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Knowledge Sharing and Scaling Barriers in Healthcare Automation

- A Techno- Anthropological Perspective on RPA at Aarhus University Hospital

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Abstract

This thesis investigates how organizational structures, infrastructural practices, and socio-technical dynamics at Aarhus University Hospital (AUH) shape the implementation, scaling, and knowledge sharing of Robotic Process Automation (RPA) solutions. Using a techno-anthropological lens, combined with theoretical frameworks such as Infrastructuring, Value Sensitive Design (VSD), Ethical Technology Assessment (ETA), and CFIR, the study explores how RPA is embedded in complex healthcare settings. Drawing on interviews, workshops, and ethnographic observations, the analysis reveals that while RPA offers clear efficiency gains, its scaling is hindered by fragmented communication, limited resources, and a lack of shared ownership. Ethical concerns, justice, autonomy, trust, and relational care, emerge as central themes, highlighting that automation is not a neutral solution but a socio-technical intervention with profound implications for healthcare values and practices. The thesis argues for participatory design, proactive outreach, distributed responsibility, and robust knowledge infrastructures as key strategies for sustainable digital transformation. By centering frontline healthcare professionals' voices, the study contributes to a more ethically grounded, inclusive approach to automation in healthcare, where technologies serve not just efficiency goals, but also fairness, dignity, and care.

Table of Contents

1 Introduction

1.1 Background: Digital Transformation in the Healthcare Sector

The healthcare sector is increasingly characterized by digital transformation, where new technologies are implemented to enhance patient care, efficiency, and resource allocatio (Topol 2019). Digitalization has resulted in increased use of electronic health records (EHR), decision-support systems, and automated processes, reshaping workflows for healthcare professional (Topol 2019). One significant challenge in this development is ensuring that technology does not just streamline processes but also supports humane and ethically responsible workflows (Greenhalgh et al. 2017). As healthcare systems worldwide face growing demands due to demographic shifts, resource constraints, and rising expectations for service quality, automation and artificial intelligence have become central topics in discussions about future healthcare systems (Davenport and Kalakota 2019). In Denmark, the healthcare system faces its own set of demographic challenges: an aging population, staff shortages and increasing efficiency demands. Projections indicate a significant growth in the elderly population and a rising burden of chronic diseases (Sundhedsstrukturkommissionen, 2024). According to OECD (OECD 2023), digitalization and automation could help address these challenges by reducing administrative burdens and freeing up time for patient interaction. Several initiatives are already underway, including digital assistants and automated processes such as Robotic Process Automation (RPA) (“Sundhedsstrukturkommissionen” 2024). While the potential of digital solutions is widely acknowledged, a balanced approach is necessary, one where technology is not just implemented for efficiency’s sake but is developed and integrated in ways that preserve the core values of healthcare: care, dignity, fairness, and trust (Greenhalgh et al. 2017). This means that healthcare digitalization must be more than just technical innovation and efficiency metrics. it must also engage with the human and ethical dimensions of change. To fully understand these complexities, this thesis adopts a techno-anthropological (TAN). Rather than seing technologies as isolated tools, a TAN lens situates digital solutions within the broader socio-technical systems they are part of. Systems shaped by people, practices, infrastructures, and organizational cultures (Børsen and Botin 2013). It is through this lens that we can explore how digital technologies in healthcare are not simply technical solutions, but deeply entangled with questions of professional identity, relational care, and ethical responsibility. By grounding the study in TAN, the aim is to illuminate how automation in healthcare is co-constructed through everyday work and ethical reflection, and how scaling technologies like RPA requires not only technical capacity but also brings attention to the human and ethical relations in care.

1.1.1 The Need for Effective Human-Centered Solutions

While digital technologies hold the potential to improve healthcare, efficiency alone is not a sufficient goal, especially in a field as ethically and relationally complex as healthcare (Greenhalgh et al., 2017; Friedman & Hendry, 2019). As the previous section outlined, the growing interest in digital tools, such as Robotic Process Automation (RPA) and AI, often comes from a desire to streamline workflows and address systemic challenges like staff shortages and administrative overload (OECD 2023; Sundhedsstrukturkommissionen, 2024). Yet, these solutions risk falling short if they are not designed with a deep understanding of the human, ethical, and contextual dimensions of care.

Technologies such as RPA may seem like neutral tools for optimizing processes, but as Value-Sensitive Design (VSD) reminds us, all technologies carry embedded assumptions about what matters, about what counts as valuable work, whose needs are prioritized, and how tasks should be distributed. If the primary metric for success becomes efficiency, there is a danger that human dignity, professional autonomy, and relational aspects of care are neglected (Beauchamp and Childress 2001). To address these risks, more holistic, participatory, and ethically informed approaches are needed. This includes recognizing and balancing core healthcare values such as justice, fairness, autonomy, trust, and care (Botin, L ; Børsen, T 2024; Beauchamp and Childress 2001). It requires engaging the people who live and work with these technologies; healthcare professionals, patients, and support staff, and not simply as end-users, but as co-creators of the systems that shape their work (Greenhalgh et al. 2017; Hendry, Friedman, and Ballard 2021). Participatory design processes and ongoing ethical reflection must therefore be central components of digital transformation efforts, ensuring that technologies support humane, relational, and context-sensitive care. This focus on human-centered design and ethical reflection sets the stage for the techno-anthropological perspective adopted in this thesis. By combining ethnographic methods, participatory approaches, and critical reflection on values, techno-anthropology offers a way to investigate how technologies are embedded in healthcare practices, and how they might be shaped to better serve the complex and diverse needs of patients and professionals alike (Botin, L ; Børsen, T 2024).

1.1.2 Strategic Vision: National, Regional, and Local Context

Denmark has long positioned itself as a frontrunner in digital health innovation, with national, regional, and local strategies converging to promote a more efficient, patient-centered, and data-driven healthcare system. At the national level, the Danish Digital Health Strategy 2018–2024 (“Sundhedsstrukturkommissionen” 2024), aims to create a coherent and

trustworthy healthcare network that prioritizes patient needs and streamlines workflows for healthcare professionals. In the Central Denmark Region (Region Midtjylland), the emphasis is on utilizing evidence-based and data-driven solutions to transform healthcare delivery. The region has a strong tradition of establishing successful partnerships across sectors, including healthcare, research, education, and the business community (Digitaliseringsstrategi for Region Midtjylland 2019.). This collaborative approach has led to the development of innovative digital tools, such as electronic medical records (EPJ) and business intelligence systems (The BI-portal), to enhance patient care and operational efficiency .

1.1.3 Local Strategy: Aarhus University Hospital

Aarhus University Hospital (AUH) exemplifies the local implementation of digital health strategies. The hospital has been recognized as one of the world's leading "smart hospitals," owing to its adoption of advanced technologies, including AI in imaging diagnostics, medicine-dispensing robots, and virtual reality for staff training. AUH's digital approach integrates electronic health records with radiology, pathology, lab systems, and telemedicine, aiming to improve accessibility and user satisfaction. Despite these advancements, AUH faces challenges in aligning its vision and mission with digital strategies. The hospital acknowledges the need for continuous improvement and innovation to ensure that digital solutions enhance, rather than hinder, patient care (“Digitaliseringsstrategi for Region Midtjylland 2019” 2025)

1.1.4 Bridging Strategy and Practice

While these strategies set ambitious goals for digital transformation, their realization in practice involves navigating complex organizational structures, ensuring interoperability of systems, and fostering a culture that embraces change. The implementation of technologies like Robotic Process Automation at AUH highlights the need for coordinated efforts across all levels of the healthcare system to achieve the envisioned benefits of digital health initiatives.

1.1.5 Robotic Process Automation

Robotic Process Automation (RPA) refers to the use of software ‘robots’ to automate routine, rule-based tasks traditionally performed by humans (Aguirre and Rodriguez 2017). In healthcare, RPA has been adopted to streamline time-consuming administrative processes such as billing, patient registration, and data entry, offering potential efficiency gains in resource-constrained systems (et al. van der Aalst 2018; et al. Talukdar 2023). At AUH,

RPA has been embraced as part of the hospital's broader digitalization strategy, with several departments reporting positive outcomes: freeing up staff time, improving data accuracy, and reducing administrative burdens. In spite of that, RPA often operates as a "silent" form of automation (Van Der Alst, et al 2018), integrated in the background, invisible to many, and implemented in a piecemeal fashion across departments. While individual solutions have shown benefits, their scaling across the organization presents significant challenges. As this thesis reveals, knowledge about RPA solutions often remains locked within local departments, lacking systematic structures for sharing and reuse. Frontline staff rarely have formal channels to contribute insights or identify new use cases, limiting the potential for participatory design and co-creation. Without careful attention to knowledge sharing, collaboration, and ethical reflection, RPA risks becoming a fragmented patchwork of isolated pilots rather than a sustainable, scalable solution for the hospital as a whole. This thesis therefore explores RPA as both a technical tool and a socio-technical phenomenon, investigating how it is implemented, adapted, and shared at AUH, and how organizational, infrastructural, and ethical factors influence its potential for meaningful, long-term impact.

1.1.6 Background and Research Problem

The case of Robotic Process Automation at AUH offers a window into a broader challenge facing digital transformation in healthcare: the tension between local innovation and system-wide knowledge sharing, between efficiency gains and the values of care, and between technical solutions and the ethical concerns they raise. While RPA has demonstrated potential to streamline administrative tasks and free up time for patient care, its implementation at AUH has been fragmented and driven by local pilots, dependent on a small central team, and often disconnected from broader organizational strategies. Knowledge about RPA solutions tends to remain siloed within departments, limiting opportunities for scaling and cross-departmental learning. At the same time, staff express concerns about how automation might affect autonomy, professional roles, and the quality of care, raising important ethical questions that often remain unaddressed in technology-driven change processes.

These tensions highlight a critical need: to understand not only what RPA can do, but how it becomes part of complex healthcare systems; how it is shaped, shared, and sustained in practice, and how its design and implementation reflect and influence values like fairness, transparency, and human dignity. This thesis therefore asks:

How do infrastructural practices, organizational structures, and socio-technical conditions at Aarhus University Hospital support or hinder the scaling and knowledge sharing of RPA

solutions, and how can a more coordinated strategy for sustainable digital transformation be developed?

To explore this question, the thesis draws on theoretical perspectives from infrastructuring, Value-Sensitive Design (VSD), Ethical Technology Assessment (ETA), and the Consolidated Framework for Implementation Research (CFIR). It builds on empirical insights from interviews, workshops, and observations with healthcare professionals at AUH, offering a multi-layered analysis of the barriers, opportunities, and ethical reflections that shape the hospital's RPA journey.

2 Problem Analysis

This problem analysis sets the stage for the thesis by introducing the technological and organizational landscape of Robotic Process Automation at AUH. It begins by outlining the background, functionality, and current use of RPA in the healthcare sector, with a particular focus on AUH, drawing on both existing literature and empirical insights from interviews, observations, and document reviews. The analysis then examines the organizational structure of AUH, highlighting how its decentralized governance model creates both opportunities and barriers for implementing and scaling RPA solutions. Finally, the section identifies a research gap in existing studies: while RPA's technical aspects and efficiency gains have been explored, less attention has been paid to the infrastructural, organizational, and ethical factors that influence its long-term adoption and knowledge sharing within complex healthcare settings. This problem analysis builds the foundation for the thesis's focus on how RPA solutions are developed, scaled, and shared across AUH, and how digital transformation efforts can be supported in ways that are both effective and ethically grounded.

2.1 Robotic Process Automation – Background and Context

This section introduces Robotic Process Automation (RPA) as a key technology in the context of healthcare digitalization. It outlines what RPA is, its relevance in the healthcare sector, and its specific use cases at Aarhus University Hospital (AUH). The aim is to provide the reader with a clear understanding of the technology, its potential benefits, and the challenges it presents, thereby setting the stage for the subsequent analysis of how RPA solutions are scaled, shared, and ethically integrated into healthcare practices.

2.1.1 Robotic Process Automation in the Healthcare Sector

Robotic Process Automation (RPA) refers to the use of software "robots" designed to automate structured, rule-based, repetitive tasks traditionally performed by humans (Aguirre and Rodriguez 2017). Unlike traditional automation that requires deep integration into IT systems, RPA operates on the user interface layer, mimicking human actions such as clicking, typing, transferring data from one IT-system to another, and reading information from screens. RPA differs from Artificial Intelligence (AI) in that it does not make autonomous decisions based on learning; instead, it follows pre-programmed instructions to complete tasks accurately and (Aguirre and Rodriguez 2017). This makes RPA particularly suited for administrative and back-office functions where processes are standardized and repetitive. In healthcare, RPA has been leveraged to reduce the administrative burden on clinical and non-clinical staff. Typical use cases include automating patient registration, billing, data migration between IT systems, and administrative reporting (Van Der Alst, et al 2018; Talukdar al. 2023).

2.1.1.1 What is Robotic Process Automation?

RPA is essentially software technology that uses digital "robots" or bots to mimic human interactions with computer systems (Nimkar et al 2024).These bots can navigate interfaces, input data, and perform a series of predefined actions without human intervention (Talukdar al. 2023). RPA functions by following pre-programmed rules and sequences. Unlike AI, RPA does not adapt or learn from new data but reliably performs the same tasks again and again as instructed. This makes it highly relevant for tasks that are repetitive, rule-based, and involve structured data (Aguirre and Rodriguez 2017). While traditional automation requires system-level integration (e.g., APIs), RPA acts more like a user which interacts directly with the same interface a human worker would. AI, in contrast, involves learning from data and making decisions based on patterns and predictions ((Nimkar et al 2024). The strength of RPA lies in its ability to reduce errors, cut processing times, and handle large volumes of transactions with minimal human supervision. This is especially beneficial in healthcare administration, where staff are burdened with routine documentation and record-keeping. In a sector under constant resource pressure, RPA helps free up clinical and administrative staff by taking over predictable, routine work. This can lead to better use of staff competencies, improved patient pathways, and greater job satisfaction (Patrício et al. 2024) . In healthcare settings, RPA is applied to tasks such as patient scheduling, insurance processing, updating electronic health records, DRG-coding, and medication registration. At AUH, I learned from my observations and interviews, that departments with heavy

administrative demands, like oncology and haematology, have embraced RPA for its potential to streamline documentation and reduce errors.

These insights are based not only on the literature but also on my empirical observations and collaboration with the RPA team at Aarhus University Hospital (AUH), where I have followed development processes and engaged with RPA specialists, users, and non-users to better understand the local implementation landscape.

2.1.1.2 How RPA Works

A typical RPA process involves several steps:

- **Trigger**: A robot is activated by a specific event (e.g., arrival of a new patient record).
- **Data Capture**: The robot extracts relevant information from an electronic system.
- **Processing**: Based on pre-defined business rules, the robot performs actions (e.g., updates a patient file, books an appointment).
- **Output**: The robot saves the results or forwards the task to a human for further action if exceptions occur.

For a visual flowchart example of an RPA-solution, see Appendix 1.

This streamlined process frees healthcare professionals from routine administrative work, allowing more time to focus on patient care.

2.1.1.3 History and Development of RPA at Aarhus University Hospital

The adoption of RPA at AUH has unfolded gradually over the past several years, shaped by a combination of organizational needs and digital transformation strategies. My collaboration with the RPA team and observations from workshops and interviews reveal a story of how local innovation often precedes top-down strategies in large healthcare organizations. From interviewing users, I learned that RPA was first introduced at AUH in response to a need for workflow optimization and resource relief. The initial pilots focused on administrative processes where manual data entry was particularly time-consuming and error-prone, such as paying bills and accounting tasks. The potential of RPA became clear when, following the introduction of a new registration system, the hospital faced a backlog of 230,000 cancer registrations requiring error correction. This incident underscored the urgency of finding solutions that could handle repetitive tasks at scale.

Early pilot projects targeted medication registration, DRG-coding, and financial processes. The success of these pilots encouraged further interest among departments, especially in areas with high administrative workloads like oncology and haematology (Information from

interviews with users). Over time, a growing number of RPA solutions were co-developed between clinical departments and the central RPA team, illustrating the collaborative, iterative nature of technological innovation at AUH. However, despite this momentum, RPA's growth has been organic and decentralized rather than systematically planned. My interviews with the RPA team and staff across departments confirm that there has never been a formal strategy for widespread RPA adoption. Instead, departments often learn about existing solutions by chance, through informal networks, personal connections, or sporadic communications. While some projects are initiated centrally, many arise from local needs identified by departments themselves. This ad hoc diffusion has led to an uneven uptake of RPA across AUH: while some departments have embraced RPA extensively, 40 out of 81 sub-departments remain unengaged or have only one or two solutions in place, often limited to centrally mandated projects[1].

2.1.1.4 Current Status of RPA at Aarhus University Hospital (AUH)

As of May 2025, AUH has implemented 323 RPA projects across a wide range of administrative functions, including medication registration, DRG-coding, appointment scheduling, and inter-system data transfers. These projects have collectively freed up an estimated 132,484 hours. Time that would otherwise have been spent on manual administrative tasks. In addition to the completed projects, 222 more solutions are considered ready for development, with an estimated 30,000–40,000 hours of additional time savings yet to be realized. However, adoption remains uneven: The BI-portal data shows that 40 out of 81 departments have not yet engaged meaningfully with RPA, often due to a lack of awareness, capacity, or structured support. RPA development at AUH is largely driven by departmental initiative, with departments expected to propose ideas or request existing solutions. While this decentralized model enables local responsiveness, it also creates challenges for scaling successful solutions across the organization. The RPA team continues to manage a growing backlog of requests, balancing the development of new robots with the maintenance of existing ones[1].

