CHALMERS
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Perceptions, Expectations, and Concerns with Digi-Physical Health Centers

A Study of Two Newly Opened Digi-Physical Health Centers

Master's Thesis in Management and Economics of Innovation

AGNES ABRAHAMSSON
KLARA JULIUSSON

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION SUPPLY AND OPERATIONS MANAGEMENT

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Supervisor and Examiner: Árni Halldórsson, Department of Technology Management and Economics

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Department of Technology Management and Economics
Division Supply and Operations Management
Chalmers University of Technology
SE-412 96 Gothenburg
Telephone +46 31 772 1000

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Abstract

This thesis aims to explore the perceptions, expectations and concerns with Närhälsan's two newly initiated digi-physical health centers in Öjersjö and Kallebäck. The integration of digital technologies in healthcare is increasing and the digi-physical health centers represent a hybrid model, combining both physical and digital service offerings. As the concept, organizational method, and working approach are new to Närhälsan, this thesis will investigate the opportunities and challenges as perceived by the employees and residents in the two areas.

Data was collected through semi-structured interviews with 11 healthcare professionals, while structured interviews were conducted with 29 residents in close proximity of the health centers. The inductive and deductive approaches of the thematic analysis enabled the emergence of themes that were not predetermined, while also supporting the pre-established themes of accessibility, continuity, and health literacy.

Findings from the residents highlighted the enhanced accessibility, the improved geographical flexibility, and the possibility to address minor ailments digitally at digi-physical health centers. However, concerns regarding inefficiencies in digital communication and lack of accessibility to physical care were raised. The residents also misinterpreted the concept and believed it to be exclusively digital, which aligns with the professionals perception that there is a lack of information flow between the organization and the residents. The empirical findings of the study identifies the professionals shared perspective of increased accessibility for the listed patients at the digi-physical health centers, some raising the concern of being too accessible. Moreover, professionals have faced technical difficulties during the delivery of digital consultations, causing frustration among the employees. However, this has not affected the patients' service experience.

As a result, recommendations have been made for the health centers to employ open innovation to engage residents and other local stakeholders to enhance transparency, increase marketing, improve digital health literacy, and raise awareness about digi-physical care. A structured feedback process is also recommended and should be included to incorporate patient perspectives and support the health centers in making informed strategic decisions.

Keywords: healthcare, digi-physical, hybrid, primary care, accessibility, continuity, health literacy, service encounters, digitalization.

Acknowledgments

We would like to express our deepest gratitude to a number of individuals and organizations whose support was invaluable in the completion of this thesis.

Firstly, we extend our sincere thanks to our supervisor and examiner, Árni Halldórsson, at Chalmers University of Technology. His extensive knowledge and insights into servitization and healthcare services greatly enriched our work. His guidance has been a cornerstone of our thesis journey, and we are deeply appreciative of his unwavering support and guidance throughout this thesis.

Our thanks also go to the teams at Närhälsan and Västra Götaland Region (VGR) for their invaluable contributions. Their openness and readiness to assist us by providing swift responses and connecting us with the right individuals were pivotal in our research. We are particularly grateful to the employees at the digi-physical health centers in Öjersjö and Kallebäck, whose willingness to participate in interviews provided us with essential information and perspectives for our thesis.

Special thanks are due to Henrietta Arwin and Josefin Friberg for entrusting us with this significant opportunity. Josefin deserves additional recognition for her continual support throughout this process. Her contributions during our numerous discussions were not only educational but also immensely supportive.

Conducting this thesis during the spring of 2024 at Chalmers University of Technology in the field of Management and Economics of Innovation has been an extraordinary journey for us. The experiences and knowledge gained during this period will remain with us as we move forward in our careers.

We are thankful to everyone who contributed to this research. Your collective knowledge, openness, and support have made this work possible.

Agnes Abrahamsson, Klara Juliusson, Gothenburg, June 2024

List of Acronyms

Below is the list of acronyms that have been used throughout this thesis listed in alphabetical order:

ICTs	Information and Communication Technologies
VGR	Västra Götalandsregionen

Glossary

Below is an explanation of frequently used terms and expressions in this thesis, presented in English with their Swedish translations in *italics*.

Term	**Explanation**
Listed patients *Listade patienter*	Choosing a health center, also known as listing, allows you to select a preferred health center. Listed patients benefit from reduced patient fees at their chosen center. Residents are not required to select a specific health center or doctor; those who do not choose, including new residents and newborns, are automatically listed at the nearest health center.
Cost responsibility principle *Kostnadsansvar*	When a resident is listed at a certain health center and visits another health center, either digital or physical, the health center where a resident is listed holds the responsibility for the cost of this visit.
Health center *Vårdcentral*	A health center is a medical facility that offers primary care services to the population in a certain geographic area. Primary care represents the first level of contact between the patient and the health care system, and the health center serves as a central point for this contact.
Infidelity visits *Otrohetsbesök*	When a resident visits a health center, other than the one where they are listed.
Out-of-county visits *Utomlänsbesök*	When a resident visits a health center outside of their registered region.
Outpatient care *Öppenvård*	Covers all health- and medical care which is not inpatient care where the patient is admitted to a health care facility.
Primary care physician *Fast läkarkontakt*	A physician in charge of providing continuous and coherent primary care to an individual patient listed at a specific health center. This physician is responsible for the patient's overall care and health, and serves as the first point of contact for medical issues.

Principle of proximity *Närhetsprincipen*	The principle of proximity is fundamental, particularly in municipal and regional administration. This principle states that decisions should be made as close to those affected as possible. The primary goal of the proximity principle is to create a more efficient and citizen-friendly administration that is responsive to local needs and conditions.
System for care of choice *Vårdvalsystem*	A model in healthcare that allows patients to freely choose their healthcare provider within specific frameworks of the public healthcare system. This system is widely used in Sweden and was designed to improve healthcare accessibility, quality, and efficiency.

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1
Introduction

During the fourth quarter of 2023, Närhälsan opened two new health centers with a digi-physical orientation in the Gothenburg region, one in Kallebäck and one in Öjersjö (Dagens Medicin, 2023;Friberg, 2023). This is a completely new way of organizing primary healthcare that needs further investigation. The start-up of these two units is a part of Närhälsan's work with the transition to close and person-centered care, which requires increased digitalization. Through digital services, the patient gets the opportunity to receive care in a safe environment and based on their own conditions, without having to adapt to how the care is organized or geographically located. By this, Närhälsan is also reacting to the quest of an "open care" service provision.

A digi-physical health center must offer digital care when possible and physical care when needed. This primarily means digital working methods where physical working methods are a complement based on the patient's needs and the profession's medical assessment (Närhälsan Kallebäck vårdcentral, 2024).

The theoretical motivation behind this thesis lies in the evolving landscape of healthcare, where digitalization plays a crucial role in facilitating patient-centered care by providing accessible and continuous healthcare in a safe environment to meet the goals of good and close care (Olausson et al., 2022). The practical motivation for this thesis derives from the dynamic landscape created by the entry of digital healthcare providers in 2016, which introduced new levels of competition within Swedish primary care providers. As society becomes more digital, there is a greater demand for digital services in healthcare as well as accessible and efficient treatments, necessitating a shift in Närhälsan to meet these growing population demands. Närhälsan's establishment of digi-physical health centers in Gothenburg is a direct response to these advances, demonstrating an effort to combine digital convenience with important physical care (Olausson et al., 2022).

1.1 Empirical setting

Närhälsan, the largest public primary care provider in Sweden, can be found at hundreds of locations throughout the Västra Götaland region (VGR). The organization includes health centers, child welfare centers, rehabilitation clinics and healthcare advisors and employs over 5600 employees. Parallel to delivery of care services, there is on-going research and development to continuously improve health care for the

benefit of residents in the Västra Götaland region (Närhälsan, 2022).

A digi-physical health center offers digital healthcare when possible and physical healthcare when needed. According to the concept of digi-physical health centers developed by VGR (2023), a digi-physical health center means that digital methods are primarily used while physical methods are a complement based on the patient's needs and the professional's medical assessment. This makes the organization different from other providers which solely offer physical or digital healthcare methods within VGR, see figure 1.1.

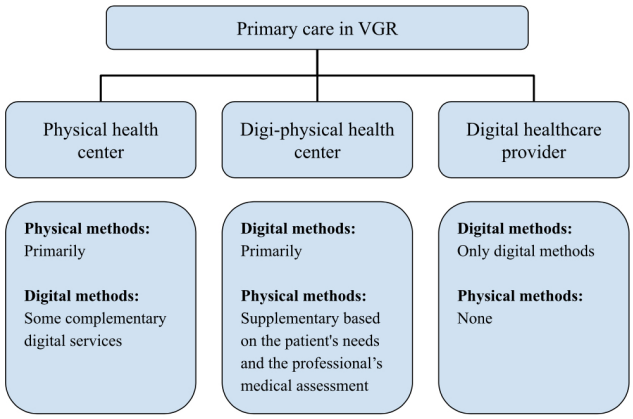

Figure 1.1: Description and distinction between physical, digi-physical and digital healthcare providers (VGR, 2023)

A digi-physical health center is distinctly different from the traditional physical health centers in VGR as the majority of the healthcare at digi-physical centers occurs digitally (VGR, 2023). Additionally, the work methods employed are tailored to the digital tools, ensuring that all staff categories are proficient in using these digital methods. They are trained to know when digital care is appropriate and when a physical meeting is necessary. Additionally, the work environment is specifically designed to support digital work while also accommodating physical meetings with patients. This includes a clear definition of which visits that are suitable for digital care appointments. Furthermore, the health centers provide personal guidance to patients on how to navigate digital healthcare services (VGR, 2023).

1.2 Aim

Närhälsan, the primary care provider in Västra Götaland is now facing a new concept, namely the digi-physical health centers and hybrid care. The aim of this thesis is to investigate and follow up the initiation of the two health centers in Kallebäck and Öjersjö, and explore how this concept and new way of organizing is viewed by the residents and possible opportunities and challenges this pose for the professionals in their service encounters. The thesis will be performed in close collaboration with the employees at Närhälsan to study how this new form of organization emerges.

The aim of this study is to define the digi-physical organizational structure and identify the challenges and opportunities encountered by the professionals in delivering high quality care. Furthermore, the study seeks to uncover discrepancies between residents' perceptions of the digi-physical health center and the information provided by healthcare professionals working there. Based on this analysis, the study aims to offer actionable recommendations for the organization to effectively bridge these gaps.

1.3 Limitations

The study focuses on primary care services in the Västra Götaland Region (VGR), specifically Närhälsan and the two hybrid health centers in Öjersjö and Kallebäck. The scope of the study is therefore limited to these units and excludes municipal primary care services such as LSS and similar home care services. Furthermore, the survey is limited to outpatient healthcare provided by health centers, thus excluding outpatient care at hospitals, inpatient care, and other forms of specialized care. This delimitation is intended to provide a focused analysis of the structure and function of primary care within the specified geographical and organizational area. Thus, the result of this study will most likely not be generalizable to other regions as each region organizes the primary care independently. Nevertheless, the findings may provide insights which can be beneficial for other regions to consider when it comes to hybrid healthcare.

In this thesis, quality of care is limited to a few key dimensions. **Accessibility** refers to the ease with which healthcare services can be accessed, including appointment availability, i.e. the simplicity and time frame required for obtaining healthcare services. **Continuity** emphasizes consistent, coordinated care over time, resulting in a stable relationship between patients and providers. **Health literacy** refers to residents' and professionals' understanding of digital tools, patients' knowledge of entry points into the healthcare system, and their ability to make informed healthcare decisions based on health information. This targeted method to define quality of care was established following a thorough assessment of the literature, including articles and publications on Swedish healthcare, the Swedish healthcare system, and general healthcare practices. These aspects were selected as the most important factors when focusing on good and close care in the context of digitalization. The decision to narrow the scope of quality of care to three specific characteristics is meant to create a clear and manageable framework for the analysis, allowing investigation of the complexities when providing effective healthcare in a digital setting.

1.4 Specification of the Issue Being Investigated

This thesis will explore:

RQ1: *From the perspective of the professionals, what opportunities and challenges do they face in delivering high quality primary care services in this new digi-physical*

organizational structure?

RQ1 will include the theoretical concepts of service offering and service encounters and highlight the themes accessibility, health literacy and continuity.

The first component of the research question involves defining the digi-physical organizational structure of Närhälsan's new healthcare model. This step is critical because it establishes the context for the investigation and further analysis. This foundational step involves outlining the integration of digital and physical healthcare services, laying the groundwork for investigating how this novel strategy influences primary care delivery. After creating an understanding of the digi-physical structure, the research will delve into the unique opportunities and challenges encountered by healthcare professionals, providing a full view of the operational dynamics of this hybrid care model.

RQ2: *How do residents view this new organizational structure?*

RQ2 will also include the theoretical concepts of service offering and service encounters and highlight the themes accessibility, health literacy and continuity.

This question seeks to understand residents' perceptions and expectations with the new digi-physical organizational structure at Närhälsan. This exploration aims to explore what residents know about this digi-physical care model, their expectations with the service offerings, and how they perceive accessibility and health literacy within this structure. It also examines the continuity of care within this new setting. By identifying what residents feel is missing, what is effective, and their overall expectations, the study will gather insights into the challenges and opportunities from the residents' viewpoint. This will provide a basis to formulate targeted recommendations for enhancing the healthcare model in RQ3.

RQ3: *By the identified challenges and opportunities in RQ1 and RQ2: What steps should be taken by the health centers to better align the digi-physical healthcare model with the needs of professionals and residents?*

This question focuses on identifying practical measures for the health centers that align the digi-physical healthcare model with the requirements and expectations of both professionals and residents, as outlined in RQ1 and RQ2. To optimize the service offering and to meet the identified requirements and expectations of both professionals and residents, strategic recommendations will be proposed.

2

Theory

The aim of describing previous research and theory is to develop an understanding for the intersection of healthcare, services and digitalization. The intersection between services, healthcare and digitalization was used to establish a theoretical framework for the analysis, as seen in figure 2.1 below.

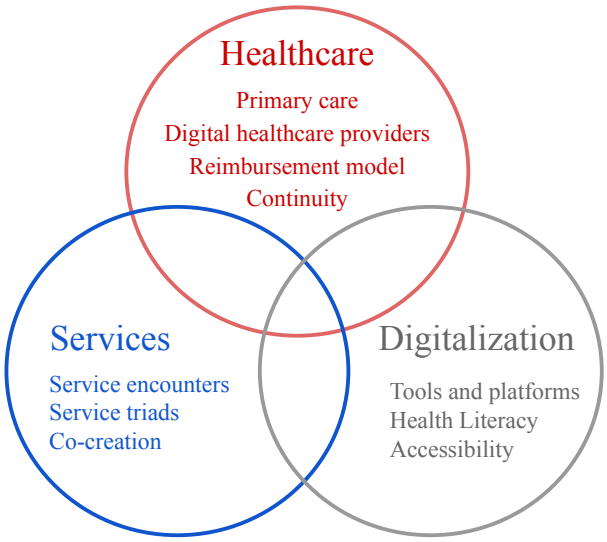

Figure 2.1: Description of the theoretical framework and the intersection between healthcare, services and digitalization.

2.1 Healthcare in Sweden

The following section will examine the Swedish healthcare system, with a particular emphasis on primary care. It will cover the substantial changes suggested by the Health and Medical Services Act of 2021, which aims to improve accessibility, increase patient participation, and provide customized care in primary healthcare. The emphasis on primary care in Sweden is critical due to its distinct model, which differs from other countries and is essential for understanding the Swedish healthcare system's structure and evolution in digitalization. The examination of the entry and subsequent impact of digital healthcare providers since 2016 is vital because of their growing involvement in the competitive landscape, their influence on market

dynamics and their effect on regional funding. The reimbursement model must be investigated in order to understand how these providers compete and the financial strategies that influence costs for primary care providers. The need to adapt and compete with digital healthcare providers highlights the relevance of incorporating these factors into the theoretical framework to provide a thorough understanding of the ongoing transformations in Sweden's primary healthcare sector.

