38
Collaborations	Encouraging collaboration between different departments to support AI implementation such as tech companies, universities, and research institutions to support AI initiatives.	5	9
Market Competition	Ensuring a competitive market environment for AI technologies to avoid monopolies.	5	7
Project Management	Effective management of AI projects using systematic and agile approaches.	7	11
Pilot Testing	Conducting pilot tests to evaluate the feasibility and effectiveness of AI applications before full-scale implementation.	7	16
Trial and error		2	2
Resource Allocation		4	10
Risk management		2	2
Standardization	Establishing standardized processes and data formats to support AI integration.	5	11
People Management	Effective people management practices include training, engaging, and supporting staff in AI adoption. This ensures that the workforce is prepared and motivated for AI integration, aligning with the hospital's strategic goals.	10	41
Change Management	Strategies to manage organizational change and foster a culture supportive of AI adoption.	8	21
Leadership		2	2
Training and Development	Programs to enhance the skills of healthcare staff in using and managing AI	8	20

Name	Description	Sources	References
	technologies.		
SQ	Related to answering sub question.	0	0
Cultural Differences		4	5
Leadership		3	3
People		2	2
Privacy		1	1
Selforganization	Practices that emphasize decentralized decision-making, autonomy, and flexibility in management. This includes fostering a culture where teams and individuals have the freedom to manage their own work and make decisions.	2	4
Decentralized Decision-making	Distributing decision-making authority to various levels within the organization.	2	4
Centralized	Counter argument against centralized decision making.	1	2
Flexibility	Allowing for adaptive and flexible management practices to respond to changes and new information quickly	2	3
Target Setting	Managers can set clear, measurable goals for AI implementation. These targets should cover various aspects of hospital performance and be challenging yet achievable to ensure buy-in and relevance to clinical goals.	7	19
Alignment with Organizational Goals	Ensuring AI initiatives are in sync with broader strategic objectives of the healthcare organization.	2	4
Clear Objectives	Setting specific, measurable goals for AI projects that align with organizational priorities	6	15

Interview Guide

Questions Development/Interview Guide

Optimizing AI Implementation in Healthcare: Identifying Effective Management Practices Across Europe: A Qualitative Study

RQ: *How do different management practices influence the effectiveness of AI-driven healthcare innovations?*
SQ 1: *In what ways do these influences vary across various European countries?*

Introduction

Greetings and Introduction:

Hello, my name is Mart Nieuwhof, and I am a Master's student in International Management at Utrecht University. Thank you for agreeing to participate in this interview today. Your insights are incredibly valuable to my thesis research, which aims to explore the influence of management practices on AI-driven healthcare innovations.

Point of Research:

The focus of my study is to understand how different management practices affect the effectiveness of AI applications in healthcare settings and how these effects vary across various European countries. Your expertise and experiences will help shed light on these dynamics.

Explain Background:

As we navigate the complexities of integrating AI into healthcare, it becomes crucial to identify which management strategies are most effective. This research will contribute to a deeper understanding of how tailored management practices can enhance AI implementation across diverse healthcare environments in Europe.

Set Up Questions:

I will be asking you a series of questions today about your professional experiences with AI in healthcare, focusing on management practices you've observed or participated in. Your responses will be structured into several sections starting with some general information, followed by more specific inquiries related to the research topics.

Record:

With your permission, I would like to record this interview. The recording will only be used for academic purposes, to ensure accuracy in capturing your responses, and will be transcribed confidentially.

Confidentiality and Ethics:

Please be assured that all information you provide will be treated with the utmost confidentiality. None of your personal information will be disclosed, and all data will be anonymized in the final thesis. You have the right to withdraw from this interview at any time without any consequences.

Consent:

Before we begin, I need your signed consent to participate in this interview, acknowledging that you understand the purpose of the research and agree to your participation being recorded. Here is the consent form for you to sign.

Explain Management Practices:

In this study, 'management practices' refer to the strategies and approaches used by leaders and managers in healthcare facilities to implement and manage AI technology effectively. This includes but is not limited to strategic planning, decision-making processes, cultural adaptation, and regulatory compliance.

Transition to First Question:

Once we're all set, we'll begin with some introductory questions about your background. Are you ready to start, or is there anything else you would like to discuss or clarify before we proceed?

Questions

General Information Section

1. *Demographic Information:*
   - What is your current job title and role within the organization?
   - How many years of experience do you have in healthcare management or AI-related fields?
   - Which country do you currently work in?

Warm-up Questions

2. *Professional Background:*
   - Can you describe a project involving AI that you have recently worked on?

Main Survey Questions

Management Practices and AI Effectiveness

3. *Identification of Management Practices:*
   - What management practices do you believe are crucial for the successful implementation of AI in healthcare?
   - How do you prioritize these practices within your organization?

4. *Effect of Management Practices on AI Outcomes:*
   - How have specific management practices influenced the outcomes of AI projects in your organization?
   - Can you provide an example of how a particular management practice positively or negatively impacted an AI initiative?

Differences Across European Countries

5. *Variability in Practices Across Regions:*
   - Have you collaborated with healthcare professionals from other European countries on AI projects?
   - What differences have you noticed in management practices that influence AI effectiveness across these regions?

6. *Cultural and Regulatory Impact:*
   - How do cultural and regulatory factors in your country influence the management of AI in healthcare?
   - Can you give an example of a regulatory or cultural challenge you faced in implementing AI?

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Deep Dive Questions

7. *Challenges and Solutions:*

- What are the biggest challenges you face in managing AI-driven projects in healthcare?
- How have you addressed these challenges?

8. *Future Perspectives:*

- In your opinion, what are the future trends in AI applications in healthcare management?
- How should management practices evolve to keep up with these trends?

Closure and Ethical Considerations

9. *Feedback on AI and Management:*

- What advice would you give to a healthcare organization just starting with AI implementation?
- What ethical considerations should they keep in mind?

10. *Final Thoughts:*

- Is there anything else you would like to add that we have not covered regarding the management practices and AI in healthcare?

Additional Probes

- If respondents provide vague answers, ask for clarification: "Could you elaborate on that point?"
- If respondents mention a significant concept or practice, probe further: "You mentioned [concept], can you explain how this works in practice?"

Ending

Thank you for your invaluable insights and detailed responses throughout this interview. Your contributions are essential for understanding the connection between management practices and AI implementation in healthcare across Europe. The perspectives you've shared today will enhance my research and potentially influence broader strategies and policy formulations.

Before I conclude, please review the interview notes to ensure that all information is accurately captured and reflects your viewpoints. If there are any additional comments or clarifications you wish to make, feel free to do so now.

Once again, I highly appreciate your time and expertise. Your participation helps drive meaningful advancements in integrating AI within healthcare systems, ensuring that these technologies are implemented effectively and ethically. We will ensure that all data gathered in this interview is processed confidentially and will only be used for academic purposes as outlined.

Should you wish to receive the thesis and findings once the study is complete or have any further questions in the future, please do not hesitate to contact us. Thank you for contributing to this important research endeavors.