2.1.1.5 Challenges

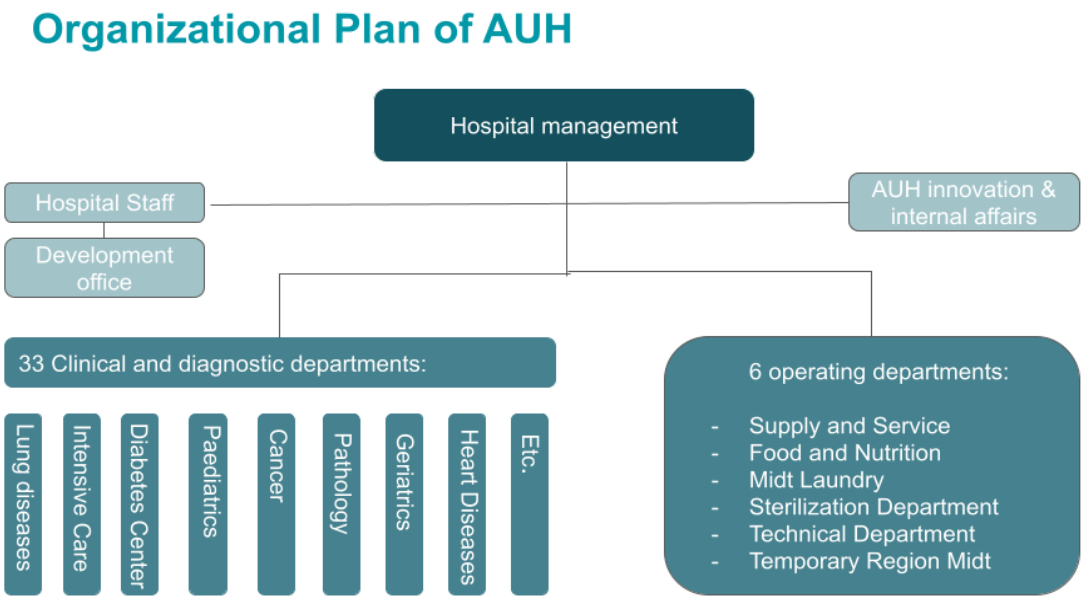
My empirical data, drawn from interviews, observations, and document reviews, highlight several key challenges that shape the current RPA landscape at AUH.

[1] Numbers Extracted from the Buisness-intelligens Portal at the intranet of AUH. Available upon request.

First, there is a tension between local ownership and organizational coordination. While department-level autonomy allows for tailored RPA solutions, it also leads to fragmentation, making it difficult to scale successful robots across the hospital. Many effective solutions remain confined to their original context, with no clear pathways for broader dissemination. Second, resource limitations in the RPA team constrain their capacity to support scaling, conduct proactive outreach, and identify new opportunities. The small size of the team limits its ability to meet the growing demand for RPA across departments. Third, communication gaps hinder knowledge sharing. Many departments remain unaware of existing RPA solutions or the process for requesting support, reflecting a lack of structured channels for disseminating information and promoting engagement. Fourth, there is a lack of education and capacity-building. No formal training or onboarding exists to introduce staff to RPA, and no designated roles (such as “RPA champions”) are in place to support local engagement and knowledge sharing. Finally, AUH’s decentralized governance structure, while valuable for clinical autonomy, creates barriers to coordinated learning, standardization, and hospital-wide scaling of RPA. These challenges indicate that while RPA has demonstrated clear value at AUH, its future success depends on addressing structural and cultural barriers, strengthening knowledge infrastructures, and fostering a shared understanding of RPA’s potential within the organization.

2.2 Organizational Context: Aarhus University Hospital

Aarhus University Hospital is a large, highly decentralized organization. While strategic oversight and resource allocation are managed by the central hospital leadership (Hospitalsledelsen), operational autonomy is distributed across more than 80 clinical departments, each with its own management structure, budget, and priorities. Middle management layers, such as functional managers (*funktionsledere*) and cross-departmental forums, facilitate local decision-making and coordination within specific units (“AUH - Ledelsesmodel og ledelsesgrundlag” 2025). This decentralized structure fosters local innovation, enabling departments to adapt technologies like RPA to their specific needs. However, it also creates significant barriers to scaling and knowledge sharing. My empirical data, drawn from interviews, observations, and document reviews, highlight that successful RPA solutions often remain confined within the departments that developed them. Many departments are unaware of existing robots or how to access support, leading to parallel development efforts and underutilization of proven tools.



Figur 1. Organizational Plan of AUH. Kilde: https://www.fagperson.auh.dk/om-os/ledelse-organisering/organisationsplan

These organizational dynamics directly impact the thesis's problem formulation: How can knowledge sharing and scaling of RPA solutions be strengthened in a large, complex healthcare system like AUH? Understanding AUH's governance model is essential for addressing this question, as the lack of formal mechanisms for cross-departmental learning and the limited capacity of the central RPA team hinder broader dissemination. From a techno-anthropological perspective, this situation illustrates how infrastructuring work, building and maintaining knowledge flows, relationships, and shared practices, is critical but often overlooked in digital transformation efforts (Karasti and Blomberg 2018; Star and Ruhleder 1996). Addressing these challenges requires not just technical solutions, but careful attention to the organizational, cultural, and ethical dimensions of RPA implementation.

2.3 Research Gap

While research on Robotic Process Automation in healthcare is growing, it remains fragmented and often narrowly focused. My literature search, including studies by Van der Aalst et al. (2018), Talukdar al. (2023) and Nimkar et al (2024), reveals that much of the existing research emphasizes technical challenges, short-term efficiency gains, or isolated project case studies. These contributions offer valuable insights into the technical feasibility of RPA, yet they often overlook the broader organizational and infrastructural dynamics that shape how RPA is embedded and scaled within complex healthcare systems. There is

limited exploration of how knowledge about RPA is shared across departments, how organizational structures influence adoption, and how cultural and ethical concerns, such as trust, autonomy, and professional identity, affect implementation in practice. This gap is particularly striking given the growing recognition that technologies like RPA are not just tools, but parts of larger socio-technical systems that shape and are shaped by human values, routines, and institutional structures (Hendry, Friedman, and Ballard 2021; Karasti and Blomberg 2018; Star and Ruhleder 1996). This thesis seeks to address this gap by investigating RPA at Aarhus University Hospital not only as a technical solution, but as a living infrastructure, a network of practices, relationships, and negotiations that influence how RPA solutions are developed, shared, and scaled across the hospital. By centering the perspectives of healthcare professionals and situating RPA within its organizational context, this study aims to contribute a more nuanced understanding of how digital transformation unfolds in large, complex healthcare settings.

Having outlined the technological, organizational, and ethical context of RPA implementation at AUH, and identified a research gap in the existing literature, the following section presents the problem formulation that guides this thesis.

3 Problem Statement

This thesis investigates the following problem:

"How do infrastructural practices, organizational structures, and socio-technical conditions at Aarhus University Hospital support or hinder the scaling and knowledge sharing of RPA solutions, and how can a more coordinated strategy for sustainable digital transformation be developed?"

This problem formulation builds directly on the preceding analysis of RPA's role at AUH, where empirical findings reveal significant barriers to knowledge sharing and scaling within a complex, decentralized healthcare organization.

3.1.1 Research Questions

To explore this problem in depth, the thesis is guided by the following research questions:

1. How do existing infrastructural practices and organizational structures influence the scaling of RPA solutions at Aarhus University Hospital?
2. What barriers and enablers for knowledge sharing exist across departments and professional groups?
3. How do healthcare professionals at AUH perceive the value, limitations, and future potential of RPA in their work practices?
4. What strategic recommendations can be developed to support a more coordinated, sustainable approach to digital transformation at AUH?

These research questions serve as a roadmap for the thesis, guiding both the analysis of empirical data and the development of theoretical insights.

3.1.2 Purpose of the Thesis

The purpose of this thesis is to contribute to a deeper understanding of how Robotic Process Automation is integrated, shared, and scaled within the healthcare sector, specifically at Aarhus University Hospital. By investigating the socio-technical, organizational, and infrastructural conditions shaping RPA adoption, this thesis aims to identify barriers and opportunities for a more cohesive and ethically responsible digital transformation strategy. Through this analysis, the thesis seeks to provide recommendations that can inform practice, policy, and future research in the field of healthcare automation.

4 Theoretical and analytical frame

This thesis takes a techno-anthropological perspective, understanding technology not as isolated artifacts but as socio-technical infrastructures shaped by human practices, institutional cultures, and ethical concerns (Botin, L ; Børsen, T 2024). This perspective informs the choice of theoretical frameworks and the analysis throughout. This chapter outlines the theoretical and analytical framework used in the thesis. To understand the socio-technical, organizational, and ethical dynamics shaping the scaling and knowledge sharing of Robotic Process Automation at Aarhus University Hospital, the chapter brings together multiple lenses: infrastructuring, value-sensitive design, ethical technology assessment, and organizational learning. Infrastructuring serves as the primary analytical perspective, offering insight into the invisible and relational work involved in building, maintaining, and adapting technological systems. The additional frameworks complement this lens by providing

perspectives on how values are embedded in design, how ethical implications are anticipated, and how knowledge is shared (or lost) in complex healthcare settings.

4.1 Infrastructuring as an Analytical Lens

Infrastructuring, as a theoretical and methodological concept, offers a powerful lens through which to examine how digital technologies such as RPA's are implemented, adapted, and scaled in complex organizational contexts like AUH. Rather than focusing on infrastructure as a static, completed system, infrastructuring emphasizes the processual and relational nature of infrastructure - as something that is continually shaped, maintained, and negotiated through practice (Star and Ruhleder 1996; Karasti and Blomberg 2018). In the context of RPA, infrastructuring is particularly relevant because it draws attention to how administrative automation is not simply a matter of deploying technical tools, but also about reshaping existing workflows, reallocating roles, and managing evolving interdependencies between people and systems. Infrastructure, in this view, is not just a background setting but an active and dynamic socio-technical construct that supports, conditions, and sometimes constrains human action (Bowker, Geoffrey C.; Star, Susan Leigh. 1999).

4.1.1.1 Defining Infrastructuring

The concept of infrastructuring was developed within Science and Technology Studies (STS) and Participatory Design (PD) traditions and has since become a cornerstone in understanding the ongoing nature of digital transformation. Infrastructuring refers to the process of integrating and adapting digital tools (e.g., RPA) within existing work practices. This includes reconceptualizing work in the context of current, potential, or envisioned technologies (Pipek and Wulf 2009). A key distinction from traditional Information Systems (IS) design lies in its emphasis on the users' broader and more situated perspective. Rather than seeing users as passive recipients of technology, infrastructuring highlights their active role in shaping, reconfiguring, and maintaining digital systems in everyday contexts. This is especially relevant in the hospital environment, where diverse professional roles and departmental silos influence how technologies are adopted and interpreted.

4.1.1.2 Key Concepts and Methodology

Infrastructuring involves a variety of activities and dynamics that help to understand how digital tools are not just implemented but lived with, repaired, and transformed.
Among the key features are:

- **Structuring and Moderating Activities:** Infrastructuring methodologies aim to structure and support the alignment between technologies and organizational practices, similar to classical IS design frameworks (Pipek and Wulf 2009).
- **Negotiation and Adaptation:** It emphasizes the importance of allowing room for ongoing negotiation of technology use, even after implementation. This flexibility is essential for ensuring that the system remains relevant and usable across contexts (Karasti and Blomberg 2018).
- **Breakdowns and Visibility:** Infrastructuring often becomes visible in moments of breakdown or misalignment, when technologies fail to function as intended. These breakdowns are not failures but opportunities for repair, reconfiguration, and innovation (Star and Ruhleder 1996).
- **Infrastructural Inversion:** The concept of infrastructural inversion is central to infrastructuring analysis. It urges us to look beneath the surface of smooth operations to understand the invisible labor, routines, and assumptions embedded in infrastructure (Bowker, Geoffrey C.; Star, Susan Leigh. 1999).
- **Historical and Situated Practices:** Infrastructuring draws attention to the historical layering of technologies and practices. What is considered “infrastructure” is often shaped by past choices, institutional norms, and professional identities (Karasti 2014).

In short, infrastructuring provides a dynamic, context-sensitive way of studying RPA not as a finished object, but as something continuously co-produced in practice.

4.1.1.3 Analytical Application in the Thesis

In this thesis, infrastructuring serves as the primary theoretical lens for analyzing empirical material from observations, interviews, and workshops. It guides the analysis of how RPA solutions are not simply introduced into departments at AUH, but rather how they are negotiated, localized, and stabilized, or in some cases, not scaled, depending on the surrounding organizational and technological contexts. For instance, the concept helps illuminate why some RPA solutions remain isolated within individual departments despite being technically replicable elsewhere. It also frames the importance of intermediary roles, such as administrative coordinators and “local champions,” who mediate between centralized innovation teams and departmental realities. Furthermore, the infrastructuring lens supports the investigation of communication infrastructures at AUH, both formal (e.g., EPJ (Electronical Patient Journal) forums, intranet announcements) and informal (e.g., peer-to-peer exchanges, cross-departmental networks), and their role in enabling or hindering the sharing and adaptation of RPA tools. By applying infrastructuring as a theoretical and

analytical framework, the thesis does not merely track the diffusion of technology but investigates the socio-technical work required to make automation meaningful, sustainable, and scalable within a decentralized healthcare organization.

4.2 Value-Sensitive- Design

While Infrastructuring provides a lens to understand how technologies are shaped in practice, Value Sensitive Design adds a normative dimension, highlighting the values embedded in design and the need for participatory, reflective processes.

4.2.1 Value-Sensitive Design: Accounting for Human Values in Healthcare Technologies

As automation technologies like continue to expand within the healthcare sector, it is no longer enough to focus solely on technical functionality or efficiency gains. We also need to ask: What values are embedded in these systems? Whose voices and needs shape their design? And how can we ensure that digital transformation in healthcare remains both ethically sound and socially desirable?

To explore these questions, I draw on the framework of Value-Sensitive Design (VSD), a theoretically grounded approach that places human values at the center of technological design. Developed by Batya Friedman and colleagues, VSD rests on the fundamental insight that technologies are never value-neutral: they shape, and are shaped by, the moral, cultural, and institutional contexts in which they are used (Friedman et al. 2020; Hendry, Friedman, and Ballard 2021). In the context of healthcare, this means that even “invisible” tools like RPA scripts carry assumptions about what counts as valuable work, who holds responsibility, and how tasks should be organized. VSD is pluralistic and interdisciplinary in its foundation, drawing on moral and political philosophy to highlight values such as autonomy, justice, accountability, and human dignity. It rejects one-size-fits-all solutions and instead promotes context-sensitive design that is attentive to diverse stakeholder perspectives (Hendry, Friedman, and Ballard 2021). This makes VSD especially relevant for healthcare, where technologies intersect with complex professional roles, patient relationships, and institutional norms.

Methodologically, VSD unfolds through an iterative process that combines:

- **Conceptual investigations** to identify relevant values and stakeholders

- **Empirical investigations**, such as interviews, workshops, or observations, to explore how values are experienced, interpreted, and sometimes contested in practice;
- **Technical investigations** that examine how design decisions promote or hinder specific values in real-world systems (Friedman, Kahn, and Borning 2003). Tools like value scenarios, stakeholder mapping, and techniques for surfacing value tensions, such as “value dams and flows” (Friedman et al. 2020), help designers and researchers anticipate ethical dilemmas, explore potential trade-offs, and co-create solutions that balance competing interests. A core insight of VSD is that values are often in tension. For instance, in healthcare automation, the drive for efficiency can conflict with concerns about transparency or professional autonomy. As scholars like Verbeek (2011) and Kozlovski (2022) argue, these tensions should not be smoothed over but instead made visible, providing a foundation for critical reflection and ethical negotiation (Kozlovski 2022; Verbeek 2011) .

VSD also recognizes that power dynamics shape who gets to define problems, set priorities, and influence design outcomes (Jacobs et al. 2021).In complex institutions like hospitals, it is often decision-makers or IT specialists who frame technology projects, sometimes at the expense of those who use the systems every day. VSD calls for inclusive processes that actively engage diverse stakeholders, including frontline healthcare professionals and patients, to ensure that design decisions reflect a plurality of needs and perspectives. Critiques of VSD point to challenges in defining values across different cultures and in operationalizing ethical principles in real-world design. Some scholars argue that VSD can benefit from integrating complementary theories, such as discourse ethics, or the capability approach, to enhance its normative depth and practical relevance. In this thesis, I apply VSD in two key way (Cenci, and Cawthorne 2020). In this thesis, First, it is used to fram the analysis of workshop reflections with nurses and secretaries at AUH, where participants explored future scenarios of automation and reflected on how technologies might impact trust, responsibility, professional identity, and patient care. Here, VSD helps interpret these reflections as ethically meaningful, not just personal opinions, but insights into what kind of healthcare system staff hope to build, and the values they want it to embody.

Second, VSD supports the analysis of barriers to scaling RPA solutions. By highlighting how value conflicts, such as tensions between efficiency and transparency, or between centralized control and local autonomy, can hinder the adoption of otherwise successful technologies, VSD shows that scaling is not merely a technical challenge but also an ethical one. It complements the infrastructuring perspective by focusing on how implicit assumptions

about what “good” technology looks like can become hidden barriers to broader implementation. Ultimately, VSD shifts the focus from simply asking "Does it work?" to a deeper question: "What truly matters?” And how can we design systems that reflect the ethical commitments and professional values at the core of healthcare?

4.2.1.1 VSD and Techno-Anthropology

From a techno-anthropological perspective, Value-Sensitive Design (VSD) adds a realy nice perspective. Both traditions share a commitment to understanding technology not as isolated artefacts, but as socio-technical systems shaped by and shaping human practices, institutional cultures, and moral landscapes (Børsen and Botin 2013). They emphasize the importance of situated knowledge and the idea that ethical and practical insights emerge through engagement with real-world contexts. Adding to that the need for reflexive, participatory processes that involve those who live and work with technologies in shaping their development (Jacobs et al. 2021; Botin, L ; Børsen, T 2024).

Where techno-anthropology advocates for humanizing technological change through ethnographic inquiry, participatory design, and critical reflection, VSD offers a structured framework and practical tools for identifying, surfacing, and negotiating values within design processes (Hendry, Friedman, and Ballard 2021). VSD complements the essens of techno-anthropology by turning broad commitments to inclusivity, fairness, and human dignity into concrete design questions: Whose voices are heard? What trade-offs are being made? And how can we ensure that technology serves the diverse needs and aspirations of its users? This thesis argues that values are not abstract ideals to be considered after the fact, nor are they secondary to technical functionality. Rather, they are integral to design itself: embedded in the systems we build, shaping how people work, relate to one another, and experience care. By integrating VSD with a techno-anthropological lens, this thesis approaches digital transformation in healthcare not as a purely technical or organizational process, but as a deeply human, ethical, and relational phenomenon, one that demands ongoing dialogue, reflection, and shared responsibility (Suchman 2006; Børsen and Botin 2013).