2.1.1 Primary Care

In Sweden, primary care is generally considered to be the basic health and medical care (Socialstyrelsen, 2020) and is the hub of Swedish health care for outpatient care, covering all care where the patient is not admitted to a health care facility (Olausson et al., 2022). In 2018, the Swedish government decided on the initiative for a transition towards good and close care through the new Health and Medical Services Act (Hälso- och sjukvårdslagen, HSL) which became effective as of July 2021. The act led to a redefinition of primary care and is defined as "...the health care activities where outpatient care is provided without delimitation in terms of diseases, age or patient groups. Primary care is responsible for the need for such measures in the form of medical assessment and treatment, nursing, preventive care and rehabilitation which do not require special medical or technical resources or any other special competencies." (Olausson et al., 2022). The act highlights three strategic goals; to increase accessibility, increase the involvement of patients and a more personalized care, and an increased continuity within primary care (Myndigheten För Vård- Och Omsorgsanalys, 2021). According to SOU (2019), continuity in Swedish healthcare primarily refers to relational continuity, meaning that the patient consistently meets with the same healthcare provider when seeking care at their health center. SOU (2019) also states that increased continuity improves patient safety, reduces mortality rates, minimizes the need for emergency visits, and enhances residents' trust in Swedish healthcare.

The healthcare system in Sweden is decentralized, meaning that managing and prioritizing healthcare resources is the responsibility of regions, local authorities or municipalities, and as a result, the type of healthcare services may vary between locations. The regions are responsible to uphold a system for choice of care regarding primary care, giving all residents the opportunity to make their own choice of healthcare provider and get access to a primary care physician. The main principle is that the resident makes an active choice by getting listed at a specific health center and primarily visits that center when in need of healthcare. Most regions also apply passive listing based on the principle of proximity in cases where the resident has not made an active choice (Socialdepartementet, 2023). However, the system for choice of care also means that residents can seek care at any other healthcare provider in Sweden within primary care, which would result in a decreased continuity. Both patients and healthcare providers can be given incentives for a continuous and relational care based on where the resident is listed to increase the continuity, where for example the provider has the main responsibility of costs incurred in cases where the resident has received care at other health centers (SKR, 2022).

2.1.2 Digital Healthcare Providers

The digital healthcare providers entered the Swedish market in 2016 and since then, the digital out-of-county visits have increased from around 20 000 visits in 2016 to over 2 million visits in 2021 for those listed in Region Sörmland (Konkurrensverket, 2022). According to Region Sörmland, which handles out-of-county visits invoices for the majority of the private digital healthcare providers, private digital healthcare services are especially popular in urban areas. 23 percent of the residents in Stockholm have at some point used digital healthcare services, followed by Uppsala (20 percent) and the Västra Götaland Region (19 percent). In 2021, the number of digital out-of-county doctor visits decreased, while digital out-of-county physiotherapist visits increased significantly. In 2021, physiotherapy visits accounted for 28% of all out-of-county digital visits handled by Region Sörmland. During a current strategic shift, leading digital healthcare providers have expanded their businesses by setting up physical centers across different regions, evolving into organizations that provide digital and physical healthcare in a hybrid form, resulting in a notable reduction in digital out-of-county visits during 2023 (Socialdepartementet, 2023). According to the Swedish Internet Foundation report on how the internet was used during 2023, Kry was the most popular healthcare app amongst the residents. Kry offers both digital and physical care through video calls, chats and through physical health centers in certain regions in Sweden (Internetstiftelsen, 2023).

The entry of digital healthcare providers has resulted in higher costs related to out-of-county visits for the regions. This cost is connected to the Swedish reimbursement model for regional healthcare, where a significant portion of the cost of a digital out-of-county visit is either allocated centrally to the regions or results in a cost for your specific listed health center (Konkurrensverket, 2022). In the following chapter, the reimbursement model will be explained in more detail.

2.1.3 The Reimbursement Model

The Swedish reimbursement model for primary care applies a combination of fixed and variable compensation for health centers. Capitation reimbursement for listed residents, reimbursement linked to visits or measures, result-based reimbursement based on selected indicators reflecting achieved results, degree of coverage of primary care consumption, and reimbursement based on an unfavorable geographical location are all common components of the reimbursement models. There is also a compensation made only to the private contractors, called VAT reimbursement. The purpose of this reimbursement is to neutralize economical differences between the private and public contractors (SKR, 2022). The reimbursement model varies by region, with this thesis focusing on the compensation model for the Västra Götaland Region (VGR).

The digital healthcare providers are also part of the Swedish reimbursement model and receive compensation accordingly. The cost responsibility principle, which states that the health center where a resident is listed holds the responsibility for the cost of a resident's visit to another health center, i.e. infidelity visits, also applies to

visits made with digital healthcare providers (SKR, 2022). Thus, if a resident is registered with a health center in VGR but visits a digital healthcare provider handled by, e.g. Sörmland, the listed health center would have to cover the cost of the visit. In VGR, however, they have chosen to centralize cost control at the regional level. Västra Götaland believes that putting the financial burden on health centers will disproportionately impact specific centers in central Gothenburg, hence the political leadership has decided to centralize the cost at the regional level (Konkurrensverket, 2022). The region as a whole will therefore be financially responsible for all digital out-of-county visits performed by their residents.

The reimbursement for infidelity patients is linked to the corresponding cost responsibility for the primary care providers where the infidelity patient is listed. In VGR, the cost when an infidelity patient visits a digital out-of-county health center is SEK 500, which is invoiced to the region. The digital healthcare provider will thereafter receive reimbursements for the visit according to their region's reimbursement model (SKR, 2022).

Since the healthcare providers entered the market in 2016, the costs associated with digital out-of-county visits have increased significantly for the regions (SKR, 2022). Digital healthcare has the potential to relieve the physical health centers, but it can also result in additional costs associated with residents who would not otherwise seek help from a health center for their problems. The purpose of cost responsibility in digital out-of-county healthcare is to encourage providers to meet the individual's perceived need for care. However, when residents who do not require medical care visit a digital healthcare provider, the region incurs unnecessary and costly expenses.

According to SKR (2022), 14 regions have the same patient fee regardless of whether it is a physical doctor visit or a doctor contact online. However, in the seven regions where the fees differ, there is a lower fee for online care in all cases. It is reasonable to believe that the size of the patient fee is a deciding factor when selecting a healthcare provider for digital healthcare. This is evident in the fact that several national digital healthcare providers have chosen to establish themselves in areas where a low patient fee for digital healthcare has been implemented (Socialdepartementet, 2023).

In a report published by the Swedish Competition Authority, it is estimated how the entry of digital care providers affect competitive conditions in primary care. The report focuses on how these factors affect competition for traditional health centers. They highlight that in 2021, over SEK 800 million in reimbursements from the regions went to digital out-of-county healthcare providers, accounting for 1-2 percent of the entire regions' primary care budget (Konkurrensverket, 2022). An investigation conducted by Socialdepartementet on how digital healthcare providers can become part of a more cohesive, accessible and continuous hybrid primary care system was presented in 2023 (Socialdepartementet, 2023). The suggested changes to the Health and Medical Services Act are the following: the concept of remote contact needs to be defined, the regions must offer remote contact if it is not deemed necessary for the healthcare to be carried out through physical contact, the patient's

home region shall not be obliged to reimburse the cost of remote contacts offered by another region if the remote contact has not been preceded by an adequate needs and suitability assessment on grounds decided by the region offering the care, and the final suggested change is that when a patient seeks remote contact out-of-county care, they must pay the patient fees that apply in the patient's home region.

2.2 Services

This section offers an exploration into the dynamics of the service sector, including theory regarding inter-organizational relationships and how these might change over time, considering that a new type of organization has entered the market, building on the theory from section 2.1. Moreover, how service experiences are shaped through direct encounters between customers and service providers. It outlines the journey of service encounters, categorizing them into pre-core, core, and post-core phases, each pivotal in influencing customer perceptions of service quality and satisfaction. As the concept of digi-physical health centers are under development, service encounters provide a theoretical base for the temporal, technical and organizational interdependencies between the three time periods. The service section also extends to the co-creation of value, emphasizing the collaborative effort between customers and firms as the new form of healthcare services demands different resource participation by the actors to create value.

2.2.1 Service Triads and Relationship Archetypes

The complexity of inter-organizational relationships between different actors in generation and delivery of services can be viewed as service triads, consisting of three parties: the buyer, the supplier, and the customer (Wynstra et al., 2015). This means that each actor in the triad has a connection to the other two actors and results in a structure which is less linear as opposed to the traditional supply or value chains. According to Wynstra et al. (2015) the supplier delivers services directly to the buyer's customer through a contract with the buyer, instead of the buyer providing the services to their customer (figure 2.2).

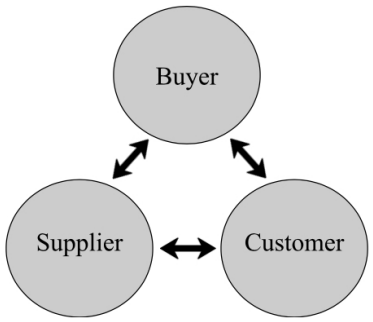

Figure 2.2: Service triad model.

Research has also been conducted from a manufacturing perspective where different actor constellations have resulted in varying relationship archetypes in the aftermar-

kets and spare part sales. Wagner et al. (2018) include independent service firms which can serve the customer in direct competition as competitors in the service triad structure such that it becomes a tetradic archetype with four distinct actors: supplier, focal firm, competitor and customer. With the addition of a competitor in the constellation, the intra-relationship structures can be altered by any actor. Disintermediation from either suppliers or competitors can then occur as the supplier or competitor bypasses the focal firm and disrupts the traditional service triad, creating new competitive pressures and altering market structures (Wagner et al., 2018). Thus, there is a potential for a relationship between each of the actors (figure 2.3) and due to disintermediation some relationships may change over time and cease to exist as actors get bypassed.

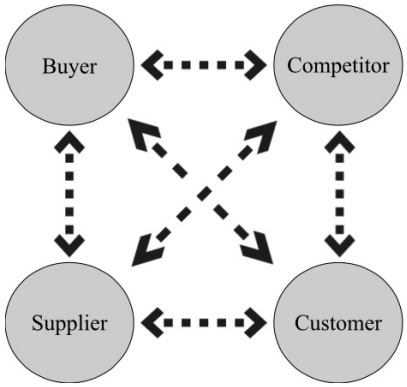

Figure 2.3: Tetradic relationship archetype with potential intra-relationships.

Based on the theoretical concept of service triads and tetradic relationship archetypes, the previous intra-relationships of the main actors in delivering primary care are VGR, digital healthcare providers, physical health centers and the patient. As the patient seeks healthcare from a physical health center or a digital healthcare provider they pay the actor according to the patient fees of the respective actor in exchange for the healthcare services (figure 2.4; figure 2.5). The competition between the physical and digital actors in serving the patient also affects the relationship between VGR and the healthcare service actors as the actors also receive reimbursement from VGR based on each served patient. Since the digital healthcare providers entered the market, patients have been seeking care either digitally from the digital healthcare providers and physically from physical health centers, resulting in a disintermediation of continuity as patients can access healthcare in multiple ways and shift between the two alternatives.

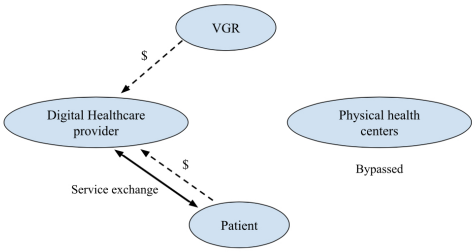

Figure 2.4: Tetradic service relationships where physical health center is bypassed

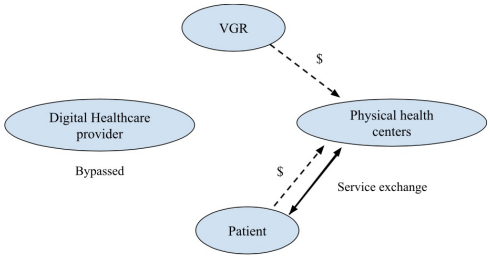

Figure 2.5: Tetradic service relationships where the digital healthcare provider is bypassed

The introduction of digi-physical health centers presents an additional relationship in the healthcare service archetype (figure 2.6). The digi-physical health center provides both digital and physical channels for the patient to access healthcare services, thus has the potential to bypass both the traditional and digital actors. The healthcare services are delivered to the patient in exchange for a patient fee and has a potential for continuity as the patient can shift between digital and physical services with the same provider. Similar to the physical and digital actors, the digi-physical health center also gets reimbursed by VGR based on serving patients.

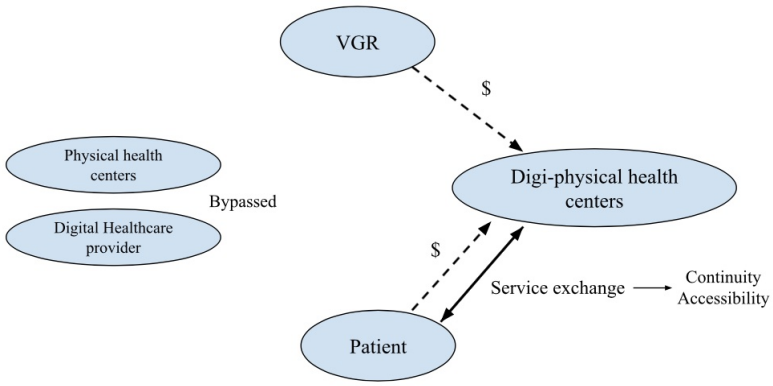

Figure 2.6: Tetradic service relationships where digital and physical actors are bypassed

However, the tetradic service system for primary care in VGR does allow the patient to alternate between any of the three actors: digital, physical or digi-physical, when seeking and receiving care regardless of listing (figure 2.7)

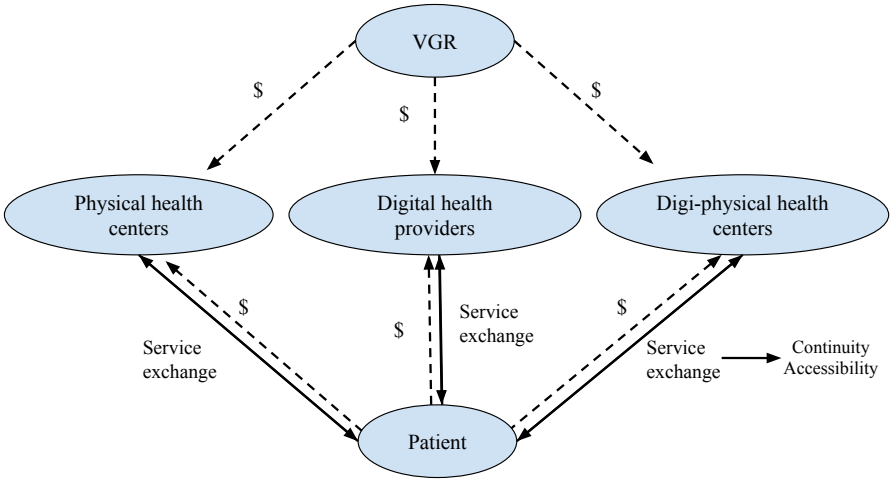

Figure 2.7: Tetradic service relationship with digital, physical and digi-physical healthcare actors

2.2.2 Service Experience Through Service Encounters

The service experience is a customer's subjective interpretation of the elements of the service, emerging during both the process of purchase and use, or through imagination or memory (Jaakkola et al., 2015). The service experience can be characterized by a period where a series of service encounters occur. Service encounters are discrete interactions between the customer and a service provider relevant to the core service offering (Voorhees et al., 2017). During these service encounters, customers experience "moments of truth" where they make judgments about the service provider and the core service which contributes to the overall perceived quality of the service and customer satisfaction (Voorhees et al., 2017). Thus, each service encounter can have a cumulative influence on the customer experience and presents an opportunity for the firm to both satisfy or disappoint the customer. The context of the service also defines the importance of specific service encounters, meaning that not all encounters are equally important and that some "moments of truth" influence the customer's perception of the service and firm more than others. Moreover, in the current digital era, boundaries of interactions have been broadened and service encounters can therefore occur in various forms. Interactions can take place face-to-face, but also through digital mediums such as online settings, email, phone and regular mail (Bitner et al., 2000; Voorhees et al., 2017).