4.3 Combining Value Sensitive Design and Ethical Technology Assessment

Value Sensitive Design has become a well-known framework for incorporating human values into technology design. It emphasizes participatory methods and stakeholder involvement to uncover what values matter to people in specific contexts (Friedman et al. 2013). This makes VSD particularly useful in complex fields like healthcare, where multiple perspectives

and values intersect. However, VSD has also been criticized for not going far enough in addressing normative and political questions, such as which values should take precedence when they conflict, or how technology might reinforce existing power structures (Manders-Huit 2011). In other words, while VSD is good at helping us listen, it doesn't always help us judge. This is where Ethical Technology Assessment (ETA) can strengthen the approach. ETA is an evaluative framework that explicitly engages with ethical questions, critically examining potential risks, benefits, and value trade-offs of technology in a broader societal and ethical context (Palm and Hansson 2006). While VSD helps us understand what matters to people, ETA helps us ask, "*Is this the right thing to do?*" and "*What kind of future are we creating with this technology?*"

By combining Value Sensitive Design and Ethical Technology Assessment, this thesis brings together the strengths of both frameworks: the participatory, context-sensitive approach of VSD (Friedman et al. 2020) and the normative, critical reflection of ETA (Palm and Hansson 2006; Botin, L ; Børsen, T 2024). This integrated perspective not only helps surface the values and priorities of those affected by technology but also offers a structured means to critically evaluate design choices, ensuring they align with broader ethical principles such as justice, fairness, and autonomy (Beauchamp and Childress 2001). Especially in sensitive fields like healthcare, where technologies can profoundly shape human relationships, care practices, and professional roles, this combination supports a more responsible and reflective approach to design and decision-making. This focus on inclusion resonates closely with the principles of discourse ethics (Yetim 2011), which emphasize that ethical participation must go beyond mere consultation. Meaningful engagement requires conditions for open, equitable, and reasoned dialogue, where stakeholders can express concerns, challenge assumptions, and co-define values. This perspective reinforces the commitments of VSD (Friedman et al. 2020) and ETA (Palm and Hansson 2006; Botin, L ; Børsen, T 2024), by highlighting that ethical design is not just about identifying abstract values but about creating democratic spaces where value conflicts can be openly negotiated. In the context of healthcare, this means recognizing the experiential knowledge of frontline staff and patients as epistemically valid (Fricker 2007), not secondary to technical or managerial expertise.

4.4 Ethical Technology Assessment: A Techno-Anthropological Approach to Evaluating Technology

4.4.1.1 Why Ethical Technology Assessment?

Technologies are never neutral. They reflect and shape societal values, cultural norms, and ethical principles. In healthcare, where technologies directly affect human lives, relationships, and well-being, it is essential to assess not only their technical functionality but also their ethical desirability. Ethical Technology Assessment (ETA) offers a structured framework for this task, asking not just *what works*, but *what is right*. As Børsen and Botin (2024) argue, technology assessment must go beyond technical specifications to consider the actual, potential, intentional, and unintentional consequences of technologies within society. From a techno-anthropological perspective, ETA is a bridge between technical expertise and the lived experiences, values, and concerns of stakeholders, whether patients, clinicians, managers, or citizens. It acknowledges that technologies are embedded within complex socio-technical, historical, and political contexts, and that any assessment must consider not just the technology itself, but also how it interacts with people, practices, and institutions (Botin, L ; Børsen, T 2024). This approach is particularly relevant in healthcare, where innovations can reshape professional roles, patient experiences, and organizational structures.

4.4.1.2 The QPeTA Model: A Practical Framework for Ethical Reflection

At the core of this thesis's ethical analysis is the Quick and Proper Ethical Technology Assessment (QPeTA) model, developed by Børsen and Botin (2024). QPeTA provides a pragmatic, accessible framework for identifying and reflecting on the ethical dimensions of technology. It is grounded in *common-sense morality*, the idea that while ethical principles may be widely shared, their application often involves complex, context-dependent judgments (Beauchamp and Childress 2001). QPeTA emphasizes that ethics is not merely a theoretical exercise but a practical, iterative process of asking questions, considering consequences, and making informed decisions. The model structures ethical reflection around seven key criteria:

1. Intended Beneficial Consequences – What positive outcomes is the technology designed to achieve?
2. Potential Misuse – Could the technology be exploited in harmful or unintended ways?
3. Unintended Adverse Side Effects – What negative outcomes might emerge unintentionally?

4. Long-Term Societal Consequences – How might the technology influence societal structures, relationships, and values over time?
5. Linkage to Ethical Values – How do the anticipated outcomes, risks, and side effects relate to core ethical principles?
6. Identification of Unethical Situations and Ethical Dilemmas – Where do clear ethical violations occur, and where do competing values create dilemmas?
7. Formulation of Design and Policy Recommendations – What changes in technology design or institutional practices could mitigate ethical concerns?

QPeTA thus encourages an iterative, participatory approach to ethics, recognizing that technologies and their contexts evolve over time, requiring ongoing reflection and adaptation. Ethical Principles: Beauchamp's Common Morality:

Principle	Definition & Relevance for Technology Assessment
Respect for Autonomy	Upholding individuals' right to make informed choices about their care and work. Essential when technologies influence decision-making, consent, or agency.
Non-Maleficence (Do No Harm)	Avoiding unnecessary harm or suffering; critical in evaluating risks and side effects of technologies.
Justice	Ensuring fairness, equity, and equal access to benefits; key for addressing disparities in technology deployment.
Beneficence (Do Good)	Promoting well-being and positive outcomes beyond technical efficiency.
Privacy	Safeguarding personal information, especially in digital health and data-intensive systems.
Compassion	Fostering empathy, care, and relational sensitivity in technological design and use.
Humility, Authenticity, Social Stability	Emphasizing transparency, caution, and responsibility in development.
Stewardship and the Precautionary Principle	Considering environmental impacts and long-term societal effects.

QPeTA is grounded in Beauchamp and Childress's framework of common morality, a set of widely (though not universally) shared ethical principles that serve as normative guides for evaluating technologies. These principles provide a normative compass, helping assess whether a technology promotes human dignity, justice, and well-being, or risks undermining them (Beauchamp and Childress 2001).

4.4.1.3 Ethical Concerns and Dilemmas: Navigating Complexity

Ethical Technology Assessment acknowledges that ethical dilemmas are inherent in technological development. Unlike unethical situations, where clear violations of norms occur (e.g., discrimination, harm), dilemmas arise when core values such as autonomy, safety, efficiency, and equity come into tension. For example, in healthcare, automating administrative tasks through RPA may improve efficiency but could also erode human relationships, introduce new risks, or marginalize less digitally literate patients. Identifying and navigating these tensions is a core task of ETA, requiring context-sensitive, participatory reflection.

4.4.1.4 Techno-Anthropology: Bridging Expertise and Experience

Applying ETA within a techno-anthropological framework means involving diverse stakeholders, nurses, secretaries, patients, IT developers, in the assessment process. It recognizes that technologies are not isolated tools but embedded in social, cultural, and organizational contexts, and that ethical assessments must consider lived experiences, values, and aspirations alongside technical specifications (Botin, L ; Børsen, T 2024).
This thesis adopts an iterative, participatory approach to ethical assessment:

- Stakeholder reflections from interviews and workshops provide empirical grounding for the analysis.
- QPeTA's assessment criteria and Beauchamp's ethical principles guide the evaluation of RPA technologies.
- Ethical concerns and dilemmas are identified, explored, and linked to concrete design or policy recommendations.

By combining structured reflection with real-world input, ETA becomes not a static checklist but a dynamic, collaborative process, one that helps ensure healthcare technologies are not only functional but also aligned with the values that matter most: care, fairness, trust, and human dignity.Together, VSD and ETA provide a critical framework for navigating value tensions and ethical dilemmas. To understand how technologies are actually adopted, adapted, or resisted in complex organizations, we must also consider implementation factors, which the CFIR framework addresses.

4.4.2 The Consolidated Framework for Implementation Research (CFIR): A Framework for Understanding Barriers and Facilitators in Implementation

Implementing new technologies in complex organizations like hospitals is rarely a simple or linear process. When we introduce a solution like Robotic Process Automation into a healthcare setting, it's not enough to ask, *"Does it work?"* We also need to understand, *"What factors help or hinder it from becoming part of everyday practice?"*

This is where the Consolidated Framework for Implementation Research (CFIR) becomes a valuable tool. Developed by Damschroder et al. (2009), CFIR was created to bring together insights from a wide range of existing theories and models into one coherent framework. By doing so, CFIR offers a practical guide for researchers and practitioners who want to explore *why* some interventions take root and spread, while others struggle to gain traction. CFIR emerged from a need to make sense of the many different factors that influence implementation, factors that span from the design of the technology itself to the organizational culture and the broader political or economic environment. It draws inspiration from theories such as Rogers' *Diffusion of Innovations*, Greenhalgh's *Model of Diffusion in Service Organizations*, and Fixsen's work on *core components of implementation* (Damschroder Et al 2015; Everett M. Rogers 2003; Greenhalgh et al. 2007; Fixsen et al. 2009).

4.4.2.1 The Structure of CFIR: Five Domains that Shape Implementation

CFIR organizes the complexity of implementation into five key domains, each highlighting different aspects that can either support or hinder success:

Domain	What it Covers
Intervention Characteristics	How is the technology perceived? Is it flexible, adaptable, or too complex?
Outer Setting	What external factors shape implementation—such as policies, regulations, or societal expectations?

Inner Setting	How does the organization's culture, structure, leadership, and resources influence implementation?
Characteristics of Individuals	What knowledge, attitudes, and motivation do the people involved bring to the table?
Implementation Process	How is the intervention rolled out? Are there clear plans, engagement strategies, feedback mechanisms?

Each domain is broken down into more detailed constructs, such as *complexity*, *compatibility*, *communication*, *leadership engagement*, *available resources*, and *learning climate*. These constructs offer a structured way to analyze qualitative data and make sense of the many factors influencing an implementation effort.

It's important to note that CFIR isn't a checklist that must be rigidly followed. Instead, it's a flexible, guiding framework that helps researchers and practitioners organize their thinking, ask the right questions, and identify where challenges, and opportunities, might lie.

4.4.2.2 Why CFIR is Useful for This Thesis

In this thesis, CFIR will serve as an analytical lens for understanding the barriers and enablers related to the sharing and scaling of RPA solutions at Aarhus University Hospital. Through interviews with both users and non-users of RPA, CFIR provides a structure for identifying and organizing the complex factors that influence whether RPA becomes an integrated part of hospital workflows. By applying CFIR, this thesis aims to provide a more nuanced understanding of the challenges and opportunities for scaling RPA at Aarhus University Hospital. It offers a systematic way to link the barriers identified in the interviews with broader structural and organizational factors, helping to identify where targeted actions and strategies can be developed to support a more coordinated and sustainable digital transformation.

5 Methodology

This chapter outlines the methodological approach guiding this thesis. It explains how the research design, data collection, and analytical strategies are shaped by the problem

formulation and the research questions, ensuring alignment between empirical work, theoretical frameworks, and analytical focus.

5.1 Science-Theoretical and Techno-Anthropological Perspective

This thesis is grounded in a social constructivist and interpretivist perspective on knowledge and technology. Rather than treating Robotic Process Automation as a neutral, technical tool, I approach it as something whose meaning and function are shaped through human interactions, organizational practices, and broader socio-technical structures (Fricker 2007). Technologies do not simply "exist" in the world, they are co-constructed by the people who design, implement, use, and reflect on them. This interpretive approach aligns with hermeneutics and phenomenology, which emphasize understanding human experience from the perspective of those living it (Manen 2016). My focus is therefore not to seek universal or objective truths, but to explore how healthcare professionals, such as secretaries, nurses, and IT staff, make sense of RPA in their everyday work. Their reflections provide insights into not only how automation works, but how it shapes workflows, professional identities, and ethical concerns.

This perspective is deeply informed by techno-anthropology, which highlights the relational and contextual nature of knowledge creation (Børsen and Botin 2013; Jacobs et al. 2021). In techno-anthropology, knowledge is seen as situated: it emerges through interactions between people, technologies, and institutions, rather than being something we simply "discover" out there. This is why my thesis focuses on the voices and reflections of healthcare professionals, acknowledging their lived experiences as central to understanding what RPA means, not just technically, but also socially, ethically, and professionally. I also recognize that as a researcher, I am not a neutral observer. My background, assumptions, and values inevitably shape the research process, and I engage reflexively with these throughout the study. This reflexivity is an essential part of interpretive, hermeneutic research (O'Reilly 2009), reminding us that knowledge is always co-created, emerging through dialogue, reflection, and shared inquiry. By combining social constructivism, hermeneutics, and techno-anthropology, this thesis seeks to understand RPA not as a purely technical solution, but as a phenomenon embedded in a complex, value-laden healthcare system. This approach allows for a more nuanced exploration of how automation affects workflows, professional roles, and ethical considerations, dimensions often overlooked in technical or managerial studies.

5.2 Research Design and Methodological Strategy

This thesis employs a qualitative, multi-method research design to explore how RPA is embedded, shared, and scaled within the socio-technical landscape of Aarhus University Hospital. The choice of methods is guided by the problem formulation and research questions, as well as by a social constructivist and interpretivist epistemology (Burr 2015) Rather than seeking generalizable truths, this study aims to understand the situated and relational dynamics of RPA implementation as experienced by healthcare professionals in their everyday work. This approach acknowledges that knowledge is co-constructed, emergent, and shaped by context (Børsen and Botin 2013; Jacobs et al. 2021). A qualitative research design emphasizes rich, contextual insights into human experiences and practices, allowing for an in-depth exploration of how people make sense of technology in complex organizational settings (O'Reilly 2009). This thesis integrates several qualitative methods, ethnographic observation, semi-structured interviews, and participatory workshops, in a strategy of methodological triangulation. Methodological triangulation refers to the use of multiple qualitative methods to explore a phenomenon from different angles, not to validate a singular "truth," but to develop a richer, more nuanced understanding. Each method offers distinct insights into the research problem: ethnographic observation reveals the tacit and often invisible dynamics of daily work practices (O'Reilly 2009); semi-structured interviews provide in-depth narratives and reflections (Spradley 2003) and participatory workshops facilitate collaborative exploration of values, concerns, and hopes for the future (Simonsen and Robertson 2012; K. Bødker, Kensing, and Simonsen 2010). Together, these methods allow for a multi-perspective analysis of how RPA technologies are negotiated, understood, and implemented across AUH's diverse organizational contexts. This approach aligns with the techno-anthropological perspective underpinning the thesis, emphasizing the co-construction of knowledge between researcher and participants, and the entanglement of technology, values, and professional practice (Børsen and Botin 2013; Jacobs et al. 2021).

5.3 Data Collection Methods

This section outlines the data collection methods used in the thesis, explaining how empirical insights were gathered through interviews, workshops, and field observations. It describes the rationale behind the chosen methods, how they support the research aim of exploring the barriers and enablers for scaling RPA in healthcare, and how they enable a participatory, human-centered understanding of the issues at hand. The section also clarifies the role of these methods in generating rich, situated knowledge that forms the basis for the analysis and conclusions.

5.3.1.1 Ethnographic Observation and Methodology

For this thesis, I adopted ethnographic observation as my primary qualitative approach, aiming to explore how RPA is embedded in the daily work practices at Aarhus University Hospital. Ethnography, as described by O'Reilly, is rooted in deep immersion within a social context to gain nuanced insights into behaviors, interactions, and cultural dynamics. Central to this approach is balancing observation, carefully documenting without interference, with participation, engaging in interactions to understand the participants' experiences (O'Reilly 2009). My fieldwork took place within AUH's RPA team. After securing access and approval, I met with the team leader to clarify expectations, outline the study's objectives, and establish my role as an observer. This initial meeting offered important context on the team's structure, ongoing projects, and organizational dynamics. I then conducted a full-day immersive observation at the RPA office, where I shadowed team members in their daily work, taking note of interactions, workspace arrangements, and informal discussions. I observed internal team meetings, documenting how tasks were assigned, progress reviewed, and challenges addressed, which provided a valuable understanding of the RPA team's role within the wider hospital. In addition to structured observations, I engaged in informal "walk-and-talk" conversations with RPA developers as we moved between the office and clinical departments. These spontaneous dialogues offered rich insights into developers' perspectives, challenges, and reflections on collaboration with clinical staff, enriching my understanding of the nuanced, often tacit knowledge shaping RPA work (O'Reilly 2009; Spradley 2003). I also observed several meetings between the RPA team and clinical stakeholders at different stages of project collaboration. For instance, an introductory session with the Neurology Department revealed how automation solutions were introduced, discussed, and sometimes met with skepticism or curiosity. At the Steno Diabetes Center, I witnessed contrasting dynamics: one meeting exposed the challenges secretaries faced in articulating workflows, prompting a more technical, screen-sharing approach, while another featured a physiotherapist with prior RPA experience, enabling a more interactive and collaborative dialogue. Throughout these observations, I maintained detailed field notes, capturing settings, interactions, and emerging themes. These notes, reviewed and thematically analyzed, helped trace how strategies, challenges, and perspectives evolved across meetings and departments. Reflexivity was an integral part of this process. As O'Reilly emphasizes, ethnographers must remain critically aware of how their presence influences the field (O'Reilly 2009). My background as an intensive care nurse at AUH provided access and familiarity but also risked introducing assumptions or blind spots. I addressed this by keeping a reflexive journal, documenting how my positionality shaped interactions, and adjusting my approach to foster authentic engagement.

Ethical considerations were central throughout. Participants were fully informed about the study's purpose, their rights, and how data would be anonymized and stored securely in accordance with GDPR and Danish data protection standards ("GDPR" 2025). Informed consent was obtained orally or in writing, and confidentiality rigorously maintained. While my observations provided valuable context and depth, a limitation of this study is the inability to follow a single RPA project longitudinally from inception to implementation. Instead, my fieldwork spanned multiple projects and stages, offering breadth but limiting the ability to capture the full lifecycle of individual RPA solutions. Future research could build on these insights by conducting longitudinal studies of specific RPA implementations.

5.3.1.2 Access – Ethnographic Access

Ethnographic research fundamentally involves gaining access to the cultural and organizational context being studied. According to O'Reilly (O'Reilly 2009), gaining ethnographic access requires both formal approval and informal acceptance within the community. My long-standing employment at Aarhus University Hospital (AUH) as an intensive care nurse significantly facilitated this process. With sixteen years of experience, I was familiar with the hospital's structure, terminology, organizational culture, and daily practices. This familiarity eased my entry into the field, allowing for smoother communication and quicker rapport-building with the research participants. However, my insider status also posed methodological considerations. As O'Reilly emphasizes, reflexivity is crucial in ethnography. My pre-existing knowledge might have created biases or blind spots in my observation and interpretation. I continuously acknowledged these potential biases in my reflective journal, trying to maintain awareness of assumptions and perspectives that could influence my analysis. Gaining access to the field was straightforward; I directly contacted relevant individuals via AUH's email system, quickly securing permissions and engagement.

5.3.1.3 Gaining Insight into the RPA Team

Initially, my intention with ethnographic observation was to identify challenges within the RPA team's work processes or in their communication with users. Given my professional experience as a nurse, I anticipated uncovering issues related to technology integration and user communication. Yet, through systematic observation of the RPA team's interactions with various hospital departments, my initial assumptions were challenged. I observed effective communication, clear explanations, and well-structured collaboration processes between the RPA team and clinical users. These observations provided essential background knowledge that significantly shaped the focus and direction of my thesis. Importantly, the observational phase did not directly contribute to the primary analytical data,

but proved invaluable as context and background. Insights from these ethnographic observations allowed me to craft precise and relevant interview questions for subsequent interviews. The nuanced understanding I gained ensured that my semi-structured interviews could explore deeper issues rather than superficial or misguided assumptions. Furthermore, observing the successful interactions and implementations provided me with valuable comparative examples, enabling me to critically reflect on cases where technological integration does not function effectively. While the observational phase did not generate primary analytical data for the analysis chapters, it was invaluable in informing the development of interview questions and ensuring a more focused and relevant line of inquiry. Observing both successful and more challenging interactions helped me refine my problem statement and guided the subsequent stages of my research.

5.3.2 Interviews

5.3.2.1 Interviews with Non-Users

During one of the Walk-and-talks with a member of the RPA-team, she reflected on the fact that the RPA-solutions are not very much being adapted to or re-used or implemented into other departments with similar worktasks and workflows. This made me identify the need to talk to the departments that are not using the solutions - The non-users.

To explore why some hospital departments did not engage with the RPA solutions, I conducted semi-structured interviews informed by O'Reilly's ethnographic principles (O'Reilly 2009), which emphasize open-ended inquiry and active listening. Initially, I interviewed my immediate leader at the Intensive Care Unit. Due to the spontaneity of this interaction, I relied on detailed field notes rather than recordings. My leader expressed surprise at the lack of awareness regarding RPA solutions, attributing this oversight to AUH's siloed organizational structure. She explained how departments tend to prioritize internal management and resources, hindering cross-departmental knowledge sharing. Subsequently, I interviewed two secretaries at the Intensive Care Unit, who also were non-users. Their limited awareness echoed the leader's reflections, confirming issues around internal communication and knowledge dissemination. After describing potential RPA functionalities, both secretaries showed notable interest and planned to explore further integration possibilities. These interactions underlined organizational silos as a significant barrier to technological innovation within the hospital.

5.3.2.2 Interviews with users

To gather detailed insights into the experiences, attitudes, and reflections of both healthcare professionals and managers regarding RPA solutions, I conducted semi-structured qualitative interviews. Inspired by James Spradley's ethnographic interview method (Spradley 2003), these interviews aimed to elicit context-specific knowledge by encouraging participants to share detailed narratives, clarify terminology, and reflect deeply on their experiences. The participants in these interviews included two leading secretaries from different departments, both highly experienced users who had been involved with RPA solutions from their inception. Additionally, I interviewed a hospital administrative officer (AC fuldmægtig), who was one of the key figures behind implementing the very first RPA robot at AUH.

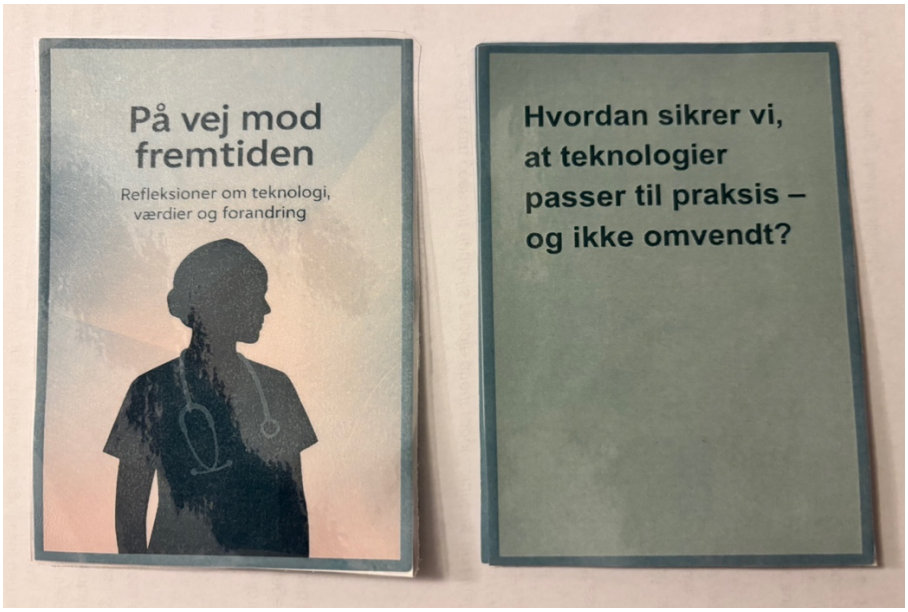
Following Spradley's guidelines, I structured the interviews around open-ended questions designed to encourage participants to elaborate on their experiences and reflections (See Appendix 2 and 3). The conversations began broadly, focusing on general experiences with RPA, then progressively narrowed to specific aspects of functionality, significance, and knowledge sharing within their departments. This approach facilitated a natural dialogue, allowing participants to express their perspectives freely while ensuring coverage of core research themes. Each interview was audio-recorded and supplemented by detailed notes to capture nuances and contextual details. I transcriped the recordings using GoodTape ("Good Tape" 2025), corrected them, and the dat formed the basis for thematic analysis (O'Reilly 2009), which revealed insights into the practical implications, challenges, and perceived values associated with RPA usage at AUH.

5.3.3 Workshops with Healthcare Professionals

I facilitated participatory workshops (see appendix 4 for structure), designed to explore how healthcare professionals at AUH reflect on and make sense of automation in their daily work. Rooted in participatory design traditions (S. Bødker 2000; Simonsen and Robertson 2012) and Value Sensitive Design (Friedman, Kahn, and Borning 2003; Le Dantec, Poole, and Wyche 2009), the workshops aimed to bringout values, concerns, and hopes related to the integration of Robotic Process Automation (RPA) and other digital tools in healthcare. The sessions combined scenario-based reflection (Carroll 2000), with reflection cards, a participatory method that invites open-ended dialogue by prompting participants to consider ethical dilemmas, practical challenges, and future visions. This approach is grounded in the idea that technologies are not neutral artefacts, but socio-technical assemblages shaped by, and shaping, human practices, relationships, and ethical priorities (Star and Ruhleder 1996).

By involving frontline professionals in critical reflection, the workshops aligned with participatory design's core tenet: that those affected by technological change should have a voice in shaping it (Simonsen and Robertson 2012).

An example of a reflectioncard:



Each of the four workshops lasted approximately 30 minutes and involved 25 participants in total, including nurses, healthcare assistants, coordinators, and administrative staff. The sessions were held in small groups to encourage dialogue across roles and hierarchies, fostering diverse perspectives. The workshops began with an open-ended prompt; "What is a robot?", designed to elicit participants' existing understandings, assumptions, and experiences of automation before introducing specific scenarios or examples. This strategy, drawn from ethnographic inquiry (O'Reilly 2009), and participatory design methods (S. Bødker 2000), helped uncover latent ideas and tacit knowledge about technology that might otherwise remain unspoken.

Following the introductory question, I facilitated discussions using the reflection cards, which covered topics such as autonomy, fairness, responsibility, trust, and the human dimensions of care. These questions were designed to encourage participants to reflect not just on the functionality of RPA, but also on its potential impacts on professional identity, patient relationships, and organizational dynamics. This method resonates with the Value Sensitive Design approach of surfacing stakeholder values early in the design process (Friedman, Kahn, and Borning 2003; Le Dantec, Poole, and Wyche 2009) and with techno-anthropological perspectives that view technologies as embedded in specific cultural,

institutional, and relational contexts (K. Bødker, Kensing, and Simonsen 2010; Jacobs et al. 2021).

The workshops were audio-recorded and supplemented by observational field notes, focusing on both the content of the discussions and the affective, relational dynamics within the groups, such as moments of enthusiasm, hesitation, or disagreement (Pols 2012). This reflexive attention to process aligns with the co-constructive ethos of participatory design, where knowledge is generated collaboratively, and the research setting itself becomes a space for mutual learning (Sanders and Stappers 2008). Ultimately, the workshops served as both a data collection method and an intervention, fostering critical awareness among participants and supporting an ongoing dialogue about the role of technology in their professional lives. By inviting healthcare professionals to imagine, question, and articulate their values, the workshops contributed to a more nuanced, ethically informed understanding of how RPA, and automation more broadly, is perceived and situated in the everyday realities of clinical work.

5.4 Analytical strategy and Theoretical framework

5.4.1.1 Theory, Methods, and a Techno-Anthropological Lens

This thesis builds on a multi-layered analytical framework that brings together theory, empirical insights, and my own professional perspective as a nurse and techno-anthropologist. My aim has been to explore how infrastructural practices, organizational structures, and socio-technical conditions at Aarhus University Hospital either support or hinder the scaling and knowledge sharing of RPA solutions, and, how we might create a more coordinated strategy for digital transformation in healthcare. I have approached the analysis as a techno-anthropologist: asking questions, being curious, and paying attention to the lived realities of people working in a complex healthcare system (Børsen and Botin 2013). This means seeing RPA not just as a technical solution, but as something that is deeply intertwined with human values, professional identities, organizational structures, and cultural norms. It means looking at how people work with technology, how they adapt and negotiate it in practice, and how it, in turn, reshapes their work.

5.4.1.2 A Techno-Anthropological Perspective: Connecting People, Technology, and Systems

Techno-anthropology, as an approach, encourages me to step into the everyday worlds of healthcare professionals, to explore how they make sense of RPA, and how technologies are embedded in broader infrastructures of care, knowledge, and power. I want to give them

a voice. It emphasizes the importance of context, culture, and meaning-making, andmake ask not just: “What works?”, but also “For whom?”, “In which situations?”, and “At what cost?” (Børsen and Botin 2013; Botin, L ; Børsen, T 2024)

This lens has been essential for me in bridging the technical and the human sides of innovation: observing how RPA solutions emerge from the collaborative efforts of the RPA team and frontline staff, understanding how knowledge flows or stalls across professional and organizational boundaries, and identifying ethical dilemmas that might otherwise go unnoticed in a purely technical assessment.

5.4.1.3 Theoretical Anchors: Infrastructuring, CFIR, Mintzberg, and Ethical Reflection

The primary lens for the analysis is the concept of infrastructuring (Karasti and Blomberg 2018) which let me see the often invisible, ongoing work of building, maintaining, and adapting socio-technical systems. Infrastructuring emphasizes that technologies like RPA are not simply “plug-and-play” solutions, but part of complex connections of relationships, practices, and evolving needs in the healthcare system. To understand the organizational structures at AUH, I have used Mintzberg’s theory of professional bureaucracies (Mintzberg 1979), which helps explain how hierarchies, silos, and professional autonomy shape the diffusion, or stagnation, of innovations like RPA. His framework gives me concepts, to discuss the structural conditions that impact knowledge sharing, such as distributed decision-making, fragmented responsibilities, and the limited “bandwidth” of leaders and staff.
The Consolidated Framework for Implementation Research (CFIR) (Damschroder Et al 2015), provides a systematic guide for coding and analyzing the barriers and enablers of RPA implementation. CFIR’s categories; inner setting, outer setting, intervention characteristics, individual characteristics, and process, helped me structure the complex landscape of healthcare change. For the ethical and reflective part, used Value Sensitive Design (VSD) (Friedman, Kahn, and Borning 2003) and Ethical Technology Assessment (ETA) (Botin, L ; Børsen, T 2024). These frameworks allowed me to explore how healthcare professionals think about the ethical implications of automation, from concerns about fairness and safety to visions of the healthcare system of the future. They helped me ensure that my analysis engaged not just with practical challenges, but also with the deeper values, hopes, and concerns that shape how technology is received and imagined.

5.4.1.4 Analytical Process: From Data to Insights

My analysis has been an iterative process, moving between theory, data, and reflection—constantly guided by the techno-anthropological mindset of being attentive to the situated practices and experiences of people working in healthcare. I began by coding the interview data thematically, guided by CFIR and Mintzberg (O'Reilly 2009; Damschroder Et al 2015), while also listening for insights about everyday workarounds, informal knowledge sharing, and the "hidden infrastructures" that enable or hinder RPA diffusion. For the workshop data, I applied VSD and ETA to brinng out the ethical reflections, values, and visions for the future of automation in healthcare. This provided a normative perspective that complemented the more structural and process-focused analysis of the interviews. Infrastructuring remained the thread that tied everything together, this as a reminder that innovation is not a linear process, but an ongoing, collaborative effort that unfolds within specific social, cultural, and organizational contexts.

5.4.1.5 Why This Approach?

This analytical strategy reflects my commitment to understanding both the technical and the human sides of innovation. As a techno-anthropologist, I believe it's not enough to ask whether RPA solutions are efficient or scalable, we also have to ask what they mean for the people who use them, what values they support or undermine, and how they fit into the broader infrastructure of care. By combining theoretical perspectives with deep engagement in the field, I aim to contribute to a more nuanced, human-centered understanding of digital transformation in healthcare - one that recognizes both the potentials and "what-to-be-aware-of when using technologies.

5.5 Literature Search

The literature for this thesis was gathered through a mix of structured searching and more exploratory strategies, depending on the purpose of each section. For the background section on RPA, I started by searching through Primo ("Primo" 2025), the Online Library at Aalborg University, which gave me 89 results. However, only a few of them turned out to be truly relevant for the healthcare context I'm focusing on. I selected a handful of useful sources and followed their reference lists to identify additional materials. Since there isn't much academic literature specifically on RPA in healthcare, I also drew on internal resources from Aarhus University Hospital. The RPA department has a very informative internal webpage where they describe what RPA is, how they use it, and what their vision for the

technology is. (Material from the closed intranetside at AUH can be provided by request). This gave me a solid practical understanding to complement the academic sources. In all cases, I aimed to use sources that were either peer-reviewed or produced by recognised institutions with expertise in healthcare technology, to ensure a high level of credibility. For the theory section, I used Scispace (“SciSpace” 2025), to go through the abstracts and chose the articles that best supported the theoretical framework I wanted to build. Again, I prioritised peer-reviewed journal articles and publications from established researchers in the field. When it came to methods literature, especially for interviews, I mainly relied on texts recommended by my supervisors or readings we’ve used throughout the Techno-Anthropology programme. They aligned well with the participatory and reflective approach I’ve taken in this thesis.

5.6 Ethical Considerations

This researchis connected to ethical standards for qualitative research, ensuring that participants’ rights, privacy, and well-being were protected throughout the study (Brinkmann and Kvale 2018). All participants were fully informed about the purpose of the project, the voluntary nature of their involvement, and their right to withdraw at any time. Informed consent was obtained either in writing or verbally prior to participation. To protect confidentiality, all data were anonymized, and personal identifiers were removed from transcripts and field notes. Data were stored securely in accordance with the European Union’s General Data Protection Regulation (“GDPR” 2025), ensuring compliance with standards for data protection and privacy in research. As a researcher with an insider position at Aarhus University Hospital, I maintained a reflexive stance throughout the study, actively reflecting on how my background and professional relationships might influence the research process (O’Reilly 2009). I addressed these ethical concerns by keeping a reflective journal and discussing potential biases in supervision meetings. This reflexivity aimed to minimize undue influence on participants’ contributions and ensure a respectful and open research environment.

6 Analysis

This analysis seeks to explore the organizational, infrastructural, and socio-technical factors that support or hinder the scaling and knowledge sharing of RPA solutions at AUH. The identified barriers help explain why RPA solutions often remain localized, while the ideas and reflections contribute to developing a more coordinated strategy

for sustainable digital transformation, thereby directly addressing the problem statement of this thesis.

6.1 Partial analysis 1

6.2 Barriers and Opportunities for Scaling and Knowledge Sharing of RPA at AUH

This first part of the analysis takes a closer look at the barriers and opportunities for scaling and sharing knowledge about RPA at AUH. By drawing on organizational theory (Mintzberg 1979), the Consolidated Framework for Implementation Research (Damschroder Et al 2015) and perspectives from infrastructuring (Karasti and Blomberg 2018). The analysis explores how structures, resources, communication channels, and organizational culture shape the spread and use of RPA solutions. The analysis is based on insights from interviews with healthcare professionals across departments, offering a grounded, human perspective on how technology meets practice in a complex healthcare setting. This part of the analysis directly addresses the problem statement by shedding light on the challenges and possibilities that healthcare professionals themselves identify when it comes to expanding RPA in a sustainable and ethically responsible way. Understanding these systemic dynamics is crucial for ensuring that future RPA development doesn't just happen for the sake of efficiency, but also supports staff, aligns with core healthcare values.