Since a service encounter is any interaction between the customer and the service provider relevant to the core service offering, the service experience includes every point of contact with the customer from the initial engagement, through the actual delivery of the service, to post-service support. Voorhees et al. (2017), propose a holistic view of the customer experience that is conceptually separated into three

phases: pre-core, core, and post-core service encounters (figure 2.8).

The pre-core service encounter period is the time frame leading up to the core service encounter that is devoted to encouraging clients to interact with the service provider in the core-service encounter (Voorhees et al., 2017). The pre-core phase is initiated when the customer begins to acquire information about the provider's service offering and ends when the delivery of the core service begins. This phase also includes the customer's initial contact with the firm, initial exploratory interactions with frontline employees and onboarding processes. The core service encounter period encompasses the time during which the primary service is provided to the consumer. This essential service satisfies a basic need of the client, which is the primary reason customers approach the service provider.

The post-core service encounter period follows the core service encounter, during which consumers evaluate their previous experiences and take actions based on their assessments (Voorhees et al., 2017). These encounters are crucial for customer satisfaction, building long-term relationships and increasing customer loyalty as this can lead to positive word-of-mouth. Additionally, a well managed post-core service encounter phase can lead the customer into the pre-core service encounter phase in the future, thus extending the service experience as a loop. Important encounters in this phase include proactive activities such as customer feedback, but also service recovery efforts, customer reviews, recommendations, complaint management and relationship development.

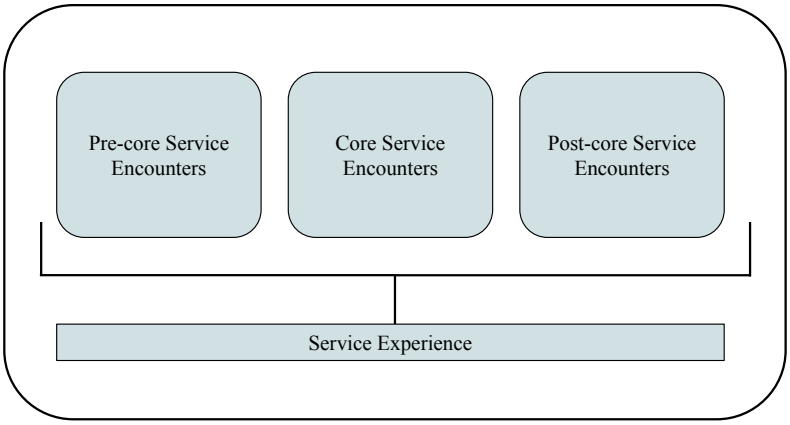

Figure 2.8: Conceptual model of the service experience with pre-core, core and post-core service encounters

2.2.3 Co-creation of Value

From a Service Dominant logic (S-D logic) perspective, value is co-created by customers and firms, and evaluated by the customer in the service context (Skålén et

al., 2015). Thus, value can not be delivered to the customer out of the service context and can only be achieved through interactions between the service provider and the consumer. During the co-creation of value, firms and customers collaboratively integrate resources (Aarikka-Stenroos & Jaakkola, 2012). Therefore, the outcome and value of the service is dependent not only on what the firm can contribute with, but also on the involvement of the customer and the degree to which the customer is able and willing to participate and dedicate resources. Moreover, both the service provider and the customer need to understand what their roles are and why they need to contribute to be able to co-create the most value (Damali et al., 2016). The customer's understanding of the tasks or inputs they need to do, know-what, can help to clarify their role. Knowing the rewards of contribution, know-why, can increase customer's motivation to collaborate while having the required skills on how to provide different inputs, know-how, can ease the customer into participation. Damali et al., (2016) argues that role clarity, motivation and skill together affects the customers readiness to provide inputs during each stage of the service and that higher levels of readiness can be achieved through customer training and education. Moreover, Damali et al., (2016) found that through customer training and education, patients with diabetes were more motivated to provide inputs which further lead to better health.

2.3 Digitalization of Healthcare Services

In the following section, digital healthcare will be presented. Furthermore, digital tools, health literacy and accessibility in digitalization will be discussed. Incorporating digital healthcare into the research of digi-physical health centers is critical for gaining a thorough understanding of how they operate, as they combine digital and physical functionalities. Investigating digital healthcare components, such as technologies and platforms, provides insight into how these centers operate and deliver services. To explore how the goals of the Health and Medical Services Act are met through digitalization, it is essential to theoretically examine health literacy and digital health literacy, especially as patients are expected to become more involved and receive more personalized care. Health literacy is critical for ensuring that patients can effectively engage with, understand, and utilize digital healthcare services. Accessibility, on the other hand, ensures that these digital and physical health services are available and equitable for all individuals, addressing the strategic goal of increased healthcare access.

2.3.1 Digital Healthcare and Digital Tools

Digital healthcare encompasses the utilization of Information and Communication Technologies (ICTs) to enhance healthcare delivery. The European Commission (2024) describes "Digital Health and Care" as tools and services leveraging ICTs to improve various healthcare aspects. Socialstyrelsen (2018) defines "Digital Healthcare Services" as a diverse set of services enabling remote communication between patients and healthcare professionals, which may include telephony, video, chat, email, text, and picture messaging, as well as mobile applications, covering a broad

range of content and medical specialties. Similarly, SKR (2023a) emphasizes the use of digital technology to enhance healthcare services through digital communication platforms like video and chat, or through personal health data monetization tools. 1177 Västra Götalandsregionen (2024) focuses on "Digital Healthcare Meetings," where patients engage in healthcare appointments via video calls or chat.

Table 2.1: Description of the digital tools presented in Digital Healthcare.

Digital Tool	**Description**
Telefony	Voice communication between patients and healthcare professionals.
Video calls	Real-time video consultations between patients and healthcare providers.
Chat	Text-based communication between patients and healthcare providers.
Email	Asynchronous communication for sharing information.
Picture Messaging	Sending images for diagnostic purposes (e.g., skin conditions).
Mobile Applications	Apps for health monitoring, patient education, and telehealth services.
Electronic Health Records (EHR)	Digital records of patient health information.
E-prescriptions	Electronic prescription services for medication.
Online Booking Platforms	Systems for scheduling appointments with healthcare providers.
Health Data Monetization Tools	Tools for personal health data management.

Parallel to digital healthcare are digital tools and platforms, which integrate into traditional healthcare models and include technologies like electronic health records, e-prescriptions, and online booking platforms, widely used across Sweden's regions (Ehälsomydigheten, 2023). However, regional and municipal policies vary, affecting the digital tools employed. Telemedicine, a critical element of digital healthcare, involves providing clinical services remotely, while telehealth, a broader term, encompasses all digital health-related services and information (Rashvand & Hsiao, 2018). The national digital gateway, 1177, facilitates access to health-related services and information, including guidance and e-services, and allows integration of telemedicine services like online consultations (1177 Västra Götalandsregionen, 2022; Ehälsomydigheten, 2023). The tools included in the descriptions by the various actors are described and presented in table 2.1.

2.3.2 Health Literacy and Accessibility in Digitalization

To discuss health literacy in the context of transitioning from a traditional to a digi-physical healthcare model, it is important to consider both the demands of physical health literacy and digital health literacy for both professionals and residents. Health literacy, as a concept, is defined as the ability to access, collect, understand and use health-related information, according to Palumbo et al. (2022). The authors also highlight that there is a need for an assessment of the concept following the digitalization of healthcare. Digital health literacy on the other hand is defined, according to Dunn and Hazzard (2019), as the ability to search for, lo-

cate, understand, and assess health information from electronic sources, as well as to use that knowledge to treat or resolve health issues. This concept extends beyond the ability to use digital technologies, it includes critical skills needed for navigating e-health environments, determining the reliability of online health information, and making informed decisions about one's health based on digital content. Consequently, both telemedicine and telehealth are included in the digital health literacy domain and must be considered.

In the digitalization of healthcare, both challenges and opportunities for health literacy are presented. Palumbo et al. (2022) identify several challenges, including navigating digital healthcare systems, comprehending online health information, and inequities caused by varying access to technology and digital abilities. To overcome these difficulties, they recommend tailoring educational programs, developing user-friendly digital health solutions, and involving patients in value co-creation. Enabling health literacy through digital technologies entails creating platforms that increase accessibility to health information, interactive learning opportunities, and secure communication routes with healthcare practitioners, with the goal of fostering a collaborative atmosphere for better healthcare results. Similarly, Dunn & Hazard (2019) points out that while technology can improve access to information and facilitate communication between patients and healthcare professionals, it can also serve as a barrier for those people that lack access to devices necessary or the skills to use them effectively. They underline the importance of building health technology solutions that promote not only numeracy skills, but also functional and crucial skills, such as navigating healthcare systems and making collaborative decisions.

Palumbo et al. (2022) define digital health literacy as a twofold construct that includes both individual and organizational components. On one hand, individuals, or patients, must be capable of accessing, collecting, understanding, and processing health information using ICTs and digital resources. This skill improves their connection with healthcare practitioners in the digital environment, allowing for more co-creation of value and delivery of health services. On the other hand, digital health literacy encompasses healthcare practitioners' ability to move to a digital-based, people-centered approach to providing health promoting and risk preventing services that suit patients' needs and provide equal access to care. This dual perspective emphasizes the need for both individual skills and organizational strategies in navigating the complexities of the digital health landscape, with the goal of improving quality of care and accessibility to healthcare services.

According to Davey & Grönroos (2019), health service literacy encompasses both individual and organizational components which are essential for integration resources effectively and to co-create value in healthcare services. They describe complementary health service literacy roles, which facilitate resource integration and mutual value creation. These roles include patients acting as seekers, deciders, networkers, sensemakers, and managers of their health information, and healthcare providers acting as knowledge brokers, ethical agents, and enablers. Effective communication and interaction between these roles are crucial for successful resource integration

and co-creation of value in healthcare settings.

Davey & Grönroos (2019), similar to Aarikka-Stenroos & Jaakkola, (2012), also emphasize the importance of co-creation in healthcare, where patients and healthcare providers collaboratively engage in health-related decision-making and actions. This collaboration is facilitated by digital health literacy, which enables patients to better understand and use digital health tools and information. By improving digital health literacy, healthcare providers can enhance the overall quality of care and patient satisfaction. Furthermore, health literacy and digital health literacy are integral to the co-creation of healthcare services. Health literacy roles, such as those outlined by Davey & Grönroos (2019), highlight the dynamic interaction between patients and healthcare providers. These interactions are based on trust, respect, empowerment, and loyalty, which are outcomes of successful resource integration. Conversely, competing health literacy roles can lead to frustration, resistance, and decreased value in healthcare services.

Accessibility as a result of health literacy is also brought up by (Levy & Janke, 2016), where the authors mention that individuals with low health literacy are significantly more likely to experience difficulties in accessing healthcare. The authors conducted a study with people in the ages of 50 and older to examine the relationship between health literacy and perceived health accessibility. The result of the study showed that low health literacy is a significant barrier to accessing healthcare services, independent of other factors such as socioeconomic status. These findings show that to obtain adequate health literacy, individuals must have the abilities and resources to understand and navigate health information and services. In the realm of digitalization, this implies that improving digital health literacy could increase access to digital care by allowing people to utilize digital health technologies successfully, seek appropriate care, and make informed health decisions, resulting in better accessibility in healthcare.

2.4 Summary of Theory

Primary care strategic goals are to increase accessibility, a more personalized care and increased personal continuity. Residents have the possibility to independently choose where to get listed as a patient but can still seek care at other healthcare providers. Out-of-county visits have increased since the digital healthcare providers entered the market and they are reimbursed by VGR and resulted in increased costs for the region due to the reimbursement model.

Service triads and tetradic relationship archetypes describes how the supply chain of service delivery can change over time, as existing and new actors enter the market. Disintermediation from either suppliers or competitors can then occur as the supplier or competitor bypasses the focal firm and changes the traditional service delivery, generating new pressures and demands for the actors in the network.

Customers' service experience can be divided into discrete encounters between the

customers and service provider. By analyzing encounters between customers and the organization occurring before, under, and after the delivery of care, the importance, absence and insufficiency of certain encounters, at specific points in the service deliver process can be identified. As care is co-created during the encounters, the service experience can be linked with the organization's means in delivering the service. The co-creation of care depends on both what the firm can contribute with and the degree to which the customer is involved and willing to dedicate their resources. Both customers' and firm's ability to participate in co-creation is influenced by their understanding of know-what, know-why, and know-how to participate. Customer training and education is one way to motivate customer to participate.

Digital health literacy is the ability by both patient and organization to locate, comprehend, and apply health information from digital sources to make informed decisions about one's health. Depending on one's ability, challenges include navigating digital healthcare systems and comprehending online health information. Technology can also serve as a barrier to access healthcare when one lack access to necessary devices or the necessary skills to use them. Tailored educational programs, user-friendly digital health solutions and patient involvement for co-creation of care can be means to enhance digital health literacy.

3
Methodology

The methodology section elaborates the qualitative research strategy, concentrating on understanding perceptions and expectations within the digi-physical healthcare model, utilized by a case study format. It includes collecting information through semi-structured interviews, structured interviews, and a literature scan. The participant selection is strategic, focusing on professionals and people associated with the health centers and the surrounding areas to ensure a broad and representative sample. Ethical issues are crucial, with informed consent and confidentiality maintained. Data analysis uses theme analysis, which emphasizes a rigorous, flexible approach to identifying patterns and insights based on a combination of deductive and inductive methodologies. The section concludes by discussing the study's reliability and validity, including tests to assure internal consistency, contextual relevance, and the possibility of broader applicability of the findings.

3.1 Research Design

A qualitative research strategy is suitable when the aim of the study is to understand a social setting by examining the participants' interpretation of the setting (Bell et al. 2022), making this approach suited for understanding perceptions, expectations, and concerns of residents and healthcare professionals regarding the digi-physical healthcare model. Moreover, a case study design was used as it puts emphasis on an intensive examination of a specific setting (Bell et al, 2022), ideal for the in-depth analysis of the new digi-physical organizational structure at the two health centers.

3.2 Data Collection Methods

The data was collected through semi-structured interviews with healthcare professionals and experts at the health centers, along with a prior literature scan. Structured interviews were conducted to gather data on the perspectives, experiences, and concerns of residents. The data collection methods are described in the following sections.

3.2.1 Literature Scan and Initial Interviews

The literature scan and initial interviews formed the base of the theoretical framework, supported by a systematic examination of relevant academic literature. This phase involved identifying deductive coding concepts relevant to thematic analysis,

ensuring a structured approach during the initial analysis stages. The themes and initial findings from the literature were verified and complemented through initial interviews with experts at Närhälsan. The literature review provided a theory-driven methodology for categorizing and interpreting initial datasets, thereby supporting the research.

A literature scan was conducted as a first step to provide an overview of the research area and identify relevant previous research. After the initial review of these scientific articles and reports, a wider literature scan was performed in order to identify other relevant research areas.

Findings: The relevant research areas identified after this first scan were: continuity, health literacy (both digital and personal), accessibility, co-creation of care and service offering. These research areas were then confirmed as relevant by the representatives at Närhälsan.

3.2.2 Participant Selection and Sampling

Both purposeful and convenience sampling strategies were used to select a representative cohort of participants. Purposeful sampling was used to select personnel employed at Närhälsan for interviews regarding the organizational means of digitalization at the health centers and the rationale for developing the digi-physical health centers.

To understand the perspective of professionals working with digi-physical care, professionals employed at the health centers with expertise knowledge and experience of the digital-physical healthcare model were purposefully sampled.

Convenience sampling was utilized to select residents for interviews. Due to absence of necessary clearance to contact patients directly, related to legal and ethical medical constraints, patients were not included in the study. Instead, interviews were conducted with residents within the neighborhoods of the digi-physical health centers. This alternative approach facilitated the collection of residents who, although not patients, could provide their perceptions, expectations, and concerns related to digi-physical care. Furthermore, residents in both neighborhoods are the most likely individuals to be listed at the health centers due to the principle of proximity. Additionally, residents in these areas have received information about the establishment of the digi-physical health centers regardless of their listing, thus ensuring a comprehensive understanding of the perception of the community.