6.2.1 Organizational Structures: Silos, Roles, and Fragmentation

Organizational structures significantly influence whether knowledge about innovations such as RPAs can be effectively shared and scaled within complex institutions like AUH. Interviews reveal that structural divisions, silo thinking, unclear responsibilities, and limited collaboration between departments pose considerable barriers.

6.2.1.1 Silo Thinking and Fragmentation

AUH, similar to many large public institutions, is characterized by structural silos, reflecting what Mintzberg (1983) describes as a classic machine bureaucracy, highly specialized and compartmentalized, with clearly defined hierarchies. While this specialization helps maintain clarity in roles and responsibilities, it also inherently restricts cross-departmental collaboration and knowledge sharing (Mintzberg 1979). As a leading head nurse an non-user illustrates: *"Sometimes I think we're just in our own little silo, our own little bubble, our own budget, our own solutions."* This sentiment underlines a widespread dynamic: departments are focused on internal operations, budgets, and performance metrics, inadvertently limiting

openness to ideas and innovations developed elsewhere. Without mechanisms to bridge these silos, promising ideas often remain isolated, resulting in fragmented islands of innovation rather than unified, scalable solutions.

6.2.1.2 Lack of Shared Strategy and Ownership

A related but distinct barrier is the absence of a clearly articulated, centrally coordinated strategy or framework guiding RPA deployment across AUH. As an administrative officer, reflects: *"It's absolutely true that there hasn't been much organization around it."*
Without a shared strategy, RPA initiatives often remain local, uncoordinated, and dependent on individual enthusiasm rather than institutional support. As highlighted by CFIR, the absence of a coordinated implementation plan, clearly articulated goals, defined roles, and systematic feedback loops, can severely hinder the scaling of innovations (Damschroder Et al 2015). The data from the interviews underscores this point: RPA development occurs in an ad hoc manner, shaped by personal initiative rather than an organization-wide vision.
This lack of strategic guidance also limits the ability to build shared infrastructural practices across the hospital. Infrastructuring theory emphasizes that scaling innovations requires ongoing, relational work, creating shared understandings, routines, and practices that bridge organizational boundaries (Karasti 2014). Without such efforts, promising ideas risk stalling at the local level rather than spreading across the institution. The issue of ownership further compounds this challenge. As a secretaty explains:

> *"It's really about the area you work in. If it's something that involves secretaries and administrative tasks, then it's within that area. If it's something to do with blood samples or medication administration, then of course it's a nurse's responsibility."*

This lack of clarity leads to what one participant described as a persistent question in their daily work: *"Who owns the robots?"*. This reflection underscores the practical challenges of scaling RPA solutions across professional domains, where the absence of an ownership model results in promising innovations stalling in organizational gaps. CFIR highlights that implementation success depends on assigning clear roles and responsibilities (Damschroder Et al 2015) a crucial factor currently missing in AUH's RPA efforts.

6.2.1.3 Professional Boundaries and Knowledge Domains

The challenge of professional boundaries further complicates scaling. As a secretary notes: *"Ordinary clinical staff wouldn't think about it in their daily work... It's probably more us who sit at desks who notice things occasionally or get an idea."*
These distinctions illustrate how domain-specific knowledge and routines shape perceptions

of RPA. Mintzberg's analysis of professional bureaucracies points out that entrenched norms can limit innovation diffusion, while infrastructuring theory emphasizes the need for collaborative spaces to bridge these divides (Mintzberg 1979; Karasti and Blomberg 2018). At AUH, such spaces are limited, constraining interdisciplinary engagement and shared learning around RPA.

6.2.2 Resource Constraints and Capacity Challenges

This section analyzes how limited resources, competing priorities, and capacity constraints affect the implementation and scaling of RPA solutions at AUH. It examines the organizational bottlenecks and structural barriers that influence the RPA team's ability to support departments effectively, highlighting the need for systemic solutions to address capacity gaps and sustain digital transformation.

6.2.2.1 Limited Capacity in the RPA Team

Resource constraints emerged as a prominent barrier across interviews, limiting the RPA team's capacity to respond to ideas, provide support, and scale solutions. As one of the secretaries, directly states: *"You're stopped by the lack of resources."*.This frustration is echoed by another secretary:

> *"It's frustrating when we suddenly come up with a great idea, and they say, 'That's a really good project, we'll definitely proceed with it, it's feasible,' but then, 'Unfortunately, we won't have time for you until 2025.' We were ready to start last year."*

This mismatch between demand and capacity undermines momentum, creating disillusionment and weakening the readiness for change (Damschroder Et al 2015). My own reflection builds on this: "If we could achieve a 20% time-saving across departments on adapting RPAs to other departments with similar workflows, it would free up time and resources for further development", but such potential remains unused due to capacity gaps.The problem is not merely a question of resources but also of prioritization: without a strategic, hospital-wide approach, RPA risks being treated as an add-on rather than a core component of digital transformation (Mintzberg 1979).

6.2.3 Fragile Knowledge Sharing Practices

This section highlights how fragmented communication and informal knowledge sharing hinder the integration of RPA at AUH. It argues that without formal structures, RPA risks remaining a niche initiative rather than a shared, strategic resource.

6.2.3.1 Ad-Hoc Communication and Random Knowledge Flows

Knowledge sharing at AUH is characterized by ad-hoc, informal practices that are not systematically embedded in the organization. As one of the secretaries puts it:
"It just kind of happens randomly. There's no real structure for how we're informed. It depends on who happens to be at work that day." This reliance on chance interactions and individual initiative creates a fragile system where the success of knowledge dissemination depends heavily on who happens to be present and engaged. A secertary reflects on this precariousness:

> *"For example, we talk about it at the meetings of the administrative leadership council. That's where I would say, 'Now we've got a really great idea.' But again, it depends on who's present at the meeting that day, who thinks it could fit into their department, or who has the time to think about it."*

6.2.3.2 Tacit Knowledge and Lack of Awareness

Another layer of this challenge is the dependence on tacit knowledge, the unwritten, experiential understanding that remains locked within specific roles and individuals. As a secretary admits:
"It's helpful if it's someone who knows the workflow." Without structures to surface and share this knowledge, RPA solutions risk remaining invisible to many. Infrastructuring theory emphasizes that knowledge does not flow automatically through systems but must be cultivated through interaction, a process of making implied knowledge explicit and connecting it across domains (Karasti 2014).

Some existing structures for knowledge sharing where information is disseminated through departmental representatives, were mentioned as potential solutions. However, interviews suggest that this model remains insufficient. A leading secretary reflects:

> *"That's what we're trying to do with the cascade model, where we say that Health-IT and finance hold these joint meetings. We actually expect the departments to send representatives... but I don't think the administration will agree to allocate resources to go out and implement in detail like that."*

This reinforces CFIR's point that passive dissemination is not enough, active facilitation, support, and follow-up are essential to translate information into action (Damschroder Et al

2015). Without these mechanisms, knowledge sharing remains inconsistent, and promising innovations struggle to gain traction across AUH.

6.2.4 Cross-Cutting Reflection: The Need for a Strategic, System-Wide Approach

Across these themes, the analysis points to a fundamental insight: the barriers to scaling and knowledge sharing of RPA at AUH are not just technical but deeply structural and organizational. Siloed communication, fragmented responsibilities, professional divides, and limited resources create a system where innovations like RPA struggle to move beyond isolated pilots. As Mintzberg (1983) and CFIR emphasize, successful scaling requires strong leadership, clear roles, dedicated resources, and robust communication practices. Infrastructuring theory (Karasti & Blomberg, 2018) adds that these elements must be cultivated through ongoing, relational work that bridges boundaries and builds shared practices.

Without a hospital-wide commitment to building capacity, aligning strategies, and fostering a culture of learning, RPA risks remaining an isolated initiative rather than a transformative force in AUH's digital future.

6.2.5 Infrastructure and IT System Barriers: Contextual Limits to Scaling RPA at AUH

While this thesis focuses primarily on organizational, cultural, and knowledge-sharing barriers, it is important to acknowledge the structural constraints imposed by AUH's digital infrastructure. Interviews reveal that RPA is often perceived as a "patchwork", a temporary fix layered on top of fragmented systems. As secretary puts it*, "RPA is essentially patchwork—repairs we're doing on top of our big system."*

6.2.5.1 System Fragmentation and Lack of Interoperability

This patchwork reality reflects a broader issue of system fragmentation and lack of interoperability across IT systems. Multiple interviewees highlighted how closed systems, rigid legacy platforms, and slow change processes limit the potential for RPA to scale. As one noted, *"AUH has over 100 different IT systems/apps,"* creating cognitive overload and technical silos. From an infrastructuring perspective this fragmentation undermines the collaborative, relational work needed to embed and scale RPA solutions (Karasti 2014).

6.2.5.2 Vendor Dynamics: Conflicting Incentives Between Public and Private Sectors

Vendor dynamics further complicate the picture. As a secretary explained, private-sector vendors often prioritize proprietary solutions over shared, interoperable systems, creating dependencies that reinforce silos rather than fostering integration. This tension between public-sector needs and vendor incentives limits AUH's ability to develop a cohesive digital strategy, reflecting a key barrier identified in Mintzberg's theory of professional bureaucracies (Mintzberg 1979).

6.2.6 Perceptions of Risk, Dependence, and the Future of RPA at AUH

Alongside structural, resource, and knowledge-sharing barriers, the interviews reveal a layer of perceptions and attitudes that shape how RPA solutions are viewed and engaged with at Aarhus University Hospital (AUH). These perceptions range from optimism and excitement to skepticism and fear, reflecting both the potential and the uncertainty that accompany digital transformation in healthcare.

6.2.6.1 Trust in Technology: The Expectation of 100% Reliability

Many participants expressed a deep trust in the reliability of RPA, almost a taken-for-granted belief that *"robots just work."* This perspective is captured in a comment: *Me: "What do you do if the robot crashes?" Interviewee: "I would close my eyes and think, 'That just doesn't happen.'"* This is echoede in another sentiment: *"As humans, we just think that robots, well, they run 100%, right?".* This trust reflects a common narrative in technological systems, the black-boxing of automation, where technologies, once in place, become invisible infrastructure (Star and Ruhleder 1996). While this faith can support adoption, it also risks complacency and an underestimation of potential risks, such as system failures, errors, or unexpected consequences.

CFIR identifies perceptions of intervention characteristics—including complexity, risk, and relative advantage, as key factors influencing implementation (Damschroder Et al 2015). Here, the belief in RPA's reliability may reduce resistance but also create blind spots where critical risk assessments and contingency planning are overlooked.

6.2.6.2 Concerns About Safety, Transparency, and Accountability

While trust is high, concerns about transparency and accountability also surface. A secretary shares an example:

> *"A colleague of mine had an issue where her name appeared in the patient log, as if she had been looking up patient records at night. She was asked why she had been in a patient's journal at 4 a.m. It turned out there were a series of logs*

> *showing that it must have been the robot. But we flagged it as a problem, it's been an issue. There shouldn't be a name there."*

This incident reveals a critical accountability gap: when automation takes over tasks, it can become unclear who is ultimately responsible for outcomes, particularly in sensitive areas like patient data. Infrastructuring theory emphasizes the need for transparency and traceability in complex systems (Karasti 2014). Without clear documentation and oversight mechanisms, trust in automation can mask underlying risks, leading to potential safety and legal concerns.

6.2.7 Dependency on Automation: A Necessary Trade-Off?

Participants also reflect on the broader question of dependency on automation. While some express concerns, there is an overall sense that increasing reliance on digital tools is inevitable. Lone articulates this pragmatically:

> *"No, it's a necessity to use it. If we look at the population demographics, we won't have enough staff to meet the growing demand. So we have to do it. I also think it helps ensure quality in many areas."*

This perspective aligns with CFIR's construct of tension for change, the recognition that current systems are unsustainable, creating a sense of urgency to adopt new solutions (Damschroder Et al 2015). It also reflects Mintzberg's insight that in large, complex organizations, technological interdependencies inevitably grow, making dependence on systems a structural reality (Mintzberg 1979). Yet this acceptance of dependency also raises questions about resilience: what happens when systems fail, vendors withdraw support, or technologies become obsolete? Infrastructuring theory warns against "over-infrastructuring", reliance on systems without continuous reflection and adaptation (Pipek and Wulf 2009). Without ongoing engagement, dependency can become a vulnerability rather than a strength.

6.2.8 The Future of RPA and Digital Transformation in Healthcare

Looking forward, participants envision a future where digital tools and automation play an even greater role, not just in administrative tasks, but across clinical workflows, patient pathways, and system-wide processes. A participant reflects on this potential:

> *"There are no limits. In theory, you could... I mean, the technology definitely already exists to create AI-generated care pathways for individual patients.*

> *Including everything, booking appointments, reminders, preparing patients before visits, even where they should park that day. There are no limits. But I think it all comes down to economics."*

This forward-looking perspective illustrates what infrastructuring theorists call imaginaries, visions of how technology might reshape work, care, and institutions (Karasti 2014). It reflects both hope (for efficiency, quality, and innovation) and caution (economic constraints, ethical considerations, and unintended consequences).

6.2.9 The Human Factor in a Digital Healthcare System

A secretay adds a more grounded, ethical perspective:

> *"Let's use our resources in a different way. But it's hard to say that out loud, because you also know it means we'll have fewer staff, at least in my job category."*

This statement highlights the value tensions inherent in automation: efficiency gains may come at the cost of job security, professional identity, and human connection, this raising fundamental questions about the future of care work.

Another secretary offers a broader reflection on the future of healthcare professionals in a digital system:

> *"One thing is coming up with a good idea, but another thing is transforming all professional groups; doctors, nurses, secretaries, social care assistants, therapists, whoever, into having a digital mindset. And I think that's a big task. Most people know their own tasks and are very focused on what they're doing. But we have to hire the healthcare staff of the future. It has to be part of the job requirements that you think digitally. You need to think about automation, learn to integrate it into your work."*

Her words resonate deeply with infrastructuring theory, which emphasizes that technology adoption is not just about tools, it's about cultivating new practices, mindsets, and identities (Karasti 2014)The future of RPA at AUH will depend not only on systems and processes but also on people's capacity to adapt, learn, and collaborate.

7 Partial analysis 2

7.1 Ideas for Knowledge Sharing and Expansion of RPA Solutions at AUH

This second part of the analysis explores ideas and reflections on how to strengthen knowledge sharing and expand the use of Robotic Process Automation (RPA) solutions at Aarhus University Hospital (AUH). Based on insights from interviews with both users and non-users of RPA, as well as reflections gathered throughout the thesis work, this section identifies key strategies such as building stronger communication channels, fostering distributed ownership, and embedding a proactive, collaborative approach to RPA adoption.

This analysis connects directly to the problem statement by offering a deeper understanding of what it would actually take, beyond just technical solutions, to support the sustainable growth of RPA in a complex healthcare system. By highlighting concrete ideas from staff on the ground, this section aims to inform a more strategic, participatory approach to RPA development—one that respects the realities of healthcare work, empowers staff to take part in shaping the future of automation, and ensures that solutions are meaningful, fair, and ethically sound.

7.1.1 Formalizing Communication Channels for Knowledge Sharing

A recurring theme across the interviews is the lack of structured, reliable communication channels for disseminating information about RPA solutions at AUH. While knowledge sharing has been discussed extensively in Partial Analysis 1, where issues like fragmented communication, reliance on chance encounters, and ad-hoc practices were identified, this section focuses on solutions proposed by staff to strengthen and systematize knowledge flows. Participants consistently suggested that formalizing communication channels could help address the uneven diffusion of RPA solutions. One key idea was to establish a regular newsletter from the RPA team, distributed through existing platforms like the EPJ Forum and professional leadership forums. As a secretary proposed:

> *“If they could just send a list from the RPA team about which robots have been deployed or are about to be deployed to the EPJ Forum or somewhere else, then you can see: ‘Okay, that sounds interesting, that’s a solution for us.’”*

This practical, low-threshold idea illustrates how making existing knowledge visible and accessible could inspire departments to explore potential solutions. The suggestion to model the newsletter after BI's (Buisness Intelligence Portal at AUH) quarterly updates reflects a lightweight infrastructural intervention, what Mintzberg (1979) would call a liaison device, facilitating cross-departmental knowledge flow in a complex organization. As a interviewee reflected:

> *"I really think it would be good to have a newsletter from the RPA department, just quarterly. Like BI sends out, a really nice newsletter: 'This new report has just been released, and it can do this and that.' That's great because it inspires you, and you think, 'Could we use that for something?'"*

Beyond newsletters, participants suggested leveraging existing forums like the Health Administrative Leadership Council and Registration-ERFA group as key infrastructural nodes for RPA dissemination. These forums, as discussed in Partial Analysis 1, already gather relevant stakeholders, head secretaries, department managers, and registration-responsibles, who are well-positioned to act as knowledge brokers. However, as a secretary noted, their potential remains underutilized:

> *"We have a forum called the Registration-ERFA, where the registration-responsible contact persons come together. The last meeting was just canceled, but we had actually planned for the RPA team to come and tell us about the solutions that exist, what the robots do, and encourage people to go back and look at their own department and think about whether they have something similar."*

This reinforces the point that while forums exist, systematic use is lacking. From an infrastructuring perspective (Karasti 2014), these forums could serve as relay stations for knowledge transfer, but only if supported by a consistent agenda, prepared updates, and clear expectations for cascading information back to departments. Another key insight was the need to tailor content for diverse audiences. As emphasized by a secretary:

> *"It must be more understandable for the average nurse, secretary, doctor, or leader. I think a lot is already being done because it's also featured in Midt-News... but I don't really know how it could be sorted. There should be some sort of filtering based on which department you're in. What could be relevant for you? Where do you work? What do you do? What could be relevant for your professional group?"*

This call for audience-specific communication echoes Wenger's (1998) principle of making knowledge actionable and context-relevant and aligns with CFIR's focus on tailoring implementation strategies to local needs (Damschroder Et al 2015; Wenger, E 1998). Finally, participants highlighted the critical role of leadership engagement in enabling knowledge sharing, an insight also explored in Partial Analysis 1. As one participant put it: *"It's also very important to reach the department leaderships."*. CFIR emphasizes that leadership endorsement shapes implementation climate and uptake. Without it, even the best communication efforts risk falling flat. Therefore, formalizing communication practices must include active leadership involvement to ensure RPA solutions are not just announced but endorsed and integrated into departmental priorities.