These methods ensure that the sample included a wide range of participants, making the study's results more valuable. This reassures that the participants selected for the study are those most affected by, or knowledgeable about, the digi-physical health centers.

3.2.3 Interviews

Interviews were conducted with professionals in possession of specialized knowledge, significant expertise and experience in the particular field and organizational context. The interviews with professionals provided data regarding both the digi-physical structure and their perspectives regarding their way of working within the digi-physical organizational model. A total of 11 healthcare employees were interviewed with varying roles at both health centers, as seen in table 3.1. These interviews followed a semi-structured format with a clear set of questions prepared in advance to guide the interview, see A for the interview guide. The semi-structured format allowed flexibility to explore both new topics as they arose and examination of topics in depth during the interviews as needed (Bell et al., 2022), thus ensured that new insights could emerge while the core research questions were addressed.

Table 3.1: List of expert interviews.

Part of Organization	Role	Number of Interviewees
Digi-physical Health Center	District Nurse	2
	Division Manager	2
	Health Center Manager	1
	Medical Secretary	2
	Pediatric Nurse	1
	Physician	3
Närhälsan	Digital Coordinator	2
	Manager of the Digi-Physical Concept	1

Interviews with professionals were conducted in a secure and confidential setting, respecting the privacy and comfort of the participants to encourage an open and honest dialogue between the interviewees and interviewers. The interviews were audio-recorded if permission was obtained from the interviewees to enable digital transcription. In the case where permission was not granted by the professional, the interviews were manually transcribed to ensure the participants' privacy. All interviews were held in Swedish and used as raw data for the analysis, while the result was translated and presented in English.

Interviews with residents were conducted to understand their view of the digi-physical health centers. These interviews were structured to facilitate time management and allow for easier comparison and analysis of the result, see interview guide in A. A total of 29 residents were interviewed, 16 residents in the area of health center A, and 13 residents in the area of health center B.

3.3 Data Analysis

In the process of qualitative research, thematic analysis stands out as a robust and flexible method for exploring complex datasets (Bell et al., 2022). It focuses on identifying, analyzing, and presenting patterns, often referred to as themes, within the data. The process of a thematic analysis involves three critical stages: coding, categorizing and thematizing. Firstly, the interview transcripts were coded based on the main themes in the theoretical framework, a deductive analytical approach as the coding categorized the data based on existing concepts from established scientific research. This ensured that the analysis was grounded in prevailing knowledge and relevant theories, thereby facilitated a structured investigation of specific themes relevant to the digi-physical healthcare model. Common patterns which were not included in the theoretical framework were also coded and categorized into novel themes. This inductive approach captured the unique perspectives of the residents and professionals and allowed a flexible analysis responsive to the data gathered and unveiled new insights which are not theoretically predetermined.

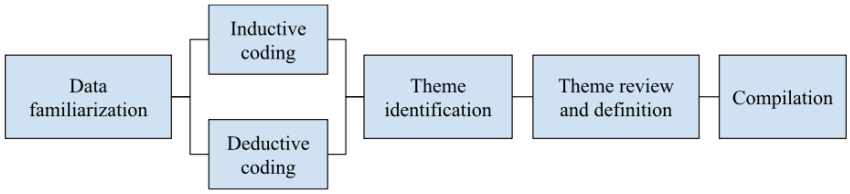

Figure 3.1: Flowchart illustrating the thematic analysis process in the study.

The thematic analysis process is visualized in figure 3.1, showcasing a dual-pathway approach after the data familiarization. One path demonstrates the inductive coding, where new themes emerge directly from the data. The other path illustrates deductive coding, applying predefined themes based on existing theoretical frameworks. These pathways merge at the theme identification, progressing to the review of the themes and the concluding theme definition. This visualization underscores the integration of inductive and deductive methodologies in the analytical process to enhance the depth and rigor of the study's findings.

3.4 Reliability and Validity of the Methodology

Bell et al. (2022) argue that reliability and validity are critical features to consider when establishing and assessing the quality of this research, and indicate that this process can be carried out in a variety of methods. The authors cite previous research by LeCompte and Goetz (1982), who emphasize internal and external reliability and validity as criteria for determining the quality of quantitative research, which were applied in this study.

Internal reliability was ensured through a consistent framework for the interviews while simultaneously allowing flexibility to explore individual perspectives. This approach minimized interviewer bias and ensured that the interviewees had the same

context and got the same opportunity to answer the questions asked. Additionally, a pilot test was conducted to refine the interview guide for clarity and consistency. For all interviews held, both researchers participated, listened and analyzed the data. After each interview, the initial analysis and interpretation was conducted individually and later discussed together to eliminate biases and include wider perspectives. Moreover, quotes presented in section 4 were reviewed and verified with respective interviewee to ensure the significance of the quotes remained when translated from Swedish to English.

To ensure that the methods accurately captured the intended information, a combination of interviews and a literature review was conducted. Bell et al. (2022) suggest triangulation, where multiple methods, data sources or researchers are included to validate the findings. Triangulation, allowed for internal validation of findings within the study and reduced the risk of misinterpretation. Moreover, the combination of inductive and deductive approach in thematic analysis facilitated the uncovering of genuine insights from the participants and enhanced the authenticity of the data interpretation with the combination from the initial findings from the theory.

Considering the specific focus of digi-physical health centers located in two neighborhoods, external reliability may be affected by the unique characteristics of these areas and their residents. Therefore, replicating this study in other settings might be difficult. However, by sampling both the perspectives of healthcare personnel with different roles and residents, the findings from this research might still be transferable for researchers in similar settings.

The extent to which the results from the study can be applied to other regions, or different digi-physical healthcare settings, was a key consideration. Given the specifications of the local context, achieving high external validity was challenging. The way health centers are governed and reimbursed varies greatly across Sweden. However, by selecting these centers due to their unique implementation of the digi-physical model, the aim was to derive insights that were potentially applicable to similar healthcare settings. The detailed contextual description of the digi-physical model and the theoretical grounding of this study will aid in assessing the relevance of the findings to other scenarios.

3.5 Ethical Considerations

Procedures were established to ensure participants were provided informed consent, were aware of the aim of the study, remained anonymous, and maintained their confidentiality. To ensure anonymity, the quotes presented in section 4 are not cited to a specific respondent. The study strictly followed ethical guidelines, with an emphasis on the moral implications of the interviews. All research activities were conducted respectfully and without intrusion, in order to maintain the study's integrity and ethical responsibility. Therefore, no interviews with residents were conducted at the digi-physical health centers, instead, these interviews were conducted outside in

close proximity to the centers.

4
Results

In the following section the findings from the interviews are presented. First, the structure and ways of working at a digi-physical health center are described by dividing the service experience into pre-core, core, and post-core encounters. Then, the analysis presented in chapter 3 has been followed, and the codes have been gathered into overarching themes. Quotes are used to represent the different themes identified and illustrate answers given in the interviews. This section will start with the findings from the interviews with the residents in Kallebäck and Öjersjö, following with findings from the professionals working at the health centers. The results are structured from the theoretical concept of service encounters in pre-core, core and post-core, where the empirical themes identified have been explained and positioned in the various phases. All themes not applicable to any of the service encounter phases are also presented separately.

4.1 The Digi-Physical Health Center

The following section explores the structured delivery of healthcare services at a digi-physical health center, categorized into pre-core, core, and post-core service encounters. This approach will demonstrate how healthcare providers experience and deliver the center's services, as well as their understanding of residents' experiences from start to finish, by incorporating theoretical perspectives on service encounters and co-creation of value within healthcare contexts. According to Jaakkola et al. (2015) and Voorhees et al. (2017), the service experience is the customer's subjective interpretation of service elements throughout their interaction with the service provider, from the first contact to the final engagement. These interactions are critical points at which customers form perceptions that significantly influence their overall satisfaction and perceived quality of service. It is important to consider both the professionals' and patients' perspectives during service encounters because value in healthcare is co-created through interactions between patients and providers (Skålén et al., 2015). Co-creation, based on service-dominant logic, emphasizes the importance that value arises not only from what healthcare providers deliver, but also from the active participation of patients throughout their care journey (Skålén et al., 2015; Aarikka-Stenroos & Jaakkola, 2012). These interactions, or touchpoints, in the various phases will be described in detail to gain a better understanding of how digi-physical health centers operate and provide their services. The various digital tools used by residents and professionals during pre-core, core, and post-core service encounters will be explained and are visualized in figure 4.1.

4.1.1 Description of the Digi-Physical Structure

The pre-core phase encompasses all preliminary interactions before the actual medical consultation, setting the stage for a smooth and informed service experience (Voorhees et al., 2017). This phase is crucial for ensuring that patients are well-prepared and healthcare providers are well-informed about the patients' needs. Pre-core service encounters begin when a patient seeks information about the desired service, whether by contacting the health center to schedule a healthcare consultation, reaching out in other ways, or simply searching the internet for information. This process entails reviewing information available from sources such as Närhälsan, 1177, and other details available about the health centers. Since the pre-core service encounters involve all relevant prior interactions with the service, it is reasonable to incorporate prior knowledge, perceptions of Närhälsan's digi-physical care along with the customers evaluation of other options, such as competitors who offer comparable services, into the pre-core phase.

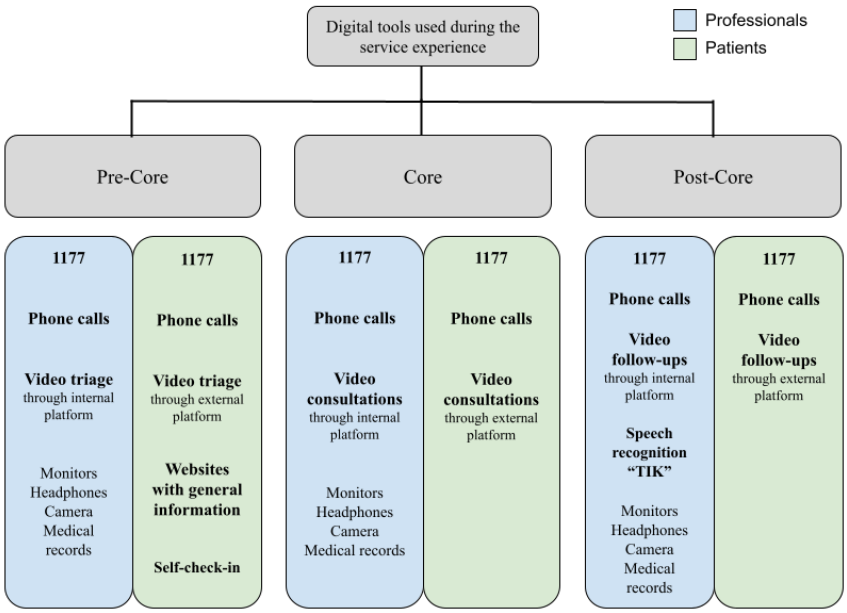

Figure 4.1: Visualization of the digital tools used by professionals and patients in the pre-core, core, and post-core service encounters.

The digital tools involved in the pre-core service experience are 1177, the health centers' own webpages, other information available online, and telephone or video triage through their internal and external video platforms. If a patient or healthcare provider inquires about a physical appointment via messages or online booking through 1177, or via triage through phone or video, the pre-core service encounter will also include self-check-in services at the premises. During video triage, the patient accesses the consultation via an online platform linked to Närhälsan's internal video platform. Patients can use the platform through a smartphone app or by visiting the related website. The professionals employ a camera, noise-canceling headphones, and two monitors, one for the video stream and the other for the patient's medical data and other important online information needed for triage.

The work procedures differ between the health centers during pre-core encounters. Health center A has implemented digital video triage as an initial step, which may be followed by a physical visit. Professionals at health center A describe this approach as a way to collect all necessary information digitally before supplementing it with the necessary physical examinations. Health center B, on the other hand, operates under certain criteria that might rule out digital health consultations, directing patients to physical visits instead. Patients at health center A can not schedule a physical meeting themselves, whereas such appointments can be scheduled through health center B's online portal at 1177.

As the professionals explained, the entry point through which a patient seeks assistance does not affect the outcome; all channels ultimately lead to either a physical or digital consultation if deemed necessary by the healthcare personnel. To clarify, messages via 1177, phone calls, and video triage are all equivalent paths that could culminate in a visit, either physical or digital, based on the healthcare team's assessment. The healthcare providers emphasize that they monitor all these channels and note that using more than one does not expedite the process, as cases are addressed in chronological order. The healthcare personnel also point out that although there is no physical drop-in service, they try to accommodate individuals who come by for a visit whenever possible.

The use of digital tools in post-core encounters has had a significant impact on the role of medical secretaries in the pre-core phase. The incorporation of these digital tools into post-core activities has reduced the workload for medical secretaries during that stage, prompting them to look for new ways to add value during pre-core encounters. This includes educating local residents on digital solutions and providing IT support for the team. Health center A has expanded on this initiative by collaborating with preschools and posting informative videos on their Facebook page, thereby increasing awareness and engagement with the community. Meanwhile, health center B has designated their medical secretaries as the primary contacts for IT-related issues, making them the links between IT support and the health center itself.

The core service encounters include the period in which the major service delivery occurs, as well as the primary purpose for the customer approaching the service provider (Voorhees et al. 2017). In digi-physical healthcare, the core service typically involves a healthcare consultation, either digital or physical. However, it can also include services such as responding to a prescription request or answering a question posed to the healthcare personnel. According to Ehälsomyndigheten (2023), all regions in Sweden have employed e-prescriptions, electronic health records and platforms for online bookings. Consequently, the focus will shift to the differences between digi-physical and physical healthcare, specifically regarding increased video consultations, during the core service encounters.

Despite the emphasis on digital interactions, the health centers recognize the im-

portance of balancing digital and physical consultations. Health center A typically initiates consultations digitally, adding physical examinations as required. In contrast, health center B identifies specific situations where digital consultations are unsuitable, opting instead for in-person appointments. Moreover, during video consultations, professionals at both health centers regularly engage with colleagues, collaborating as necessary to ensure thorough evaluations. Such collaboration may include a nurse consulting a physician during a video consultation with a patient.

The setup for video consultations is identical to that of video triage for both patients and professionals, involving the use of an external platform or app for patients and an internal video platform for professionals. This configuration also includes cameras, noise-canceling headphones, monitors, and access to the patient's medical records for the healthcare providers.

The post-core service encounters include the period where customers assess and act on their prior experience during post-core and core. According to Voorhees et al. (2017), the service provider's goal through this period is to retain the customers and improve their future service experiences. Voorhees et al. (2017) also highlight that if this phase is managed effectively, actions taken during the post-core service period can seamlessly transition into subsequent pre-core service encounters, thereby continuing the experience loop. Voorhees et al. (2017) explained that researchers have examined these crucial encounters, recognizing the significance of interactions that occur after the core service has been delivered. This includes a focus on service recovery efforts, highlighting their importance in maintaining continuity and quality in the service cycle. In healthcare, post-core services differ from those in other industries; the primary focus is on resolving patient issues rather than customer retention. Nonetheless, if problems persist or new issues arise, continuity of care is enhanced if a patient decides to return to the same service provider, showing the importance of post-core services.

The post-core services at the health centers are in a way a part of the experience loop, since a follow-up appointment could result in triage for a new appointment booking. The professionals emphasized the flexibility of post-core follow-ups, tailored to the specifics of each case. Follow-ups could be conducted through 1177 messaging, phone calls, video, or in person. However, the majority of employees acknowledged a focus on digital follow-ups over physical ones, unless a physical presence is necessary. The tools and processes used for video follow-ups are identical to those employed in video triage and video consultations.

The additional tool used for the healthcare personnel during post-core services is the speech recognition tool called "TIK". Previously, healthcare personnel would record audio files that medical secretaries would later transcribe, but with voice recognition, the text is entered into medical records in real-time.

Feedback is an essential component of the post-core service encounter. The professionals stated that it is primarily accessed through individual efforts, either during

or immediately following a consultation. However, neither health center has used structured feedback loops or systematically engaged patients to improve their services.

Furthermore, the professionals explained that they were unable to fully implement the concept due to various factors, such as insufficient numbers of listed patients or not enough employees. Health center A currently has a smaller workforce, making them unable to split the team into two. Conversely, health center B has a sufficient number of employees but lacks enough listed patients, necessitating the outsourcing of their services to other facilities. Moreover, the professionals described a digi-physical health center as an organization where innovations are tested and applied to both enhance the quality of care for patients and improve the daily work for healthcare professionals.

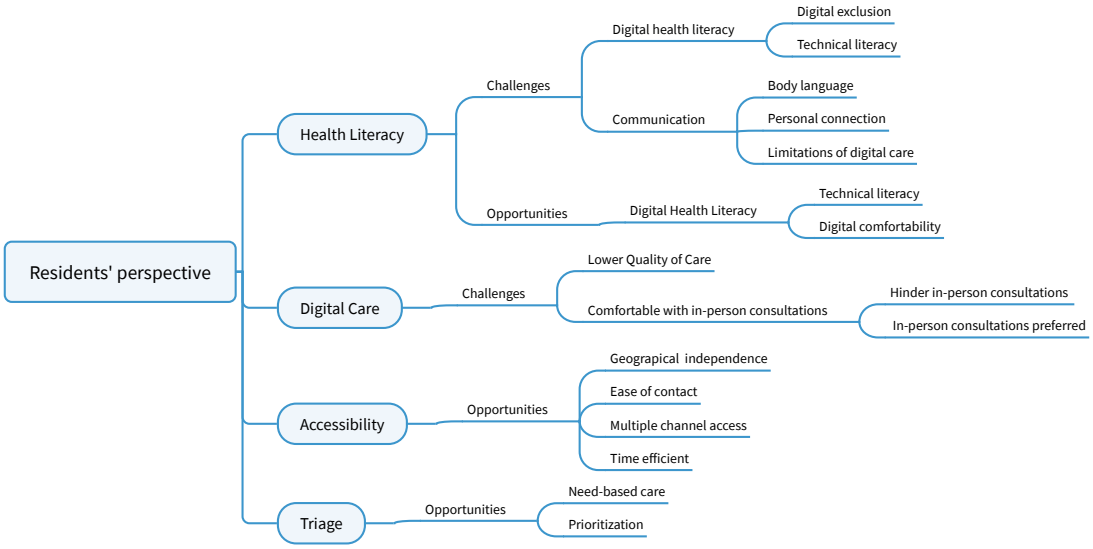

Figure 4.2: A visual representation of the data gathered from the residents, divided into themes.

4.2 The Perspective of Residents Regarding the Digi-Physical Health Center

The following section describes the findings from interviews with residents about their awareness of and experiences with digi-physical health centers. To illustrate the findings and the residents' responses, quotes from various individuals are used throughout the section. This section of the result aims to provide a more nuanced understanding of the residents' familiarity with the new health center model, as well as their perceived opportunities and challenges. The opportunities and challenges identified in the following sections for the residents are described in figure 4.2.

4.2.1 The Residents Awareness of Digi-Physical Health Centers

Residents in the neighborhoods were asked about their understanding of the newly opened digi-physical health centers, and their responses varied. Some locals had visited the health center and were familiar with its procedures, but others had never heard of the concept and were unsure what it could represent. Table 4.1 presents the variation in the answers. Despite having attended a physical visit at one of the health centers, one individual listed there remained unaware of their digi-physical structure, assuming it to be purely physical.

Table 4.1: A visual representation of the answers given by the residents when asked if they knew what a digi-physical health center was.

Q: Do you know what a digi-physical health center is?		
Yes	5	Of which, all were listed at the health centers.
No	14	Of which, one was listed at the health center. 3 guessed correctly after hearing the name 'digi-physical' and being asked to guess. One had heard of one in the area but didn't know the meaning.
Purely digital	10	Directly assumed it was purely digital or connected it to one of the existing digital healthcare providers.

One resident who instantly connected the digi-physical health center to a digital healthcare provider was asked if they knew what the concept was, and stated:

"But are you thinking about doktor.se and Kry and stuff like that?"

While this concept was unfamiliar to some residents, five individuals were aware of it and were all listed at the health centers. However, during the interviews with residents nearby the health centers, 14 people were unaware of what the concept entailed and failed to guess its meaning.

4.2.2 The Residents Perceived Opportunities Regarding Digi-Physical Health Centers

Despite varying levels of familiarity, residents' perspectives shed light on potential opportunities associated with these health centers. Through their responses, key themes were uncovered, such as accessibility, digital competence and need based care through improved triage. The most frequently mentioned opportunity, improved accessibility, was brought up by the majority of the interviewees. One resident highlighted the accessibility through the perspective of geographical independence and time efficiency, by stating:

> *"You can just sit at work and take a doctor's appointment, and that's very positive. And it's quick."*

While another resident pointed out the ease of contact by stating:

> *"It feels like it might be a bit easier to get appointments and that they can offer more appointments."*

Another important aspect is the multiple channel access, which a resident highlighted through:

> *"The fact is that it becomes a larger and broader range. Sounds more accessible."*

Several residents highlighted the quicker care as an opportunity within accessibility and one pointed out that:

> *"It feels like you can communicate directly whenever you want and get healthcare faster, which is good."*

Another aspect and opportunity brought up by the residents was the digital competence. This could be seen through their willingness to try digital tools and digital care. The aspect most frequently mentioned was that people felt safe using digital care for minor ailments. This can be illustrated through the statement made by one of the residents:

> *"Practically, I think there are advantages [of digital care] in that if it's not such big things, it can be something that can be solved [...]. So it's an advantage that it can go smoothly."*

Many residents highlighted that the younger generation have a better digital competence in general and that their technical knowledge and digital literacy made them feel confident and comfortable using digital and digi-physical healthcare. One younger resident pointed out that:

> *"I'm at that age where it doesn't matter if it's a video call or if it's in person as long as it's something simple."*

The last frequently mentioned opportunity brought up by several residents was the possibility to have improved triage and need-based care. One resident stated that one opportunity with digi-physical healthcare from their perspective is:

> *"That one can crystallize healthcare needs more quickly and thus, for those who actually need to come physically to the location, that one can better distinguish those groups."*

The improved triage was also mentioned in combination with accessibility and continuity. One interviewee mentioned that:

> *"You get to know about the person digitally, and the problem the person is suffering from in a digital format. Then you see if it is necessary to*

have physical contact with the person. So you can reach everyone."

The interviewees highlighted accessibility, stated opportunities such as simplified appointment scheduling and increased service accessibility. Furthermore, residents exhibited trust in digital care for minor ailments and recognized the younger generation's familiarity with digital tools. Improved triage and need-based care through digital care were also viewed as opportunities, allowing for faster identification of healthcare requirements.

4.2.3 The Residents Perceived Challenges Regarding Digi-Physical Health Centers

The residents primarily considered consultations conducted either in person or in the digital format through video connection and did not mention other digital formats for the contact with the health center. The challenge most frequently mentioned by the residents was how the communication with the physician was limited when the consultation was conducted through video. Residents brought up that the healthcare professional might not read the body language as well as when seeing the patient in person, as one resident stated:

> *"You might miss certain details that you would have noticed if you met someone in person. When you meet someone digitally, you might not see that their eyes are drooping or notice the whites of their eyes."*

Moreover, residents expressed a concern for receiving lower quality of care as all issues cannot be investigated digitally. The concern for lower quality of care were also mentioned to be caused by the difficulty in analyzing body language through video, as highlighted by a resident who said:

> *"You can't read body language as well digitally, and sometimes it actually becomes a bit worse."*

The communication between the resident and the physician is described to be of importance for both groups in establishing a personal connection. Residents perceive the in person meeting to more easily mediate the interpretation of the other participant. A resident described the personal relationship as below:

> *"I get more personal contact with the treating doctor or healthcare staff, so they can read me and I can read them."*

Additionally, residents also expressed concern regarding their own ability to interpret the physician during video consultations to the same degree as they would during in person encounters, and how this could lead to a less personal connection where the residents fear they would not feel comfortable nor safe as described by a resident below:

> *"I want to be able to read the treating person for my own sake to feel secure and safe, the feeling that is conveyed when you are face to face."*

Residents further raised the concern that they might be faced with the challenge where the physician does not listen to the patient as carefully or does not conduct as thorough assessment during a digital consultation, as compared to one in person.

> *"A disadvantage [with digital care] might be that you don't receive the help you need, that things aren't looked at closely enough, and something gets overlooked, and you might need medical assistance or someone to examine it physically."*

The fear of not receiving the necessary care during digital visits, made the residents reluctant to digital consultations when they perceive their condition to be of a more serious matter, as one resident explained: "Well, if it wasn't necessary, it entirely depends on what it is [healthcare condition]. Of course, if it could have been done digitally, I would have opted for that [digital care] if it isn't that serious."
Digital literacy was brought up by multiple residents, categorized as the younger generation, where they had the perception that this type of service offering was mostly accessible to the younger generation while the older generation would find it difficult to know where and how to request care at a digi-physical health center.

> *"Perhaps only the young might seek it out [the digi-physical health center]. Those with the greatest need, the elderly, might not really know where to seek care."*

This was also raised as a concern by the residents categorized as the older generation, where a resident expressed their concern as below:

> *"I find that a bit challenging as well, considering that I didn't have digital access as I mentioned before. Or well, I do have a phone [to call], but you know what I mean."*

Both the perception that the communication is not as efficient in a digital format and a lower degree of digital literacy by the resident results in the residents preference for in person encounters with healthcare professionals. In both of these cases there was a perception that the resident could find it more difficult to get an in person encounter with healthcare personnel and that it would take a longer time before one receives in person care. As one resident reasoned:

> *"One potential drawback could be that meeting someone in person might be more difficult. Asserting your rights can be challenging. They may assume that the issue can be managed digitally, but you might prefer personal contact."*

This underscores the residents' belief that securing an in-person consultation would be difficult, despite their preference for face-to-face interactions, as they perceive healthcare professionals to be reluctant to accommodate their desire for in-person meetings.

The residents brought up several limitations with the digi-physical care. Communication over video can be restricted, where body language is not interpreted as easily

and critical signals can be missed, resulting in less accurate medical assessments. The residents also find the loss of personal contact challenging as in-person meetings provide a space where the patient can interpret the healthcare professional, creating a feeling of comfort and safety. Additionally, residents fear healthcare personnel may be reluctant to provide in-person visits for instances they believe can be resolved over video, reducing the availability of in-person care. While the residents think minor ailments can be suitable for video visits, physical visits are generally preferred by the residents for more serious conditions. Lastly, the younger generations often feel more at ease using digital care, whereas the older generation often find it challenging.

4.3 The Perspective of Healthcare Professionals Regarding Digi-Physical Health Centers

The findings from the interviews with healthcare professionals are presented in the following section. To illustrate the findings and the responses of the professionals, selected quotes from various professionals are used throughout the section. Note that when patients are mentioned, these are based on the professionals perspectives as no patients have been interviewed. This section covers the professionals' motivation for engaging in a digi-physical environment, their descriptions of digi-physical health centers, and their interactions during pre-core, core, and post-core service encounters. Additionally, it addresses their perspectives on marketing and information distribution, the specific requirements imposed by the digi-physical model, and their visions for the future of digi-physical healthcare.

4.3.1 The Motivation of Healthcare Professionals to Work at a Digi-Physical Health Center

The professionals were asked about their motivation to start working at these digi-physical health centers and the different answers were clustered together into overarching themes. The professionals are motivated by the opportunity to shape a new healthcare initiative from the ground up, allowing for more decision-making autonomy. Furthermore, they are drawn to the challenge of working on a new project and believe in the transformational potential of digital aspects of healthcare.

The first theme, the opportunity to shape a new healthcare initiative from the ground up and allowing for more decision making autonomy were brought up by many employees, as one mentioned:

> *"A completely new [venture], and to be involved from scratch, so that you have more say now, that appeals to me."*

Another employee also stated:

> *"I believe in digital healthcare now and in the future. And I want to be part of starting it up, and I knew it didn't exist, so to speak. [...] it didn't*

exist anywhere, and then I felt that this is something I want to be involved in and initiate."

Their enthusiasm over digital transformation was evident among many employees. This attitude was consistent among the majority of the employees. Several mentioned that digitalization is a significant part of the future within healthcare. One individual emphasized:

"Also, I believe very much in the digital aspect, I think it will facilitate and simplify healthcare in many ways."

Before employment at the health centers professionals had a general positive attitude towards digi-physical healthcare, showing enthusiasm and pleasure with their employment. After experiencing the positive aspects of digi-physical healthcare, this attitude remained. However, obstacles to being innovative and fear of excluding the patient have somewhat negatively affected their motivation. When asked about their attitude, the favorable aspects of their employment were evident in numerous interviews, underscored by a statement from one of the employees:

"It's very positive. It's been a long time since I felt such genuine work joy."

One challenge mentioned to have impacted their attitude negatively was obstacles to being innovative. One interviewee highlighted the obstacles they face by stating:

"We were actually stopped so many times with various things we wanted to do because the conditions weren't right. And that has been the hardest part for me."

Another challenge mentioned that negatively impacted their motivation was the fear of excluding patients. This concern was underscored by comparing it to the banking industry, which had previously undergone digitalization, as one employee explained:

"I can sometimes sense a fear of attempting to exclude the patient. Similar to when the banks closed, not receiving customers, or suddenly having no money in the bank. [...] Sometimes it feels like one has to push to guide them on the right path."

The professionals at the digi-physical health centers are primarily motivated by the transformative potential and autonomy offered by this new healthcare model. Their enthusiasm stems from the opportunity to shape healthcare from the ground up, heavily influenced by the advantages of digitalization. Despite the fact that some of the professionals reported concerns about patient exclusion and their desire to innovate freely, their overall positive outlook remained unchanged.

4.3.2 Pre-Core Service Encounters

The professionals were asked to elaborate on the work procedures and tools employed during the pre-core service encounters, which occur before the actual health-

care consultation with patients. Specifically, they were tasked with describing the various methods through which residents can initiate contact with the health centers. The gathered information and identified themes are represented in figure 4.3. The responses were remarkably consistent across different interviewees, suggesting a standardized set of practices for initial patient engagement. The tools and procedures mentioned included physical visits, phone calls, and contact through 1177. 1177 is a website that allows residents to write messages to health centers, renew prescriptions, and book appointments with a nurse, as one respondent explained:

> *"There's the classic option of coming in physically. Then we have a manned telephone line, which is the old classic that many feel comfortable with, so it's manned from 8 to 17 every day. Then we have 1177, where you can send messages or send 'I want to renew my prescription' and some other things. At 1177, we also have the web booking. So patients themselves go in and book appointments with a nurse."*

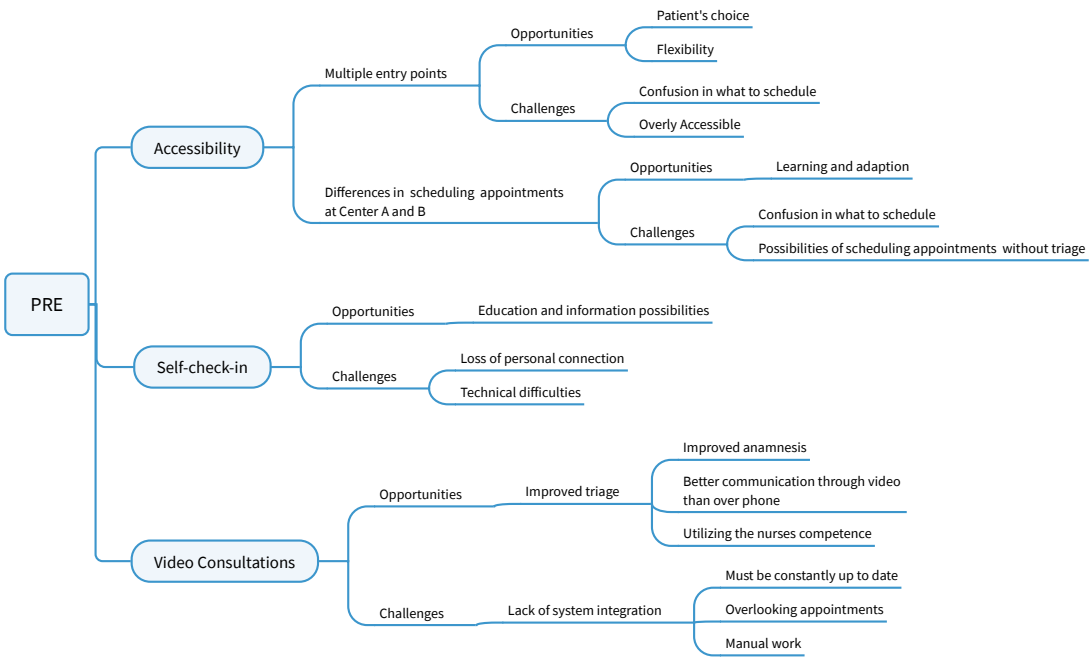

Figure 4.3: A visual representation of the data gathered representing the pre-core service encounters, divided into themes.