In summary, staff ideas for formalizing knowledge sharing emphasize simple but effective measures: regular newsletters, structured updates at existing forums, tailored communication by audience, and leadership engagement. These suggestions align with infrastructuring theory's focus on building relational, context-sensitive infrastructures (Karasti 2014) and CFIR's emphasis on implementation climate and communication networks (Damschroder et al 2015). These suggestions are not just "nice to have" additions, they are essential infrastructural practices for supporting knowledge flow in a large, complex organization like AUH. Without them, the risk is that RPA solutions will remain isolated pockets of innovation, unable to achieve their full potential as part of a coordinated, hospital-wide strategy for digital transformation.

7.1.2 Embedding RPA Awareness and Responsibility in Departments: Towards Distributed Ownership and Digital Mindsets

A striking theme throughout the interviews is the need to embed responsibility for RPA within the fabric of departmental structures at AUH. As discussed in Partial Analysis 1, the current system leaves responsibility for RPA diffuse and undefined, resulting in a lack of ownership, sporadic engagement, and a tendency for promising ideas to "fall through the cracks." Staff reflected on the importance of assigning clear roles:*"During implementation, it's really important that someone has the responsibility. When responsibility is shared, everyone leaves it to someone else."* This insight resonates with Mintzberg's (1979) observation that complex organizations need clear roles to prevent fragmentation, and with Argyris and Schön's (1978) argument that double-loop learning requires deliberate structures for feedback and responsibility (Mintzberg 1979; Argyris and Schön 1978). A concrete solution suggested by myself is to establish a "robot-responsible" in each department, someone who could act as a local champion, liaise with the RPA team, and ensure ongoing engagement with automation opportunities. This idea aligns closely with CFIR's concept of "champions"

(Damschroder Et al 2015), individuals who promote and sustain innovation in their local contexts. However, participants also acknowledged the practical challenge of creating such roles in a resource-constrained system: *“Our secretary already has plenty to do, and they have many committees to attend. But someone has to take the responsibility to look at the email and act on it.”* This tension highlights the need for RPA awareness to be embedded into existing job roles and workflows, rather than added as an extra burden. As a participant pointed out:

“It’s really Health-IT that has the responsibility for creating intro courses for the registration-responsible, and then integrating into the job description that they also have the responsibility to think about digital solutions. That could actually be done.”

This perspective suggests a pragmatic path forward: creating a distributed network of “RPA ambassadors” by formally incorporating RPA awareness into existing roles, such as registration-responsibles. This model could help overcome the bottleneck created by a small, centralized RPA team and support the development of locally relevant, context-specific solutions across AUH. Importantly, participants emphasized that awareness alone is not enough, it must be supported by access to knowledge, training, and co-creation opportunities. As a secretary noted:*“Maybe they need more info or training, some kind of introduction, about what this actually is.”* This insight aligns with CFIR’s emphasis on access to knowledge and information as critical factors for implementation success (Damschroder Et al 2015). Providing introductory resources, embedding RPA in onboarding processes, and offering regular learning opportunities could help shift RPA from being seen as an “add-on” to an integral part of professional practice. Ultimately, embedding RPA responsibility into departments is not just a technical fix, it’s a cultural shift. As a participant articulated:

“One thing is coming up with a good idea, but another thing is transforming all professional groups; doctors, nurses, secretaries, social care assistants, therapists, whoever, into having a digital mindset. And I think that’s a big task… We have to hire the healthcare staff of the future. It has to be part of the job requirements that you think digitally. You need to think about automation, learn to integrate it into your work.”

This reflection underscores a central point: the future of RPA at AUH depends not just on systems and processes, but on building a workforce that is ready and willing to engage with automation as a collaborative, everyday part of their work. As Karasti and Blomberg (2014) remind us, infrastructuring is an ongoing, relational process, one that requires continuous negotiation, learning, and adaptation across technical, organizational, and human domains (Karasti 2014).

7.1.3 Proactive Outreach and Support for Departments

A central theme emerging from the interviews is the critical need for proactive outreach to support departments in identifying opportunities for RPA, understanding existing solutions, and overcoming barriers to implementation. As discussed in Partial Analysis 1, many barriers to scaling RPA stem from siloed structures, fragmented knowledge flows, and a lack of shared strategies across AUH. This section builds on those insights by highlighting concrete staff ideas for improving support and engagement at the department level. Participants consistently emphasized that waiting for departments to discover RPA on their own is not an effective strategy, especially given the complexity of clinical and administrative workflows, time pressures on staff, and the sheer scale of AUH as an organization. As one participant put it:*"It's very hard for us to know what processes are out there. It's really different from department to department."* This reflection illustrates a fundamental infrastructural gap: while the RPA team has technical expertise, they cannot fully understand the nuanced, context-specific workflows within each department. Conversely, department staff, particularly secretaries and clinicians, may lack awareness of RPA's potential. This mutual blind spot reinforces the fragmentation highlighted in Partial Analysis 1 and hinders the diffusion of innovations across AUH. A concrete solution proposed across interviews was dedicated outreach efforts by the RPA team, either through visits or structured dialogues within departments. As one participant suggested:

> *"It would be really nice to have someone visit our department and help point out: 'That could be an opportunity.' There are also things you do every day without thinking about it, you become blind to it."*

This idea aligns with the infrastructuring perspective (Karasti 2014)emphasizing the need for relational, situated work that connects technical expertise with local practices. It also resonates with CFIR's concept of external change agents, individuals or teams who bring specialized knowledge to support local implementation efforts (Damschroder Et al 2015). However, participants acknowledged the practical limitations of a small RPA team. As a secretary noted:

> *"You won't find one person who can provide solutions for the hospital's 53 departments like that. It'll probably be hard to find something that one person can figure out what everyone could benefit from."*

This points to the need for targeted, collaborative outreach, not a one-size-fits-all solution. A hybrid model was suggested, where RPA experts partner with local staff, such as secretaries or administrative leads, to conduct joint workflow reviews. As another secretary reflected:

> *"But you could do it together with a secretary, schedule a meeting with a department secretary, of course. They'd probably have time for that. An hour-long meeting now and then."*

This model reflects situated co-design (Karasti & Blomberg, 2014) and liaison roles (Mintzberg, 1979), building personal relationships and trust to identify RPA opportunities tailored to local contexts.

Beyond initial outreach, participants stressed the importance of ongoing engagement, not just one-off visits. As one participant suggested:

> *"You could come back every three months and say: 'Now there's this, and now there's that.' Or get an overview of what they have solutions for and what they don't."*

This iterative engagement mirrors the principles of organizational learning theory (Argyris and Schön 1978), continuous reflection, feedback, and adaptation are essential for embedding innovations into complex systems. Importantly, outreach is not just about technical information,it's also about inspiration, motivation, and breaking down resistance. As one participant reflected:*"Some departments give up before they even start. The time pressure is so great that they think, 'We can't do this too"*. This highlights the need for gentle nudges: showcasing success stories, demystifying the process, and offering low-barrier entry points. As I reflected during a conversation with one of tehsecretaries in one of the interviews:

> *"You don't need to reach every department, because those that are already using them are on fire. You really just need to reach the departments that aren't using them yet and get them started, maybe just with one solution, so they can see: 'What can this do for us? How little work does it actually require once you get started?'"*

This aligns with CFIR's emphasis on readiness for implementation (Damschroder et al., 2015): support should be tailored based on a department's current stage of engagement and capacity. It also echoes the infrastructuring-as-carework perspective (Pipek and Wulf 2009): nurturing relationships, building trust, and creating a sense of shared purpose are as

important as the technical aspects of RPA design. By fostering proactive outreach, AUH can shift from a passive diffusion model,where departments wait for solutions,to an active engagement strategy that invites staff into the co-creation of a more automated, efficient, and human-centered healthcare system.

7.1.4 Ensuring Quality, Safety, and Trust in RPA Deployment

In spite of the enthusiasm for RPA's potential, a critical thread running through the interviews was a cautious, reflective concern for quality, safety, and long-term sustainability. Participants repeatedly highlighted that while RPA can streamline repetitive tasks and free up time, it is not a "plug-and-play" solution. Instead, it requires careful consideration of workflows, responsibilities, and the invisible complexities embedded in clinical and administrative processes. As discussed in Partial Analysis 1, the complexity of healthcare systems, characterized by silos, professional boundaries, and fragmented infrastructures, can make it difficult to fully anticipate the downstream effects of RPA deployment. This concern was strongly articulated by a participant, who reflected:

> *"Overall, I think the challenge with these solutions is that there are many things you have to consider when changing a registration. One thing is that it makes a nurse's job easier, but there could be reasons for that registration that neither the nurse nor the RPA team knows about."*

This insight illustrates how infrastructuring theory (Karasti & Blomberg, 2014) helps us understand RPA as more than a technical fix: it is entangled with professional logics, legal requirements, and data flows that demand careful reflection. Rather than restating theory here, the focus should be on staff suggestions: the need for rigorous quality control and ongoing dialogue between the RPA team and domain experts to ensure that solutions are not only efficient but also safe and ethically sound. Participants also expressed concerns about traceability and transparency in automated systems. As highlighted in Partial Analysis 1, issues around audit trails and accountability have already been discussed. Here, the key takeaway is the call for improved oversight mechanisms, ensuring that RPA solutions include clear documentation, logs, and responsibilities. This aligns with CFIR's constructs of perceived complexity and risk management (Damschroder et al., 2015). For example, the story of a robot unintentionally creating an audit trail under a staff member's name underscores the fragility of trust:

> *"There was a case where a colleague's name appeared in the patient log at 4 a.m., even though she hadn't been in the system. It turned out it was the robot that did it."*

This emphasizes the need for robust system design, where traceability and transparency are built into RPA solutions, not as afterthoughts, but as core elements of responsible innovation.

Participants also reflected on the limits of RPA: while robots can handle structured, rule-based tasks, they cannot replace professional judgment. As one staff member noted: *"The robot can't think or make decisions. It should be able to do more complex things in the future."* This perspective echoes Mintzberg's (1979) point that professional bureaucracies rely on expertise and discretion, not just standardization. The takeaway for future RPA development is to recognize the boundaries of automation, to design solutions that support staff, rather than undermine their autonomy. Despite concerns, there was a pragmatic recognition of RPA's necessity, driven by demographic pressures, staff shortages, and the demand for data-driven healthcare. As one reflected:

> *"No, it's a necessity. If we look at the population demographics, we won't have enough staff to meet the growing demand. So we have to do it. I also think it helps ensure quality in many areas."*

This realistic yet hopeful view aligns with the Ethical Technology Assessment (ETA) approach (Børsen & Botin, 20124): acknowledging both the benefits and risks of automation, and the need for ongoing reflection on trade-offs and unintended consequences. Finally, participants stressed that quality and safety are not one-off tasks,they require continuous monitoring, feedback, and adaptation. As a secretary noted:

"Digitalization is the way forward. That's it. We're also mandated to work on it in the administration.And we're increasingly dependent on output data. We're a data-driven hospital, and we need output data. But that data also has to be entered. And we don't have the time to input it. So the robots have to help us with that."

These reflections reinforce that RPA is a strategic enabler for AUH's future as a data-driven, patient-centered hospital, but it can only fulfill this promise if infrastructures of trust are established. This includes not only technical safeguards but also clear communication, staff involvement, and a shared understanding of what RPA is, what it can do, and where its limits lie.

8 Partial analysis 3

8.1 Technology in Healthcare: Justice, Autonomy, and the Moral Dimensions of Digital Transformation

This third part of the analysis explores the ethical reflections of healthcare professionals on the use of technology in healthcare, with a particular focus on justice, fairness, inclusion, autonomy, relational care, and trust. Drawing on rich empirical data from interviews and workshops, this section highlights how staff at AUH, experience and navigate the ethical dilemmas that arise when digital technologies, such as Robotic Process Automation, AI, and decision-support systems, are integrated into complex care environments. This analysis is a key part of answering the problem statement, as it provides a deeper understanding of the values, concerns, and hopes that healthcare professionals bring to the table when discussing technology. By giving them a voice, this section underscores the importance of designing and implementing technologies that are not only efficient but also just, inclusive, and supportive of human dignity. It also offers critical insights into the kind of participatory design processes needed to ensure that technology in healthcare aligns with the principles of fairness, trust, and care.

8.1.1 Justice, Fairness, and Inclusion in Healthcare Technologies

Healthcare practice is inherently moral, intertwined with questions of justice, fairness, and inclusion, especially when integrating technologies like Robotic Process Automation, artificial intelligence, and digital decision-support systems. At AUH, these concerns emerged strongly in interviews and workshops, where healthcare professionals reflected on technological implementations through the lenses of Value Sensitive Design (VSD) (Friedman et al. 2020), Ethical Technology Assessment (ETA) (Palm and Hansson 2006; Botin, L ; Børsen, T 2024) and Beauchamp's biomedical ethics (Beauchamp and Childress 2001). A recurring concern was that efficiency, the primary driver of many technological initiatives, may come at the expense of fairness and inclusivity. A nurse's reflection on automated shift scheduling captures this tension: *"If I don't have a say in my work plan, it's not fair. It's about my life, my family, and my ability to make plans. The system can't just decide for me."* This perspective underscores Beauchamp's principle of justice, emphasizing fair distribution of benefits and burdens, and echoes VSD's call for context-sensitive design, ensuring technology does not erode autonomy and well-being in the name of optimization (Friedman et al. 2020). The

QPeTA model further highlights the need to examine unintended consequences, even when technologies are developed for the greater good (Børsen & Botin, 2024). Concerns about procedural justice were also prominent, with staff feeling excluded from decision-making processes: *"We're rarely asked about what we need. It feels like decisions are made by people who don't understand our work."* This exclusion risks epistemic injustice (Fricker 2007), where frontline expertise is undervalued, leading to technologies that fail to fit the realities of care work. Justice concerns extended to patients, particularly in relation to telemedicine and digital platforms: *"It might be fine for me, I'm resourceful, but what about the patients who aren't? Not everyone can manage video calls or digital platforms."* This raises the issue of contextual fairness: technologies must provide equitable benefits for all, not deepen existing inequalities. Beauchamp's principle of justice and ETA's call for equitable outcomes emphasize the need for inclusive design that avoids creating digital divides (Palm & Hansson, 2006; Beauchamp, 2001).

Job security was another ethical concern, as participants questioned the long-term impacts of automation: *"If robots take over some tasks, what happens to the people whose jobs are affected?"* This reflection aligns with ETA's systemic view on technology's broader societal impacts, including employment stability (Børsen & Botin, 2024), and the precautionary principle's emphasis on anticipating and mitigating future harms (Palm & Hansson, 2006). Despite these concerns, AUH staff also articulated a hopeful vision for technology that supports human-centered care: *"If we could automate the most repetitive tasks, maybe we'd have more time to care for the patients who really need us."* This aspiration reflects Beauchamp's principle of beneficence and VSD's goal of enhancing human dignity, autonomy, and equity through thoughtful design (Friedman & Hendry, 2020; Beauchamp, 2001). From a techno-anthropological perspective (Børsen & Botin, 2013), this highlights the importance of participatory design that centers diverse voices, anticipates consequences, and ensures technologies distribute benefits and burdens fairly. In summary, healthcare professionals at AUH are not opposed to technological innovation, they advocate for ethically conscious design that promotes fairness, inclusion, and procedural justice. Technologies must reflect the lived realities of staff and patients, supporting rather than undermining human care.

8.1.2 Autonomy, Responsibility, and Trust in Healthcare Technologies

Healthcare professionals at AUH express deep concerns about how automation, such as RPA, AI, and algorithmic systems, reshapes decision-making power, professional identity, and the human dimensions of care. Their reflections reveal a complex ethical landscape:

while technology offers potential support, it also risks undermining autonomy, responsibility, and relational care.

8.1.3 Autonomy and Professional Agency

A strong theme is the fear of losing control when algorithms override professional judgment. A nurse shared: *"If I get my shifts handed to me by a robot, it feels like losing control over my life. What if I have a sick child, or I'm burned out? A system can't know that."*
This tension between efficiency and human dignity echoes Beauchamp's principle of respect for autonomy (2001) and QPeTA's critique of efficiency-first logic (Børsen & Botin, 2024). Participants stressed that decisions about schedules, workflows, or patient care must remain context-sensitive, acknowledging human realities.
Concerns about diffused responsibility also emerged: *"If the system suggests something, and I follow it, but it's wrong, am I responsible? Or do I just say it was the system?"*
This reflects ETA's warning about blurred accountability in complex socio-technical systems (Palm & Hansson, 2006) and VSD's call for user control and critical reflection (Friedman & Hendry, 2020). Participants worried that opaque systems could erode their moral agency, reducing them to passive executors rather than active, reflective professionals. Yet, participants also saw potential for technology to enhance autonomy, if designed thoughtfully. Tools that reduce administrative burdens, like voice-controlled documentation, were welcomed: *"If I could just say what I'm doing and have it documented, that would be amazing. It would save time and let me focus on the patient."*
This hopeful vision aligns with VSD's focus on supporting professional agency and QPeTA's emphasis on enabling human judgment within automated systems.

8.1.4 Empathy, Relational Care, and the Human Touch

Healthcare professionals consistently emphasized that while technology can assist with tasks, it cannot replace the relational core of care: *"A robot might fetch things, but it can never give empathy or comfort."* This reflects Beauchamp's principle of beneficence (2001) and VSD's emphasis on embedding human values like empathy and dignity into system design (Friedman & Hendry, 2020). Participants warned that poorly designed systems risk reducing care to a checklist, stripping away the tacit, embodied knowledge that underpins relational care (Star and Ruhleder 1996). One nurse reflected: *"Maybe I'd prefer a robot to wash me instead of a colleague,it depends. But the robot wouldn't know if I was in pain. It wouldn't know when to stop."* This highlights QPeTA's concern for unintended side effects (Børsen & Botin, 2024): automation may increase efficiency but risks depersonalizing care. Participants also expressed hope that technology could support relational care by freeing up time: *"If a robot could fetch supplies and tidy up the ward, we'd have more time to sit with*

patients, hold their hand, and just be there." This vision reinforces the need for participatory design processes that prioritize human presence over pure efficiency.