One aspect that differed between the two health centers was in what ways residents can book an appointment through 1177. Employees at health center A have taken the initiative to conduct all visits digitally first, followed by physical elements if needed. An employee from the health center explained:

> *"Even the visits that we know will be physical, we start digitally with them as well, and sort of do the groundwork, do all the preparation, and then complement it with that little thing as a physical aspect. Instead of having a completely physical visit just because we know that in the*

> *end there will be, for example, sampling. Then it doesn't have to be a completely physical visit but we still do it digitally and then we book an appointment for sampling."*

At health center B, residents have the option to book both physical and digital appointments with a nurse directly through 1177. However, appointments with a physician must always be initially triaged. An employee at health center B explained:

> *"You can schedule appointments for district nurses [...] for both types of visits [digital and physical]. But for a doctor's visit, you must call."*

The interviewees at the two health centers described the most commonly chosen methods for scheduling appointments. For instance, residents at center A primarily utilized web bookings through 1177. An employee from health center A provided an explanation to the most commonly chosen paths to get in touch with the health centers:

> *"With us, it's the web appointments; generally, it's by phone. But that's because many health centers don't have the digital option of web booking like we do, so it's ingrained to call in. We don't have much of that; it's the opposite with us."*

Although all channels were mentioned by the employees at health center B, the majority of the interviewees mentioned the telephone was a commonly used method to get in contact with the health center. An employee at health center B stated the most commonly used channels for contact as:

> *"It's the phone calls, of course, to the nurse or that they just show up at the door. Or they can write using 1177. Those are basically the main channels."*

Another distinction between the health centers lies in the requirements for booking an appointment. At health center A, all requirements for online appointments were removed to better understand the demographics of people seeking care and the nature of their illnesses, as one interviewee explained:

> *"We've removed the limitations, so you can seek care for anything, and thus we can't have any requirements either, so then we have to accept everything as well. But it's also the start-up for us because we need to get a grip of what kind of cases we have seeking care. They can seek care for anything. They could do that otherwise as well, but for example, an emergency appointment today might involve certain criteria. We don't have any criteria; you can seek care for anything."*

Opposite to health center A, health center B has specified cases when digital appointments are not suitable. Their procedures during triage are explained by one of the employees at health center B:

> *"They [nurses] need to keep track of which health conditions can be ad-*

> *dressed in a digital meeting, and we have a document for that. It's not complicated, we've just taken a different approach in that document. Instead of listing all the conditions that can be managed digitally, we've specified the instances when it should not be digital. So, we don't need to sit with an extensive list of conditions."*

Thus, at both health centers, individuals can schedule digital appointments with a nurse. However, health center B has implemented criteria where they deem digital meetings unsuitable, in contrast to health center A. Furthermore, health center A highlights that digital booking constitutes the primary mode of contact for residents. Another distinction lies in the possibilities of booking physical appointments with a nurse directly through 1177 at health center B. At health center A, a physical appointment necessitates triage with a nurse before an in-person consultation, which can be conducted either through a video appointment or over the phone. The options available online at the health centers are illustrated in table 4.2.

Table 4.2: The various ways of booking an appointment, both digital and physical, at health center A and B.

Health center	Options available for bookings
A	• Digital appointment with a nurse • Seasonal influenza 2023/2024 • Vaccination
B	• Physical appointment with a nurse • Appointment schedule for sampling • Vaccination TBE • Video visit with a district nurse • Video visit - Consultation regarding a sick child

The professionals highlighted that the different points of entries to the health centers are very accessible to the residents. However, they also explain that difficulties could arise when there are equivalent options available for the residents to choose from. When the residents have several ways of contacting the health centers and no restrictions in using multiple channels simultaneously, it generates a frustration as the healthcare professionals need to manage the resident through all channels. The professionals have experienced that this creates a frustration for the patients as they do not get faster access to the health center despite going through several channels, as explained by a respondent:

> *"But I would also say this: when there are very equivalent opportunities, it creates frustration among healthcare personnel because patients use the three or two channels. This results in double or triple the work for the staff. It also becomes an irritation for the patients, the healthcare seekers, because they feel like they're trying in many different ways, yet it doesn't speed up the process."*

Furthermore, the professionals highlighted the aspect of them being too accessible. Lacking specific criterias could also allow residents to request care for unnecessary ailments:

> *"The accessibility is really great. The patients are surely very satisfied, much easier to access healthcare. The downside is that they might seek care for unnecessary things, and that's a bit of an issue because we can't triage them in any way, so perhaps we're too accessible."*

In terms of increased accessibility, the professionals highlighted positive aspects for the residents regarding the multiple choices of entry points to healthcare. Where the residents have the option to choose the most suitable option for themselves, as one interviewee explained:

> *"I think it's great that there are several options available because those seeking care with us, or trying to get in touch in some way, can choose what suits them best."*

Another healthcare professional points out that residents have varying preferences, and it's beneficial for them that these diverse pathways are available. They explained:

> *"So, the possibilities from the patient's side are that they don't have to sit and wait for this phone call that many find bothersome, instead you can just write in what you're seeking and then you leave it there. [...] Also, in terms of an appointment, there are many who just want an appointment, it calms them down a lot just to be able to talk to someone and so on."*

The accessibility provided by these pathways is perceived as both advantageous and disadvantageous for the residents. While they are offered options, the lack of clarity can lead to confusion, resulting in residents seeking care through multiple channels for the same condition. Additionally, this can contribute to increased workload and frustration for the employees. Both health centers also have individual websites where information can be found about the digi-physical concept, along with direct links to online bookings via 1177 and general information such as phone number and the address to the health center.

The triage was something brought up by the majority of the professionals as something that has been improved with the digital tools and video meetings available at the health centers. The interviewees explained that the triage has previously been through a phone call or exclusively physical at traditional health centers. The video triage available at the digi-physical health centers enables the provision of additional information in comparison to a phone call, as one professional mentioned:

> *"It's easier to triage digitally than over the phone because we can see each other. [...] I feel that they feel more receptive to the self-care advice given than if you give them over the phone because you don't have this contact."*

Another employee highlighted the additional information the visual representation provides for assessment during triage by stating:

> *"And that's it, you see each other. That's how you see a facial expression. [...] On the phone, it's only 85% of the conversation that comes through. When you have a picture, it's 95%."*

The video meetings are not only beneficial for the triage of patients, but also valuable for the professionals where they can leverage their competence in a new way, bringing them renewed job satisfaction as compared to their traditional way of working, as one respondent explained:

> *"I've previously worked at a health center where perhaps eleven thousand patients were listed. At that center, I would often spend my days, from 8 AM to 5 PM, continuously answering phone calls, maybe three out of every five days. However, at my current position, I am able to utilize my competence differently. I engage in patient meetings, and honestly, it's incredibly enjoyable to go to work. Indeed, that's the point—it feels rewarding in the heart, being able to make a difference for those we serve. This satisfaction was something which I perhaps lacked before, which is likely why I decided to switch health centers."*

During the discussion of working procedures in pre-core service encounters, challenges were also highlighted. The major challenge brought up by the employees at the health centers were the lack of system integration and the technical difficulties this entailed. The digital booking system used by patients and the scheduling system used by professionals are not synchronized, which can result in them overlooking appointments scheduled close to the actual appointment if all systems are not consistently updated:

> *"Our systems aren't really tailored for digital healthcare, but that's what we consider the biggest challenge. We ended up doing a lot of double work. We release digital appointment slots online for patients to book. [...] And those slots come into our scheduling system, and we have to manually transfer them to our platform where we conduct digital visits because they [the systems] don't communicate with each other. [...] And it might be that at 11 o'clock, there's no appointment booked, and that time is available. And then someone goes in and reserves it, so we don't have time to book it into the digital system. Then they call us after 10 minutes asking 'where's our link?'. And it's because we haven't really been up to date and noticed that a time has now been booked. Now we have to transfer this [to the other system]."*

Another aspect that is part of the pre-core service encounters is the self-check-in services at the health center. One health center employee explained the challenges with self-check-in services regarding the loss of personal encounters and technical difficulties associated with the tool:

> *"That one should have an unmanned reception, but many also just want to come and talk. Many just want to be seen. But also, around it, with this self-check-in that doesn't always work. So, those kinds of things that we find challenging."*

Another interviewee highlighted the time aspect of the self-check-in services. Since this is a new implementation, some visitors have had issues with navigating the system:

> *"Self-check-in, they have problems with it, they don't have time to check in. So many times, we come and fetch them from the waiting room, to not lose time."*

Since residents have varying technical abilities, and some require assistance, the health centers have a back office that can assist when problems arise:

> *"We have self-check-in as well. We notice when patients come in here, some pick up their phones directly, just click, and then they go and sit down. While others start to spin, look, and think about how to do it. We don't have a traditional reception here, but we have personnel sitting in the back office, and they are immediately alert and ask if the patients need help."*

The professionals at health center A have noticed a positive response from the residents while they were not in their professional role. As one professional explained that they had interacted with residents and naturally the discussion the digi-physical health centers which had led to the resident re-listing themselves to the center:

> *"When I was paying at the checkout [at the local supermarket], the cashier sitting at the checkout started re-listing himself."*

This section covered the experiences from the professionals during pre-core service encounters at the health centers, with an emphasis on work procedures and digital tools used prior to healthcare consultations. The interviewees described the various contact methods available to residents, including physical visits, manned phone lines, and online platforms such as 1177 for messaging and appointment scheduling. The self-check-in service is also brought up along with its challenges for the professionals and the residents. There are notable differences between the two health centers, particularly in criteria for, and availability in, appointment booking. The improved accessibility is praised but also criticized for causing confusion and increasing workload. Despite the challenges, video triage is considered to enhance patient care, although it is still hindered by system integration issues. The most significant challenge identified is a lack of system integration, which resulted in manual work and inefficiencies in their work procedures.

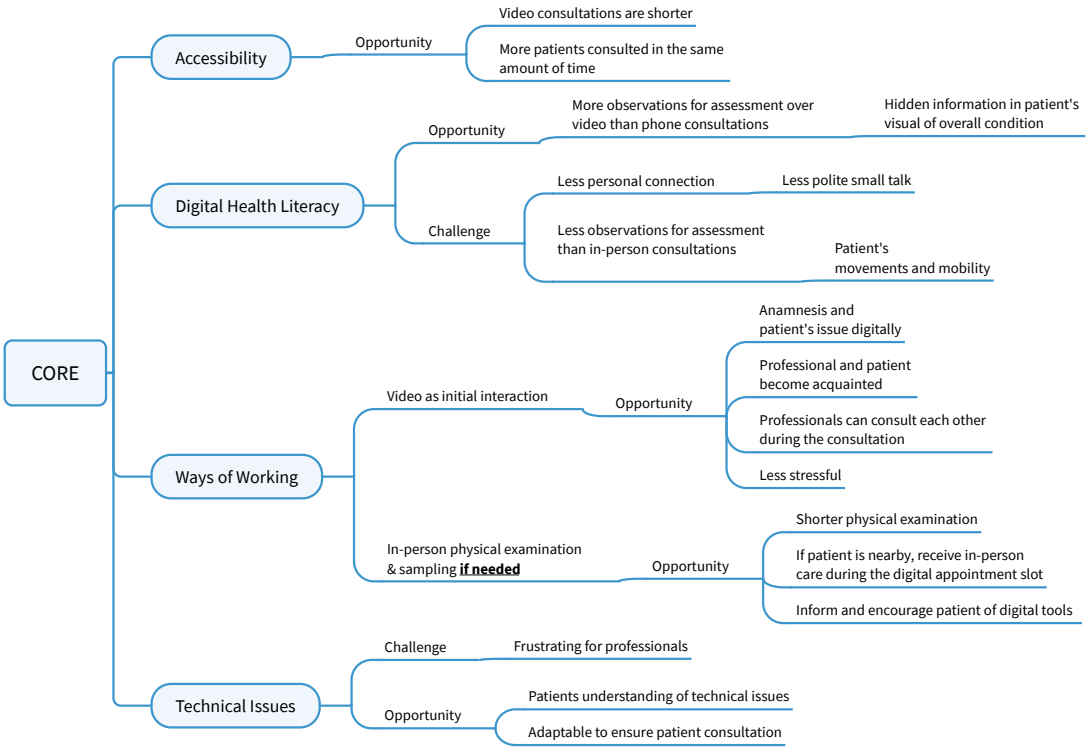

Figure 4.4: A visual representation of the data gathered representing the core service encounters, divided into themes.

4.3.3 Core Service Encounters

During the interviews, professionals were asked to describe the procedures during the main service exchange, the core service encounter, and elaborate on opportunities and challenges associated with this phase. The gathered information and identified themes are represented in figure 4.4. The healthcare encounters between patient and professional can be facilitated over phone, video, in person at the health center or through a messaging feature on the website 1177. The messaging feature is mostly used for answering questions which do not need an examination, for example a renewal of a prescription as explained by an interviewee:

> *"We offer traditional in-person appointments where patients come to the clinic to see me. Furthermore, I am available for phone consultations. I also handle inquiries and medication requests through 1177, or alternatively, we can conduct meetings via digital video encounters."*

During the consultations, the professionals can view the health information in the patient's digital medical records regardless if it is by phone, video, in person or 1177. For video, phone and 1177 consultations, the healthcare professionals have access to a workspace which includes two monitors, a laptop, noise canceling headphones and a camera. The professionals access the video consultations through an internal platform connected to the external platform Närhälsan Online, which is the way of access for the patients. One professional described how their digital visits were

conducted as:

> *"We use two monitors; one is dedicated to viewing the patient's medical records, allowing us to easily check their medications, medical history, and other details. The other monitor is for interacting with the patient, although sometimes it's used for other purposes. For instance, we can access FASS or other databases to verify if two medications are compatible. Typically, during a digital visit, one monitor displays the internal platform, while the other shows the patient's medical record. This setup is very practical because if the patient inquires about test results, we can instantly access their records and provide immediate responses."*

One of the main aspects brought up by the personnel at the health center was that the video consultations have increased the accessibility to care since the patients can connect with the health center digitally from any location with an internet connection, as one respondent said:

> *"I had a digital meeting with someone who was at a hunting stand in the forest."*

The healthcare professionals have also found that they assess the patients' issue or condition in a shorter amount of time during video consultations as the encounter is more focused on the patient's issue and includes less polite small talk than in-person encounters, as described by a professional:

> *"It certainly opens up opportunities, particularly for the patients—it's outstanding. It might take half a day to go to the doctor...but digitally they can quickly connect with us during their workday, and within just 10 minutes, everything is done. Indeed, this significantly enhances access to healthcare. I would say that by eliminating many of the peripheral aspects of a visit, it leads to greater efficiency. For instance, whereas we might see two patients in an hour during in-person appointments, we can likely manage three patients digitally within the same time frame. Thus, it effectively optimizes healthcare delivery."*

While the video consultations were explained as time efficient as more patients can be served in the same amount of time, the shorter video consultations were also viewed as a potential challenge since the more structured format conveys a less personal connection between patient and healthcare professional. Additionally, the professional would have less observations to base their advice and treatment on since they cannot assess the patient and their body language in a physical space as one interviewee explained:

> *"I believe this is because one is more structured. The question is whether this is beneficial. In a physical meeting, there is often a 'cocktail phase' at the beginning, meant to make patients feel comfortable before questions are asked. You also see polite exchanges at the end, and instructions like putting on or taking off a jacket, which allows for assessing functional*

> *abilities. This is particularly useful for observing how older individuals move or manage tasks like removing clothes, thus providing additional information. On the other hand, digital or telephone meetings are more straightforward, focusing directly on 'here's the question, here's the task, let's address it."*

The majority of professionals believed that digital consultations were progressing very well, with both patients and themselves finding satisfaction in the digital video encounters. Many professionals instinctively compared video consultations to phone consultations, emphasizing that their ability to assess the patient and their condition is improved by the addition of video, which allows for visual assessment, as one interviewee explained below:

> *"I believe it works exceptionally well; the patients were often very pleased. While one might assume there's little difference between a phone call and a digital visit since physical examinations aren't possible, the reality is quite the opposite. There's a significant improvement in quality because we can see each other. This visual contact provides crucial additional information, especially for doctors. Observing a patient's overall condition reveals a lot of hidden information for us. For the patient, it also matters; they appreciate knowing what their doctor looks like. The simple act of smiling, this basic human connection, is incredibly important."*

The quote above also highlights an opportunity mentioned by many of the professionals regarding their ability to connect to the patients during the video encounters. At Health Center A, they tried to conduct all initial patient interactions digitally, even when physical examinations or sampling were required. This approach allowed both parties to become acquainted during these digital meetings, enhancing their connection during the subsequent physical examination. One professional even explained that having the initial encounter through video made their work feel less burdensome than before as the patient's medical history can be focused on during a video encounter, while the in person meeting is focused on the patient's issue. The respondent also expressed that they felt less stressed and that they can reflect on the patient's condition in between the digital and in-person encounters, as seen below:

> *"Digital visits are somehow less burdensome; they are divided into two parts: the digital consultation and then the physical examination [if needed]. This is actually great for us as well since we have time to review the patient's medical history and reflect. [...] It almost seems better than the traditional method of meeting the patient in person [exclusively]. [...] By dividing the process, we can concentrate on the initial part: conducting the anamnesis, and truly listening to them. This makes patients feel genuinely heard, and I am less stressed. Then the second part is really brief because we already know each other, and it leads to a short physical examination. They understand that it will be brief because they have already said everything. In some way, this is actually easier and feels less*

burdensome than a physical examination [exclusively]."

Although the professionals expressed that they are forming a personal relationship with the patient over video, they raised the challenge of conveying a safe presence where the patients feel comfortable in sharing their issue. One professional explained how they need to continue to develop ways in making the patients feel safe and comfortable online, as seen below:

> *"But we also need to work on instilling a sense of security in these digital visits. I think many people find comfort in meeting someone in person, seeing and feeling you, and observing you. [...] But I also see you through the camera. I hear you and can see how you express yourself."*

The main challenge mentioned by the healthcare professionals regarding their own work was that the digital tools do not always work appropriately when they need them for the consultations, thus leading to a frustration. This was mainly connected to the video meetings where the internet connection was poor for either party and made the image blurry or sound faulty. Another common cause was that the headphones did not work appropriately, making it difficult to hear the patient. However, the overall attitude among the professionals is that most patients today are used to, and have an understanding for technical issues during video consultations from previous experiences. Moreover, the professionals are flexible in their way of working and call the patient whenever there are issues with the video meeting, thus, ensuring that the patient receives advice, care and treatment, as explained by a respondent:

> *"Some [patients] may get upset until they are informed that we are not ending the visit due to technical issues; we will call them back, which then calms them down. However, there is generally a good level of understanding, and nowadays, I believe almost everyone is sympathetic to the technical challenges. It is typically we, the staff, who feel the most frustration when there are technical difficulties, and find it bothersome."*

Although the technical issues have generated a frustration for the personnel, the majority of them still had a positive attitude towards the video consultations, as they too have an understanding for technical issues and are flexible to accommodate the patient by using alternative methods as seen below:

> *"Even though there have been technical issues, I still found it to be positive because, well, that's what can happen, but we resolved the rest over the phone."*

The technical issues during video consultations may also be solely on the patient's side of the connection where the patient is not navigating into the meeting correctly. When the professionals notice that the patient has not entered the digital meeting, they have adjusted their methods and called the patient to properly guide them into the video consultation. One of the healthcare employees explained this as:

> *"Then we help each other out. If we notice that the patient isn't able to join the meeting, we might call the patient on their phone number. 'We*

sent this link; does it work?' and then we can assist each other."

The respondents raised the challenge of offering the digital services to all citizens as some may not be able to access these due to being foreign citizens or residents without the possibility to identify themselves online, indicating the importance of the possibility to access the health center and health services in person, as one healthcare professional said:

> *"The issue is that we can't meet everyone on these digital platforms. There are those who don't have BankID. There are also those who may not be Swedish citizens but live nearby. And there are older people who frankly find the digital aspect a bit scary."*

During in-person visits at the health centers the professionals have informed the patients that they offer video consultations, as many patients have been unaware of the option. All employees with direct patient contact have assisted in informing the patients, however, the administrative personnel at the centers have had a greater responsibility in this regard. Both centers have also encouraged their patients during in-person visits to try video consultations when they are in need of care the next time. Sometimes the patients are familiar with other digital healthcare providers and find it surprising but positive that the health center offers video consultations. While at other times the patients are hesitant and in need of more assistance in how to manage a video consultation, as explained by one professional:

> *"We encourage many patients to realize that other options are available. There's no need for concern; just try it out. 'We've assessed that your particular issue can effectively be managed via video.' Sometimes, this involves hands-on guidance. You have to carefully guide them: 'Now, take out your mobile phone, download this app, and follow these steps.' Thus, providing very systematic guidance is necessary for some, while others grasp it immediately and don't need any assistance. They might say, 'Oh, can I have a video meeting? That's great, I can even do it during my break at work,' or something similar."*

As health center A have promoted digital visits in all cases, they have found that by being flexible between digital and in-person visits, they can manage both a digital and in-person examination when needed if the resident is in the nearby area and able to get to the health center quickly, as explained by one interviewee:

> *"We aim to begin with a digital visit whenever possible, and those who cannot participate digitally are, of course, welcome to come in person. For instance, during a digital visit, I might ask, 'Do you live nearby?' If the answer is yes, I invite them to come right in. If they can arrive promptly, I can examine their ears or handle other issues as needed. This way, there's still time to conduct a physical assessment during the slot allocated for the digital visit."*

Respondents at both health centers also highlighted the opportunity they have in

working together in a flexible way and consulting each other. This was exemplified by a respondent who explained that even though patients had a video appointment with a nurse, they were able to get an evaluation by a physician as they work together as seen below:

> *"During the digital [video] visit, I can tell the patients to wait a moment while I consult the doctor, so they can evaluate this skin change or other issue. They just look into the camera, and then they receive a doctor's assessment right there during the ongoing [video] consultation."*

This section covered the various procedures of patient-professional interactions at the health centers, including phone, video via Närhälsan Online, in-person consultations at the health centers, and messaging services via the website 1177. Professionals emphasized the efficiency and accessibility of digital consultations, enabling remote access to care. While video consultations streamline the process, offering advantages like increased efficiency and reduced appointment times, they also pose challenges in maintaining a personal connection and assessing patients without physical components. Despite technical difficulties experienced, both professionals and patients exhibit adaptability and understanding. ensuring continuity of care through alternative means when necessary. Collaboration among healthcare personnel further enhanced the patient experience by enabling timely and efficient consultations.

4.3.4 Post-Core Service Encounters

Professionals were asked to explain the work methods and digital tools utilized after the actual healthcare consultation with patients, often known as post-core service encounters, where feedback plays a crucial role. The data from the interviews, divided into themes, is represented in figure 4.5. Following the interviews, the general perception was that there was no established structure for collecting feedback from those who visited the health center or conducted digital visits. However, the interviewees had a general understanding of how visitors to their health centers perceived digi-physical healthcare, and they communicated with residents about their experiences when the opportunity arose. The possibility of implementing existing feedback systems was brought up as an opportunity to enhance the service experience for the patients. An employee described how they work with the feedback process at the health center as:

> *"I sometimes try to catch up with patients if they've been here in person. 'How did your visit go? Did it feel alright? Is there anything we should be aware of?' I often do this when I see people using the self-check-in, as it's still new to us. [...] But we don't have a natural process for that. You know, we don't send out a form, asking how the digital healthcare meeting went. We've discussed it because there's a lot of information on 1177. There are really useful tools [for implementing feedback]. Figuring out how to make use of them, to work with them, I think it would be really helpful. Especially to address the challenges we're facing."*

Another respondent also stated that the feedback they are providing is based on what they have heard during in-person visits, and that no surveys have been distributed:

> *"We haven't issued any surveys yet where we've gathered their opinions. So far, this is just based on what we've heard around here."*

When asked about residents' impressions, comprehension, and experiences with the digi-physical health centers, the professionals noted how positively surprised the visitors were:

> *"Everyone is really pleased, yes. Beyond expectations, I think. Many patients do not know what to expect from a digital meeting until they have experienced it. And when they do, they are pleasantly surprised by how smooth and quick it is."*

The processes for receiving feedback differ among the professionals, which further demonstrates the unstructured nature of the feedback process:

> *"No, we never discuss how one experienced the meeting, so, no."*

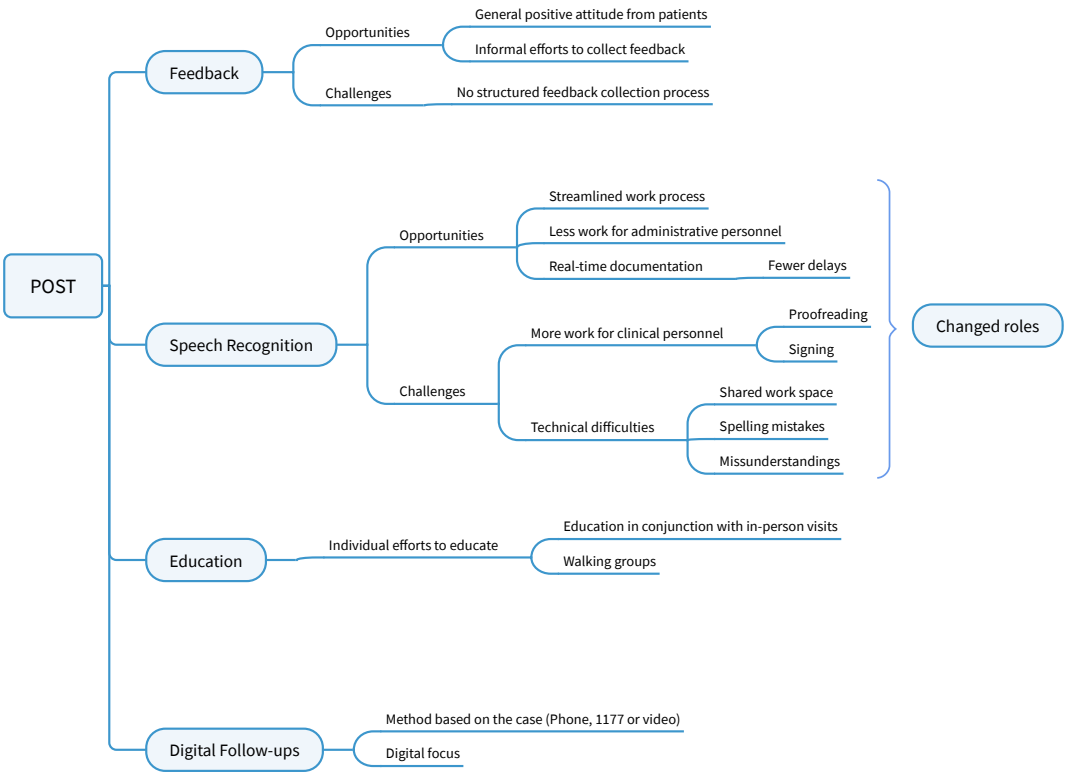

Figure 4.5: A visual representation of the data gathered representing the post-core service encounters, divided into themes.

When discussing digital tools in the post-core service encounters, many interviewees brought up speech recognition, or 'TIK' as they refer to it, as a tool that has changed

the way that professionals work at the health centers. Prior to the release of this new tool, nurses and doctors logged information from health consultations through audio files and then sent the file to the medical secretary, who wrote it all down and continued the errand. This information could include instructions on how to proceed, whether the secretary should forward certain information, or information from the meeting that should be included into the patient's medical record. This tool can sometimes misunderstand spoken words and may require proofreading by its users, as one of the professionals explained:

> *"I forgot to mention, of course, speech recognition. Yes, and that's quite new actually, for about six months or so. It's something completely new that they're rolling out now. And it's simply that we just speak into a microphone and then the text comes straight into our medical record system. [...] It works quite well. Normally, we speak and send it to a secretary who writes everything down, but now we speak and the text goes straight into the same module. But what happens is that there are a few spelling mistakes and misunderstandings in this app or this technical solution, so you have to go in and proofread."*

The interviewee further elaborated on the advantages of this tool, noting that its real-time documentation capabilities lead to fewer delays:

> *"It's me who reads and signs. It's not someone else whom you forward it to for reading and signing. What's good is that it's documentation in real-time, meaning it shouldn't wait for a secretary to write it down for 3 days or 5 or 7 days; it should come out on the same day."*

Other professionals have raised further challenges regarding the tool's functionality, particularly in environments where the work space is shared. An employee describes their struggle with the speech recognition feature:

> *"My colleague sits next to me, so we can't use speech recognition, or 'TIK' as we call it, in such situations. It feels a bit silly; if they are talking on the phone and I need to speak as well, we end up disturbing each other because I tend to speak loudly. Moreover, if they are also using speech recognition, their computer might accidentally pick up my voice and start typing my words instead."*

Another aspect of this tool is its ability to automate tasks traditionally performed by a medical secretary, enhancing efficiency and streamlining workflow. An interviewee elaborated:

> *"[...] we can work efficiently, and this saves a lot of time, and we use speech recognition. It's a tool that allows the medical secretary to, well, they don't have as many steps in their workflow."*

The use of the new tool for speech recognition is advised but not required. The previous method, in which nurses and doctors record audio files and send them to the medical secretary, is still employed to some extent, as one of the employees

exemplified:

> *"You can use speech recognition, to write the letter or to compose a message to 1177. You can utilize the microphone to dictate a response that the secretary transcribes, which ideally shouldn't be used nowadays. Previously, they may have managed 70 in a day [files to be transcribed], but now they might only have 10. So, it's a significant difference."*

Speech recognition demands more work from nurses and doctors because they are now responsible for double-checking, proofreading, and signing, therefore this new tool, combined with self-check-in protocols, has resulted in less work for medical secretaries. One of the interviewees explained how speech recognition and real-time documenting will impact the workload and integrate the communication between health centers and hospitals:

> *"So, it's almost a requirement now that we should start documenting in real-time because the new medical records system, which will be introduced in 9 months, apparently demands it. That's why we're working so hard on this. Hospitals are also working on this. There will be better communication between the units. [...] They already have it in certain counties or regions. They have other systems that are more integrated, and we will get that now, which will be a challenge. It saves a lot of time. Then there's the fact that a number of medical secretaries will have considerably less to do, as it was a big part of their workload before, and they find it a bit sad because they thought it was a fun part of the job. [...] Then with self-check-in, perhaps there will not be as many of those [medical secretaries] in the future."*

Both health centers have found new tasks for their medical secretaries. At health center A, the initiative has been to inform and educate elderly about the digital format, as one employee at mentioned:

> *"There's an idea that our medical secretary creates walking groups for the elderly and lonely, and during the walk, they plan to sneak in some digital information and educational content."*

Another employee at health center A also explained that the medical secretary has educated the residents in conjunction with an in-person visit:

> *"They [medical secretary] try to catch them [residents] when they're here 'Okay, do you know that you can go onto 1177, do you have it on your phone? I can show you here.' And then we help each other."*

At health center B, the medical secretaries are responsible for reporting errors to IT support in addition to their current work procedures, as mentioned by one of the employees:

> *"We've arranged for anyone experiencing issues with printers or computers to come to the medical secretaries. They serve as the primary contact*

> *point with IT support. It's important for them to be knowledgeable so they can assist others with their questions. Essentially, they provide support to the rest of the staff. There are two medical secretaries, and they both act as local IT administrators."*

The final theme identified in the post-core service encounters involved follow-up visits, which could be either in-person or digital via 1177, phone, or video. Most professionals reported satisfaction with the digital follow-up appointments. One interviewee described how these appointments are conducted, with a particular focus on digital follow-up visits through video:

> *"Either you send a letter or you call the patient, or you choose to book a visit [...] Or you can send a message via 1177. [...] and then if you schedule follow-ups. Follow-up is a very good thing that you can do digitally. [...] So follow-ups are something that we also try to focus on digitally."*

Expanding on this, another employee emphasized that follow-ups generally utilize video or phone:

> *"You might have more follow-up visits via video calls if it's such a case [you can take digitally], or you have a follow-up, so that a simple phone call is enough, to follow up and ask how you're feeling and how the medication is working and such. It's primarily video, or phone. But if it's just a simple test result showing that the tests look good, then you can contact them through 1177."*

During the post-core service encounters, feedback collection surfaced as an important component, with respondents pointing out the lack of a structured feedback system. Despite this, they had a general awareness of patient attitudes, which they found to be positive towards the use of digital technology in healthcare. Employees reported informal efforts to get input, emphasizing the lack of formal feedback surveys. Professionals observed challenges in implementing digital tools such as speech recognition, which, while saving time, necessitated further proofreading. They also examined how automation has changed the roles of medical secretaries. Efforts to educate residents about digi-physical healthcare were addressed, including activities such as organizing walking groups for the elderly at health center A. Follow-up meetings were something the health centers prioritized and valued in a digital format.