8.1.5 Vulnerability, System Fragility, and Resilience

A recurrent concern was vulnerability in the face of system failures. Participants described how reliance on digital tools can backfire: *"When the system goes down, we're left standing there. And it's always the most vulnerable patients who pay the price."* This aligns with ETA's call for anticipating unintended harms (Palm & Hansson, 2006) and Beauchamp's principle of non-maleficence (2001). Technologies must be designed with robustness, redundancy, and fallback plans to ensure resilience. Participants warned against over-reliance, emphasizing the need to maintain manual skills: *"The more we rely on robots to mix meds or systems to tell us what to do, the less we remember how to handle things ourselves."*
This highlights the infrastructural perspective: technologies are embedded in social systems, and resilience depends on human preparedness (Jacobs et al., 2021). Practical strategies, training, backup systems, and regular drills, were suggested as critical safeguards.

8.1.6 Transparency and the Right to Know

Transparency was seen as key to fostering trust and safe use. As one nurse put it:
"If the system flags a result, and I just follow it blindly, have I really made a decision?"
This raises the risk of nontransparent "black box" systems undermining clinical autonomy, as highlighted in VSD's call for explainability (Friedman & Hendry, 2020), and ETA's focus on scrutinizing embedded values (Palm & Hansson, 2006). Participants stressed the need for functional transparency, accessible explanations of system capabilities and limitations:
"I don't need every line of code, but I need to know when to trust the system—and when not to." These reflections reveal a call for epistemic justice (Fricker 2007), technologies must be co-designed with users, ensuring that frontline expertise informs system development, and that accountability is shared, not obscured.

8.1.7 Designing for Human-Centered Care

Healthcare professionals at AUH envision a future where technology supports, but does not replace, human care. Their reflections highlight a need for participatory, ethically conscious design that safeguards autonomy, fosters resilience, and preserves the relational core of healthcare. Technologies must be tools for enhancing, not diminishing, human dignity, judgment, and connection.

8.1.8 Participatory Design, Inclusion, and Moral Imagination

A central theme in the interviews and workshops was a pervasive sense of exclusion among healthcare professionals, an experience that highlights critical questions of power, inclusion, and participatory design in healthcare technology. Participants consistently expressed frustration that decisions about technologies, how they are designed, implemented, and used, are often made without input from those who work with patients every day. As one nurse put it: *"It feels like decisions are made in a boardroom somewhere, without asking us who actually use the systems."* This disconnect reflects a form of procedural injustice (Børsen & Botin, 2024), where frontline knowledge is sidelined in favor of managerial or technical perspectives. It also echoes epistemic injustice (Fricker, 2007), where those with situated, practical expertise are excluded from shaping the systems they must navigate. The result, as many participants emphasized, is technology that risks misalignment with the realities of care: *"The people who design these systems don't understand how we work. They don't see what happens on a busy ward."* From a techno-anthropological perspective (Børsen & Botin, 2013; Jacobs et al., 2021), this reinforces the need to treat technology not as a neutral tool but as part of a socio-technical infrastructure, one that should be co-designed with those who will live and work with it. Participants called for meaningful participation, and as a core principle of ethical technology design. As one participant insisted:*"It's not just about us as staff. Patients and families also have to be involved. It's their lives too."* This vision aligns with Value Sensitive Design's (VSD) call for stakeholder inclusion (Friedman & Hendry, 2020) and ETA's emphasis on broad, democratic participation in technology assessment (Palm & Hansson, 2006). However, participants noted that existing knowledge-sharing structures, such as leadership meetings and newsletters, are inadequate for genuine dialogue: *"We get information, but there's no real conversation. It's like we're expected to just accept it, not question it."* Healthcare professionals also highlighted the material consequences of exclusion: systems that prioritize efficiency over care quality, overlook vulnerable populations, or create new burdens rather than alleviating them. These concerns resonate with QPeTA's focus on identifying unintended side effects and Beauchamp's principle of justice: ensuring that technologies distribute benefits and burdens fairly (Beauchamp, 2001; Børsen & Botin, 2024).

The data also reveal moral imagination, a capacity among staff to envision both risks and hopeful possibilities. One nurse reflected on the dilemma of automated shift scheduling: *"I'd feel like a cog in the machine. If I have no say, how can I feel responsible for my work?"* This illustrates the tension between efficiency and autonomy, a key concern in both QPeTA and Beauchamp's ethics of respect for autonomy. Meanwhile, others saw the potential for

technology to support care: *"If a robot could fetch medicine, we'd have more time to sit with patients, hold their hand, and just be there."* These visions reflect the co-design potential of frontline professionals, insights that can inform more ethical, effective, and user-centered technologies. As one participant put it: *"We should be in the room when these decisions are made. It's our work, our patients, our responsibility."* This call is not just for consultation but for genuine co-creation, a process where healthcare professionals are treated as partners in shaping the systems that structure their work. This perspective echoes Star's (1996) idea of infrastructuring, the iterative, relational work of building and maintaining systems that are responsive to local practices and needs.

Participants also voiced critical reflections on the risks of technology: job displacement, de-skilling, and potential harm to vulnerable patients. One nurse asked: *"If a robot replaces a cleaner or a secretary, what happens to them? Are we thinking about the people who lose their jobs?"* This reflects a broader ethical concern, technology's societal impacts must be considered alongside technical functionality. As ETA and QPeTA stress, responsible innovation requires attention to long-term, systemic consequences (Palm & Hansson, 2006; Børsen & Botin, 2024). Importantly, participants framed these reflections not just as critiques but as calls to action, requests for inclusion, dialogue, and participatory design processes that center care, dignity, and professional judgment. As one nurse concluded: *"We need to be part of shaping these systems, not just told how to use them."*

In sum, this analysis underscores the ethical imperative of participatory design: to move beyond top-down decision-making and towards co-created, reflective, and inclusive technological futures in healthcare. Technologies must be designed with those who will live and work with them, ensuring they truly support care, rather than constrain it.

9 Discussion

9.1 Revisiting the Problem Statement: Why RPA in Healthcare Matters

This thesis set out to explore a critical question: How do infrastructural practices, organizational structures, and socio-technical conditions at Aarhus University Hospital support or hinder the scaling and knowledge sharing of RPA solutions, and how can a more coordinated strategy for sustainable digital transformation be developed? This inquiry reflects a broader challenge in healthcare: while automation technologies like Robotic Process Automation hold promise for improving efficiency, their implementation is deeply entangled with the complexities of healthcare work, professional silos, ethical concerns, and structural constraints.

RPA is not a neutral tool to be “plugged in” but part of a socio-technical system shaped by relationships, values, and infrastructures. As this thesis demonstrates, the success or failure of RPA depends not only on technical performance but on whether systems align with core healthcare values such as care, fairness, and human dignity. These findings extend beyond AUH, offering insights into the ethical, practical, and organizational dynamics that shape digital transformation in healthcare systems worldwide.

9.2 Synthesis of Key Findings Across Analyses

The analyses connect on a set of interlinked challenges and opportunities. Barriers to scaling RPA include organizational silos, diffuse responsibility, and fragile knowledge infrastructures, where information sharing relies on chance encounters rather than systematic structures. The limited capacity of the RPA team and the fragmentation of digital systems further constrain scaling efforts. CFIR and Mintzberg reveal how these issues are embedded in the organizational architecture of a large, bureaucratic hospital system.

Ethical reflections highlight justice, fairness, autonomy, and trust as central concerns. Staff question whether efficiency gains justify the erosion of agency and human connection. The risk of epistemic injustice, where frontline voices are excluded from design processes, emerges clearly, illustrating how ethical issues are not separate from technical challenges but woven into the fabric of RPA implementation. Beauchamp’s principles, the QPeTA model, and the participatory ideals of VSD illuminate these tensions, underscoring that RPA is not a purely technical intervention but a deeply moral issue. The data also points to opportunities. Staff envision a future where technology supports, not replaces, human care. They call for participatory design processes, embedding RPA awareness into roles, proactive outreach, and resilient knowledge infrastructures. These suggestions align with VSD’s call for context-sensitive, value-driven design and infrastructuring’s emphasis on the invisible work that sustains technology in practice.

Theoretical frameworks help unpack these interconnections. Infrastructuring reveals the often-invisible relational work of adapting RPA, highlighting breakdowns, repairs, and the role of intermediaries. VSD and ETA provide tools for surfacing ethical concerns, anticipating unintended consequences, and framing design choices in terms of justice and fairness. CFIR and Mintzberg map structural barriers like leadership engagement and resource constraints, while the techno-anthropological perspective weaves these threads into a holistic, relational understanding of RPA as a human-centered, ethical, and organizationally embedded process.

9.3 Theoretical Reflections: Strengths and Limits of Frameworks

The combined theoretical approach has enabled a nuanced analysis, but it also reveals tensions. Infrastructuring is very good at capturing the ongoing, situated work of RPA adaptation, making visible the relational and organizational labor that underpins scaling. However, it does not fully account for normative questions about fairness or ethical desirability. Here, VSD and ETA provide critical depth, foregrounding values like justice, autonomy, and inclusivity, and prompting reflection on who benefits from RPA, who might be excluded, and what ethical trade-offs arise. The QPeTA model, in particular, sharpens the ethical lens, supporting analysis of unintended consequences and long-term impacts. Yet, both VSD and ETA's participatory ideals clash with practical constraints: while staff express a desire for involvement, time pressures and organizational structures limit meaningful participation, a persistent tension that neither framework fully resolves.

CFIR adds valuable structure for identifying barriers, but its limited attention to ethics and values means it must be complemented by frameworks like VSD and ETA. The TAN perspective serves as a crucial integrative lens, bridging technical, human, and ethical dimensions, and framing RPA as a socio-technical, relational phenomenon embedded in care practices and institutional cultures. Finally, this thesis acknowledges areas for further development. While epistemic injustice and discourse ethics (Fricker, 2007) were noted as relevant, they were not fully developed. A more explicit reflection on my reflexive positionality, as a practitioner-researcher navigating healthcare, would have further strengthened transparency and enriched the analysis.

9.4 Methodological Reflections

This thesis has been grounded in a techno-anthropological, participatory research approach, which has proven invaluable for capturing the complex, relational, and often hidden dimensions of RPA implementation at Aarhus University Hospital. By engaging directly with healthcare professionals through interviews, workshops, and field observations, the study has been able to foreground the lived experiences, concerns, and hopes of those working within and around these technologies. This participatory orientation has fostered empathetic engagement with stakeholder voices, helping to surface ethical dilemmas, power dynamics, and structural barriers that might otherwise remain unarticulated in more detached research designs. The strength of this approach lies in its depth and contextual sensitivity. Rather than treating healthcare professionals as passive users or implementation subjects, the study has treated them as co-creators of knowledge, people whose expertise is embedded in their daily practices and who hold vital insights about how RPA functions (or fails) in

complex organizational settings. This participatory lens has been critical in identifying epistemic injustice, as well as in articulating a vision for more ethical, inclusive, and context-aware technology design and governance. However, the research process has also faced methodological challenges. As a practitioner-researcher embedded within the healthcare sector, I occupy a techno-anthropological insider-outsider position: simultaneously a participant in the healthcare system and an observer seeking critical distance. This positionality has offered unique access to stakeholder reflections and tacit knowledge, but it has also introduced potential biases, particularly in interpreting data through the lens of my own professional assumptions, priorities, and values. While I have strived for reflexivity throughout the project, there remains a risk that my interpretations are shaped by the very institutional logics and norms I seek to critically analyze.

The limited longitudinal scope of the project also presents a constraint. Although the thesis captures a rich snapshot of RPA implementation dynamics, it does not follow these processes over extended periods. This temporal limitation means that some longer-term effects—such as shifts in professional identity, emergent uses of RPA, or evolving trust dynamics—remain outside the scope of the analysis. Furthermore, time constraints and the pressures of working within a busy hospital context have limited the depth of participatory co-design activities. While the workshops generated valuable insights, there was less opportunity for iterative design cycles or sustained, collaborative solution-building—an aspiration that would have further strengthened the participatory ethos of the research.

Reflecting on my reflexive position, I recognize that my role as a techno-anthropologist, working within and alongside the healthcare system, has shaped not only the access I had to stakeholders but also the nature of the dialogue itself. My dual role as researcher and practitioner allowed me to build rapport with participants and elicit candid reflections, yet it also introduced dynamics of trust, power, and expectation that may have influenced what was shared and how it was interpreted. I acknowledge that my presence may have shaped the very processes I sought to observe, and that my interpretations are necessarily situated and partial. Nonetheless, I have aimed to approach the research with humility, transparency, and a commitment to amplifying the diverse perspectives and ethical concerns voiced by healthcare professionals. In sum, while this study's methodology has enabled a rich, human-centered understanding of RPA in healthcare, it also underscores the need for ongoing, participatory, and reflexive engagement with digital transformation processes, engagement that is iterative, collaborative, and critically aware of the researcher's own position within the socio-technical systems under study.

9.5 Limitations

This thesis offers an in-depth, context-sensitive analysis of RPA implementation at Aarhus University Hospital (AUH), but it also carries important limitations that must be acknowledged. First, the scope of the study is anchored in the specific organizational, cultural, and policy context of a large Danish public hospital. While insights from AUH provide valuable reflections on the interplay of infrastructures, ethics, and organizational practices in healthcare digitalization, the findings are not universally generalizable. Instead, they offer transferable learnings,rich, qualitative insights that may resonate with, but not directly map onto, other healthcare systems, particularly those with different governance models, resource constraints, or professional cultures.

The study's sample composition also introduces limitations. The research primarily reflects the perspectives of nurses, secretaries, and the RPA team, whose roles are central to the current use and development of RPA at AUH. However, voices from other key stakeholder groups, such as doctors, patients, and senior hospital leadership, are less represented. Their absence limits the study's ability to fully capture how RPA intersects with clinical decision-making, patient experiences, and strategic leadership perspectives. Future research should aim to include these groups more systematically to enrich understanding of RPA's cross-professional and patient-facing impacts.

Methodologically, the workshops served a dual role: as a platform for participatory exploration and as a source of qualitative data. While this approach yielded rich, co-constructed reflections, the limited duration of the sessions constrained the depth of iterative engagement and co-design activities. As a result, the workshops generated conceptual and reflective insights rather than fully developed solutions, an important first step, but one that underscores the need for longer-term, embedded participatory processes in future research and practice.

The use of a complex theoretical framework, combining infrastructuring, Value Sensitive Design (VSD), Ethical Technology Assessment (ETA), and CFIR, was necessary to grapple with the multi-layered dynamics of RPA implementation. However, this theoretical breadth may have introduced analytical challenges, such as overlaps, blind spots, or simplifications when integrating diverse lenses into a coherent analytical narrative. While efforts were made to synthesize and apply these frameworks judiciously, the analytical choices made reflect an interpretation of the data shaped by the researcher's positionality, priorities, and epistemological stance.

In sum, this thesis provides a situated, partial perspective on the ethical, infrastructural, and organizational dimensions of RPA in healthcare. It offers a foundation for further research, but it also invites continued reflection on whose voices are included, what knowledge is foregrounded, and how participatory, reflexive, and ethical approaches can be sustained and expanded in future studies of healthcare technologies.

9.6 Contributions to Research and Practice

This thesis offers several key contributions to both research and practice, highlighting the interplay of technological, ethical, and organizational dimensions in the implementation and scaling of Robotic Process Automation (RPA) in healthcare. Empirically, the thesis provides rich, qualitative insights into how healthcare staff, especially nurses, secretaries, and RPA developers experience, reflect on, and navigate the ethical and organizational challenges of digital transformation. By foregrounding the voices of those closest to the work of care, the study surfaces practical, value-laden concerns that are often overlooked in technology-driven change processes, such as fairness, autonomy, trust, and relational care.

Theoretically, the thesis demonstrates the value of combining infrastructuring, Value Sensitive Design (VSD), Ethical Technology Assessment (ETA), and CFIR as complementary frameworks for analyzing the complex, multi-layered realities of technology in healthcare. This integrated approach shows how theories from socio-technical studies, ethics, and implementation science can be used together to generate a nuanced understanding of barriers, opportunities, and value tensions in digital transformation. It also illustrates how techno-anthropological perspectives can bridge the human, ethical, and infrastructural aspects of healthcare innovation.

Practically, the thesis offers actionable strategies for AUH and similar organizations seeking to strengthen their approach to RPA implementation and scaling. These include:

- Developing clear communication structures for knowledge sharing across departments, including newsletters and structured forums.
- Establishing RPA ambassadors or “robot-responsibles” in departments to foster local ownership, identify opportunities, and act as liaisons between the RPA team and clinical staff.
- Embedding participatory design practices into technology development, ensuring that frontline staff and patients are meaningfully involved in shaping the tools they use.

- Strengthening resilient infrastructures by maintaining fallback procedures, investing in training, and cultivating a culture of preparedness to mitigate the risks of technological breakdowns.

Ethically, the thesis advocates for a care-centered, participatory approach to healthcare technology design and implementation. It argues that digital tools like RPA must be developed not as abstract solutions to efficiency problems, but as socio-technical systems embedded in the relational, ethical, and human fabric of care. By highlighting the moral imagination of healthcare professionals, their hopes, concerns, and visions for the future, the study underscores the need for technology design that upholds justice, fairness, empathy, and dignity in healthcare.

In sum, the thesis contributes to research that calls for ethically grounded, participatory, and human-centered digital transformation in healthcare, an approach that values not just what works, but what matters.

10 Conclusion

This thesis set out to explore how infrastructural practices, organizational structures, and socio-technical conditions at Aarhus University Hospital (AUH) support or hinder the scaling and knowledge sharing of Robotic Process Automation (RPA) solutions, and how a more coordinated, sustainable approach to digital transformation can be developed. Through a qualitative, techno-anthropological study involving interviews, workshops, and document analysis, I have shown that the challenge of scaling RPA at AUH is not primarily a technical issue, but a deeply human and relational one. The success of RPA depends on more than well-functioning bots; it hinges on the people, practices, values, and infrastructures that shape its use. Across the three partial analyses, the thesis identified a series of barriers that constrain the scaling of RPA solutions. Organizational silos, a lack of clear roles and ownership, and fragile, informal knowledge-sharing channels create an environment where promising RPA initiatives struggle to spread beyond local contexts. Limited capacity within the RPA team further amplifies these challenges, creating bottlenecks that leave ideas unrealized. These structural and infrastructural issues are compounded by systemic fragmentation in AUH's digital landscape, where legacy systems and vendor lock-in hinder interoperability and adaptability.

Alongside these practical barriers, the study uncovered a rich tapestry of ethical reflections among healthcare professionals. Staff raised important questions about fairness, autonomy, trust, and relational care. They expressed concerns about losing control over their work, the

risk of digital exclusion for patients, and the erosion of professional judgment and empathy in an increasingly automated system. These reflections, interpreted through the lenses of Value-Sensitive Design (VSD), Ethical Technology Assessment (ETA), and the QPeTA model, reveal that RPA is not just a technical solution to efficiency problems but a socio-technical intervention that carries moral weight and long-term consequences. The thesis also points to clear opportunities for overcoming these challenges. Healthcare professionals are not rejecting technology, they are asking for it to be developed thoughtfully, inclusively, and with care for the values that matter in healthcare: fairness, trust, human dignity, and relational care.

10.1 How can the barriers to scaling RPA at AUH be overcome?

This thesis proposes a set of interconnected actions:

1. **Strengthen Knowledge-Sharing Structures:** Establish formal communication channels, such as newsletters, case-sharing events, and RPA updates in existing forums like the EPJ-Forum, to make RPA solutions visible across departments. Move beyond passive dissemination to interactive learning sessions and cross-departmental sharing of best practices.
2. **Create Clear Roles and Local Ownership:** Appoint dedicated RPA ambassadors or “robot-responsibles” in each department. These individuals can bridge the gap between the RPA team and clinical staff, observe workflows in context, identify potential RPA applications, and foster local engagement. Embed RPA awareness into job roles like registration-responsibles and in onboarding programs for new staff.
3. **Identify and Adapt Existing RPA Solutions:** A core insight from this thesis is that many RPA solutions already exist but remain isolated within departments. Systematically mapping current solutions and identifying where they could be reused or adapted in departments with similar workflows is essential. This approach can accelerate scaling, reduce redundant development, and foster a culture of shared innovation.
4. **Invest in Proactive Outreach and Capacity:** The RPA team, or designated outreach roles, must actively visit departments, observe workflows, and collaborate with staff to surface automation opportunities. This work requires sufficient resources: time, training, and leadership support to ensure it is sustained.
5. **Embed Participatory Design and Ethical Reflection:** Engage staff not as passive users but as co-designers. Use participatory methods, such as scenario workshops and co-design sessions, to anticipate ethical dilemmas, surface value tensions, and

develop solutions that reflect real-world needs. Apply frameworks like VSD and QPeTA to guide these processes, ensuring transparency, accountability, and alignment with core ethical principles.

6. **Build Resilient Infrastructures:** Strengthen fallback systems, invest in training, and foster a culture of preparedness to mitigate risks of technological failure. Recognize that human skills and judgment remain essential safeguards in a digital healthcare system.
7. **Adopt an Iterative, Long-Term Mindset:** Scaling RPA is not a quick technical fix but an ongoing, relational process. Trust, capacity, and collaboration must be built gradually. By fostering participation, ethical reflection, and robust knowledge-sharing structures, AUH can create the conditions for scaling to happen, not as isolated projects, but as a sustained, co-created transformation.

These recommendations do not offer a simple, one-size-fits-all solution. Rather, they point to the need for a multi-layered, iterative, and participatory approach, one that acknowledges the messy, complex realities of healthcare work. Scaling RPA at AUH is not just about deploying more robots; it is about building infrastructures that support knowledge sharing, trust, and ethical reflection. It is about creating systems that are robust, flexible, and responsive to the needs of those who deliver and receive care. And it is about recognizing that digital transformation is not just a technical process, but a moral and relational journey, that must be navigated with care, humility, and shared responsibility.

In this way, the thesis contributes to a broader conversation about the future of healthcare: a future where technology can enhance, rather than erode, the values that make care meaningful. By centering the voices of healthcare professionals and highlighting the ethical dimensions of RPA, this study argues that scaling automation in healthcare is not just a matter of efficiency, it is a matter of justice, fairness, and care. The lessons from AUH are clear: if we want digital transformation to succeed, we must build it together.

11 Perspectivation

This thesis offers insights that extend beyond Aarhus University Hospital, highlighting challenges and strategies that are relevant for healthcare organizations navigating digital transformation globally. As healthcare systems increasingly adopt technologies like Robotic Process Automation (RPA), AI, and decision-support systems, the findings underscore the need for care-centered, participatory, and ethically reflexive approaches. The barriers identified, silos, limited knowledge sharing, and fragile infrastructures, are not unique to AUH

but reflect structural issues present in many large, complex organizations. The solutions proposed, such as participatory design, clear roles, and proactive outreach, offer a model for embedding technology in ways that align with human values, ethical principles, and the relational core of care.

The study also suggests important directions for future research. Longitudinal studies could track how RPA adoption and scaling evolve over time, while comparative research across hospitals and healthcare systems could illuminate how different organizational cultures, policies, and resource levels shape digital transformation processes. Moreover, exploring patient perspectives on automation would deepen our understanding of how these tools affect not just workflows but the patient experience. Future studies could also investigate how leadership, policy frameworks, and governance structures enable or constrain participatory design and ethical technology development.

Importantly, this thesis contributes to the ethical governance of digital transformation in healthcare by showing how even “silent automation”, technologies like RPA that often operate under the radar, can profoundly reshape work practices, decision-making authority, and professional identities. While these tools may seem uncontroversial, they can carry significant ethical implications, subtly influencing what is valued in care and who holds power in the system. By bringing these dynamics to light, the thesis advocates for an approach to digital transformation that is not just technical or efficiency-driven, but deeply ethical, participatory, and human-centered. Ultimately, this work calls for a shift in how we understand and govern technology in healthcare: from seeing digital tools as isolated solutions to recognizing them as socio-technical, relational, and value-laden infrastructures that must be co-designed with those who live and work with them. Meaningful participation is not a luxury or a checkbox—it is an ethical necessity. If healthcare is to remain grounded in ethics, then digital transformation must be guided by these same principles: not just what works, but what matters.

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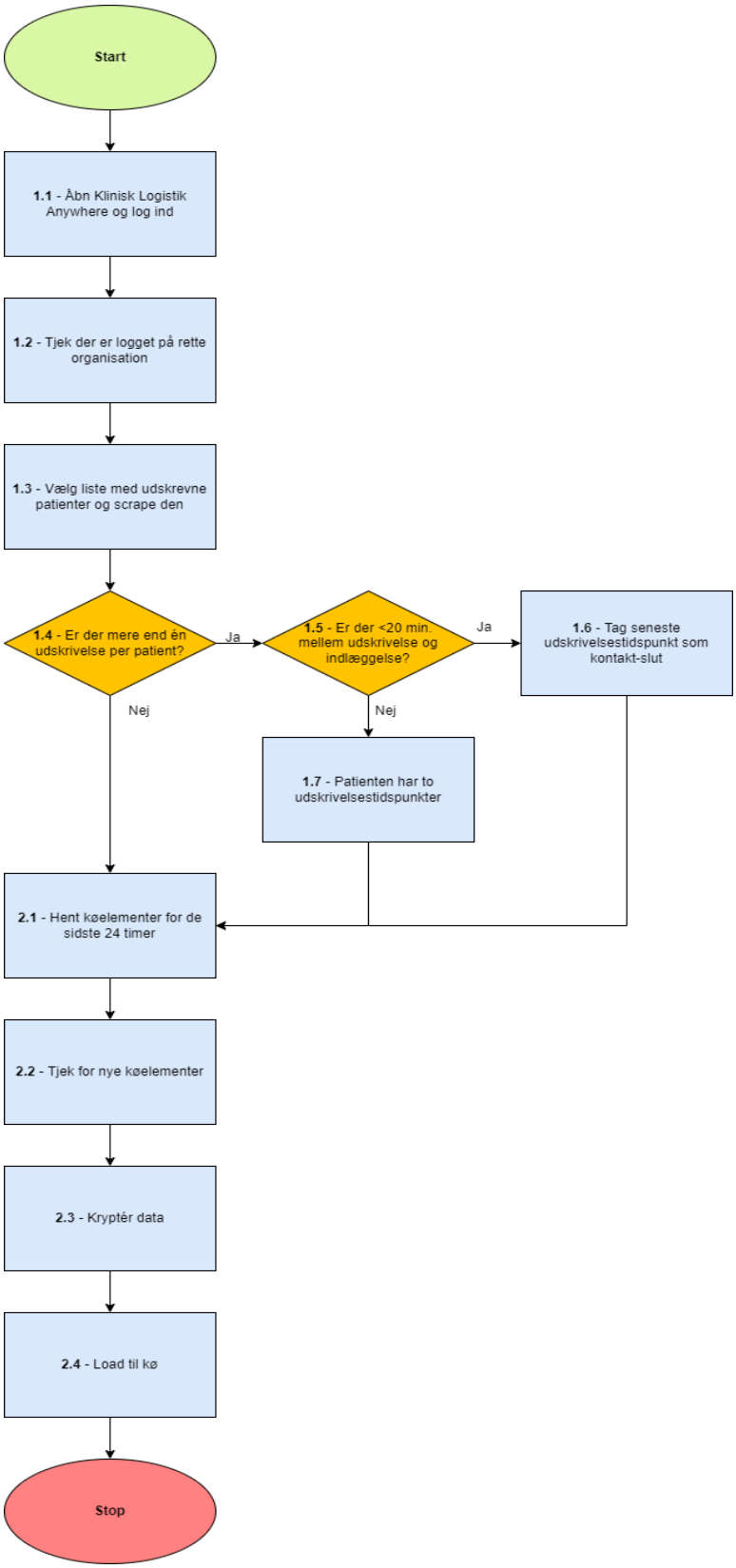
13 Appendix

13.1 Appendix 1: Flowchart of ARP-solutions



13.2 Appendix 2: Semi-Structured Interview Guide for Non-Users of RPA

(Inspired by James Spradley's Ethnographic Interviewing)

Theme 1: Initial Understandings and Perceptions of Robots

Grand Tour Questions:

- Could you tell me what comes to mind when you hear the word "robot"?
- In your opinion, what is a robot?

Mini Tour / Specific Questions:

- Have you ever heard of RPA solutions—Robotic Process Automation?
    - If no: Why do you think you haven't come across them?
    - If yes:
        - Where did you hear about them?
        - When did you hear about them?
        - How or from whom did you learn about RPA?
- What is your general impression of RPA in a hospital setting?

Theme 2: Reflections on RPA in Your Department

Grand Tour Question:

- Let's talk about your own department or unit. What comes to mind when you think about using RPA in your daily work?

Mini Tour / Specific Questions:

- Do you think RPA could be relevant in an intensive care setting (or in your specific department)?
- Are there specific tasks where you think automation might be helpful?

Theme 3: Knowledge Sharing Across AUH

Transition Statement:

I'd now like to ask a few questions about how knowledge and ideas are shared across departments at AUH.

Grand Tour Question:

- Imagine that a department comes up with a really good solution—perhaps a way to save time or use resources more efficiently. In your experience, how is that knowledge usually shared across the hospital?

Specific Questions:

- Is there a systematic way to share such solutions across departments? Or does it feel more random and ad hoc?

- In your opinion, how could a solution like RPA be spread across departments at AUH?
- If an RPA robot has been developed in one department, and there are other departments with similar tasks, what do you think would be the best way to identify and connect with those departments?

Theme 4: Ideas for Improving Knowledge Sharing

Grand Tour Question:

- If you were to imagine an ideal system for sharing knowledge about tools like RPA across the hospital, what would it look like?

Specific Questions:

- Can you think of any existing platforms or forums at AUH that we could use to share knowledge about RPA?
- Could these platforms be adapted for more effective communication and awareness about automation solutions?

13.3 Appendix 3: Semi-Structured Interview Guide: Experiences with and Scaling of RPA Solutions at Aarhus University Hospital

Target Group: Secretaries, administrative staff, and nurses who actively use RPA in their work
Purpose: To explore experiences with RPA, as well as barriers and opportunities for scaling and sharing knowledge across departments.

Opening Questions: Setting the Scene

Grand Tour Questions

- Could you start by telling me a little about your role in the department and your main tasks?
- What has been your general experience with digital solutions in your work?
- When did you first encounter RPA solutions at AUH?

Understanding and Experiences with RPA

Mini Tour Questions

- How would you describe what a robot or an RPA solution is?
- What are your general thoughts about RPA—both benefits and potential drawbacks?

Specific Questions

- What specific RPA solution do you use in your department? What exactly does it do?
- How did you first become aware of the possibility to develop that robot?
- Who took the initiative to get it developed?

- Can you describe how the collaboration with the RPA team worked?
- How did you experience the process—from the initial idea to the final working robot?

Contrast Questions

- How has the robot changed your work processes?
- Do you notice a difference in your day-to-day work?
- Are there tasks you miss doing manually—and others you are happy to let go of?

Barriers and Challenges

Grand Tour Question

- Are there any aspects of the robot or the system that don't work as well as they could?

Specific Questions

- What would you wish worked better?
- Have you experienced situations where the robot stopped working or didn't function as expected? What happened in those situations?
- Do you have any concerns about becoming dependent on RPA solutions in your department?

Knowledge Sharing and Scaling RPA Solutions

Transition Statement
I'm also curious about how knowledge about RPA is shared across AUH, and how we might make it easier for departments to learn from each other.

Mini Tour Questions

- Are you aware of any other departments using RPA?
- Have you ever shared your experiences with RPA with colleagues from other departments? How did that happen?

Specific Questions

- Is knowledge sharing about RPA happening in a systematic way at AUH, or does it feel more random?
- If a department has developed a good RPA solution, how do you think we could identify other departments with similar tasks who could benefit from the same solution?
- Can you imagine an easy and effective way to share knowledge about RPA across AUH?
- Are there existing platforms or forums at AUH that could be used for this? For example:
    - Email newsletters from the RPA team?
    - Appointing a "robot-responsible" in each department?

Reflections on the Future

Grand Tour Question

- Looking ahead: What do you think about the future of digital transformation and the use of (robotic) technology at AUH?

Specific Questions

- What are your hopes—and any concerns you might have?
- Are there specific tasks in your daily work that you would like to see automated in the future?

Closing Questions

Grand Tour Questions

- Is there anything we haven't talked about that you think is important to mention?
- Do you have any suggestions for other people I should speak with about this topic?

13.4 Appendix 4: Workshopstruktur

(25 min)

Workshops consisting of nurses, nursing students, service assistants, coordinators and a head nurse.
2 days with 2x30 minutes. In total approx. 25 participants. 3-8 participants in each group.
Sessions was recorded and transcribed, and I got oral permission to use the participants' statements.

Time	Activity
0-5 minutes	Short presentation of me and my thesis
5-10 minutes	Introductions: Technology in the future healthcare system. What are robots? And why is tech one of the solutions to the demographic problems the healthcare sector are facing?
10-20 minutes	One of the participants pics a card and reads it out loud. Then they all reflect and add their input to the question on the card
20-25	Summary and thank you for participating

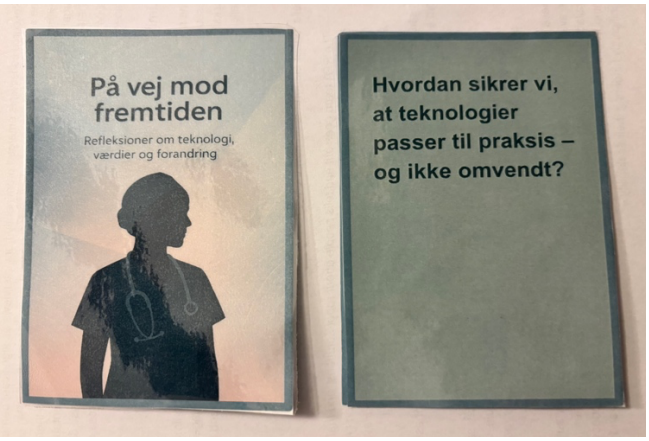
Short presentation (5 min)

Hi, my name is Marie and I am studying technoanthropology. As part of my thesis, I am collaborating with the RPA team at Aarhus University Hospital on how we can become better at sharing and scaling the automation solutions that already work really well in some departments. When we say 'robot', we often think of machines with arms and legs – but robots are much more than that. Today they are everywhere – both as physical and digital helpers "Today we will not only talk about robots as technology – but also about how they affect everyday life, values and collaboration in healthcare."

Summary:

Did anything surprise you?
Thank you for participating. You reflections will part of my analysis.

Reflection Cards:



The questions on the cards were deliberately designed to invite critical reflection, ethical sensitivity, and situated insights—encouraging participants to speak both from personal experience and broader professional and societal perspectives.

Questions on the reflection cards:

What role do you think technology will play in the future of healthcare?	How can we ensure that technology is developed with respect for the professionalism of healthcare professionals?	What should we remember when introducing new technologies so that human values are not lost?
How can we maintain closeness and relationships in a more digital everyday life?	What concerns do you have about the future of healthcare technology – and how can we take them seriously?	Who should decide what “good technology” is in healthcare?
How can technology support collaboration between professional groups – and when does it risk creating distance?	Who should be involved when we decide what technology to develop and use in everyday life?	How do we ensure that technologies fit practice – and not the other way around?
How can technology help us use time meaningfully - for both patients and staff?	In the future, shift schedules and task allocation will be generated automatically based on patient load data and staff profiles. You will receive your shift schedule without influence. Question: How would this affect your experience of autonomy and fairness?	Can we become too dependent on technology?