4.3.5 Information and Marketing

During the interviews, the respondents were asked about marketing efforts and how they inform the residents about the digi-physical care. The identified themes and data gathered are represented in figure 4.6. To the question whether the residents know what a digi-physical health center is and what the digi-physical health centers offer, the respondents varied in their answers. Some professionals perceived most patients to be well informed of what digi-physical healthcare is, while others perceived patients and residents to be unaware of digi-physical healthcare and the

center's existence, as one interviewee responded that:

> *"No one knows. Not even other healthcare workers. It becomes our responsibility to inform."*

Initially there were many patients who did not understand that a digi-physical health center meant that one could do both digital and in-person visits. Some believed it to be exclusively digital while others believed it to be a traditional health center with only in person visits. One of the respondents explained it as:

> *"At first, many people didn't understand what 'digi-physical' meant, so they thought it was only digital. We received many questions about whether it was possible to visit us in person. But now, we actively use our Facebook page where we've provided a lot of information and explanations. So, we are beginning to reach the residents effectively."*

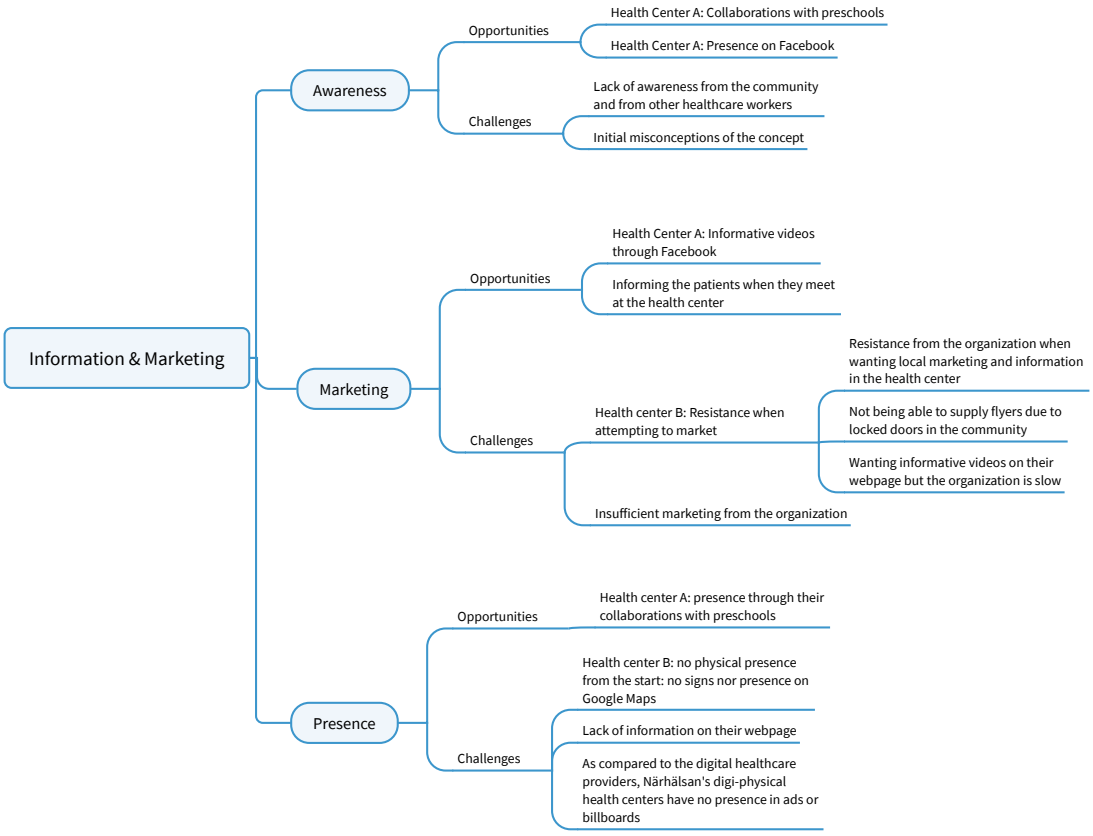

Figure 4.6: A visual representation of the data gathered representing the Information and Marketing, divided into themes.

The above quote also highlights how Facebook has been used by health center A to inform the community of the existence of the digi-physical health center and the digi-physical concept. The employees expressed that they felt like there has been a lack of information and marketing of the digi-physical health centers in other

formats. This has been handled by the employees through Facebook for the area in which they operate to inform the community of the center.

> *"We have handled the marketing internally, posting updates on our Facebook page. However, I feel that there is a lack of good information elsewhere, leaving patients somewhat perplexed when we ask them to download the Närhälsan Online app. They often wonder, 'Okay, what happens next?' There simply isn't enough information available, [...] this is something we have been addressing ourselves."*

The employees at health center A have posted informative videos on Facebook and have collaborated with the preschools to connect to the residents and hear their perspective on how to accommodate potential patients.

> *"On the Facebook page, a district nurse and a doctor appear in videos. They provide self-care advice for children's various illnesses and conditions. The page has been well-received and is utilized by preschools in the municipality. It's a lively way to share information and offer guidance to people. The manager has encouraged input [from the residents]by asking, 'This is how we're thinking, what do you think? How do you want things? How can we be more accessible? Should we adjust opening hours for early mornings or late evenings?' Here, you can be part of the decision-making process, or at least share your thoughts."*

At health center B, they have had other ideas of how to inform patients of the possibilities of how to receive care at the digi-physical center. The first initiative mentioned was that while the patient is i the waiting area, they could be made aware of the digi-physical options by reading on the displays, however, this had not been approved, as one interviewee said:

> *"We had hoped they [Närhälsan] would, for instance, upload several slides onto these waiting room screens that clearly state this is a digi-physical health center. 'Here, we primarily operate in this manner. However, if needed, it can certainly be done [in-person], guiding individuals in a straightforward manner. So, that's an option. If you're seated here, you should be able to see it as well."*

Another initiative which had also faced resistance was to update the health center's website to inform the patients of how to seek and receive care at the center, as one employee stated:

> *"We also talk a lot about wanting to launch informative content on our website about what a digi-physical health center is and how it works. Simple instructional videos, for example. But it's slow, it doesn't happen overnight."*

Employees at health center B also expressed frustration that the residents had not been informed about the digi-physical concept nor the centers location, as one professional explained:

> *"It's locked doors, you can't get in [to distribute flyers to the residents' mailboxes]. We probably have 1000 flyers lying around here. [...] You have to verbally talk to people to reach them. It's different because in the other area [health center A], it's just there as you walk by. Here, there are no signs, nothing at all. It's not a natural place to pass by on your regular route either. If you look at Google Maps, we didn't even exist for a while. [...] But there's no advertising, advertising is a low priority."*

The marketing channels of the new health centers were compared to the private digital actors as residents are more prone to see advertisement from these actors due to their advertisement in the surroundings, as one professional mentioned:

> *"But if you compare us to the private market, the private market is very visible. I mean, take Kry for example; Kry is big, and we've been hearing about them for many years. They have TV ads, newspaper ads, and even billboards."*

The professionals highlight that many residents and patients are unaware of the digi-physical health centers. Initially, patients did not realize that both digital and in-person visits were offered. Health center A has primarliy conducted employee initiated marketing efforts through a Facebook page, but there is a lack of information elsewhere on what the digi-physical health centers offer and how to access care. To engage with patients and increase awareness, health center A has launched informative videos. Meanwhile health center B has seen potential in informing the patients about the digi-physical healthcare model while seated in the waiting area if they are not previously aware. Lastly, distributing physical information to residents has been challenging and the professionals perceive private digital healthcare providers to have much greater presence and visibility than Närhälsan.

4.3.6 Introduction of New Requirements Associated with the Digi-Physical Structure

Changing requirements for the professionals and for the residents were brought up during the interviews. The data collected regarding the professionals answers are thematized and visualized in figure 4.7. When the healthcare professionals were asked if there are any new requirements for them in their roles at a digi-physical health center compared to a traditional health center, they expressed that they were expected to have a positive attitude towards innovation and in adopting new ways of working by integrating technology and learning new systems. The professionals were not required to have any previous experience with digital care and all employees were provided support and education from the organization to learn how to use the digital tools. This is explained by one professional who said:

> *"The expectations placed on all of us working at this health center are quite high. Here, one should be positive as new implementations are introduced, and not be thinking, 'No, I'm not very tech-savvy so I won't do it.' Instead, it's required to be receptive to all such new developments,*

not just new technologies, but also learning systems. Assistance is readily available, so you're not expected to figure things out alone. We provide help and support, making it a requirement to engage actively."

The professionals are expected to learn the systems to efficiently navigate and use them in order to provide the service offerings, as explained by a respondent below:

"Because of the digital aspect and, as I mentioned, the accessibility, there is also a responsibility on us to be able to deliver, to maintain a certain pace, and to feel confident on these platforms."

Furthermore, giving advice and communicating digitally demands that professionals provide guidance in a more detailed and supportive manner than in person. This approach ensures that patients feel comfortable and understand the advice, which is typically conveyed more naturally in face-to-face encounters, as one interviewee explained:

"Yes, it's somewhat different because you can't see everyone in person, so you need to think more about giving advice differently. It requires being more detailed, essentially like becoming more of a nurturing figure."

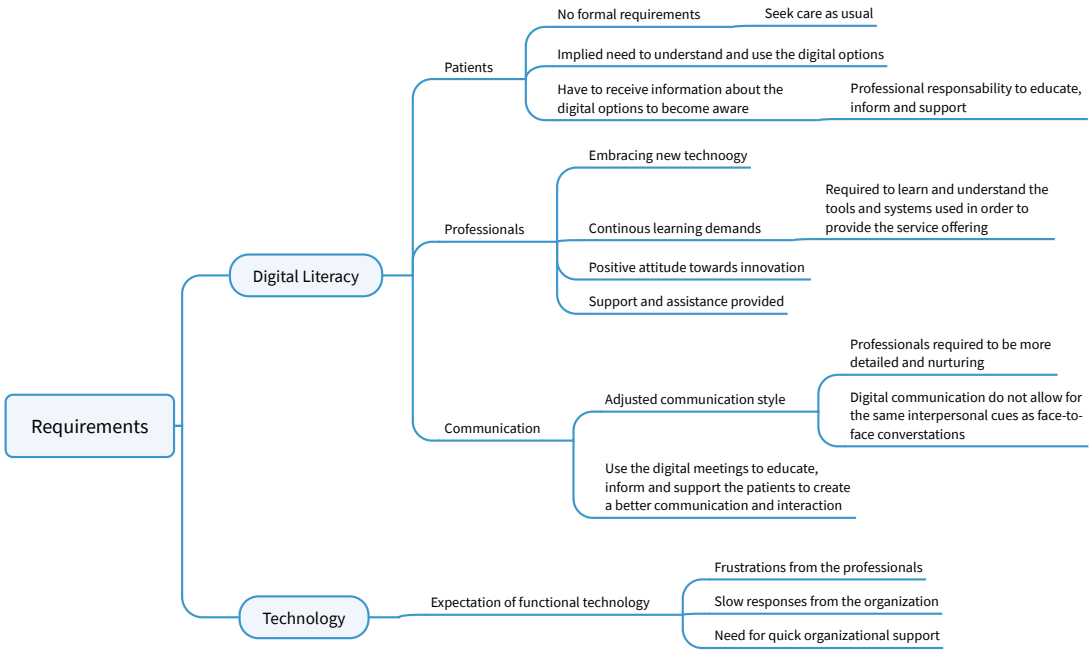

Figure 4.7: A visual representation of the data gathered representing the requirements introduced by the digi-physical structure, divided into themes.

When the ways of working at the digi-physical health center's were discussed, the professionals explained how they need to not only give advice differently, but also

change their way of thinking. This was especially a requirement for the nurses as they need to assess if a patient can be assessed digitally or if they need an in-person consultation to give accurate care, as a professional stated:

> *"It's the mindset that needs to change, actually, and it doesn't happen overnight. A lot relies on nurses because they handle the bookings. They are the ones who make the initial contact with the patients. They are the ones who assess whether the patient should come in physically or digitally, so the concept of thinking needs to change in their, well, heads, and in their ways of working."*

When discussing the new requirements for the patients in seeking and receiving care at the digi-physical health center, the majority of the professionals said that there are not any new requirements for the patients compared to a traditional health center. Instead the professionals highlighted how it is their responsibility to inform the patients about the digi-physical options and support the patients in adopting the digital tools, as one professional explained:

> *"There should be no additional requirements for them. They should be able to seek care on the same terms as at any other health center. It is our responsibility to help individuals understand which health center they have chosen and to familiarize them with the tools they may need to use to receive our services. [...] No, I would say there are no additional demands on them."*

However, one professional pointed out that in order for the patients to use the different ways of contact, patients need to learn of their existence and how to access and use the different options to contact the health center, as explained below:

> *"From a patient's perspective, I believe it primarily involves having the necessary knowledge. Specifically, it's about understanding how to access [the health center]."*

Although the majority of the interviewees expressed that they had experienced that the technology had not worked at time, they still found it to be overall manageable and acceptable. However, some respondents expressed frustration since they had expected that the technology would be working seamlessly from the first day the center opened, an expectation that the organization did not meet, as one respondent said:

> *"Functional technology! An organization that isn't so sluggish; we need rapid decisions and support from the organization. People who manage the system. I'm unsure whom to contact now. It's very slow and not functioning, and I am frustrated."*

The professionals feel like they are expected to be adopt new digital tools and ways of working, have a positive attitude towards changes. Employees are supported by the organization in learning how to use new tools and feel responsible for to be confident using the digital tools in order to deliver the expected care. Professionals also need to

be more detailed in communicating advice during video visits. Moreover, the nurses experience a greater responsibility in assessing if the patient should have a video or in-person consultation, requiring a different way of thinking and working. There should be no additional requirements for the patients in seeking and receiving care, it is the professionals responsibility to inform and support the patients. However, in order to utilize the different entry points, the patients need to know where and how to access the options. Lastly, the professionals expect the organization to provide functional technology and support to be able to efficiently manage their ways of working.

4.3.7 The Healthcare Professionals' Future Vision of Digi-Physical Care

The respondents were asked to talk about their future visions and to compare the digi-physical health centers to the traditional ways of working. The gathered data and identified themes are visually represented in figure 4.8. The employees with previous experience at traditional health centers within VGR highlighted how the other centers would both be able to ease their workload for the personnel by implementing more digital consultations, while also keep their listed patients satisfied with their service, as seen below:

> *"Traditional health centers need to recognize the potential methods of working. I keep in contact with my previous workplace, and they are experiencing significant difficulties. However, if they had introduced digital visits, it would have greatly eased the workload for my former colleagues. This change could have made a substantial impact and potentially helped them retain their patients."*

Moreover, the interviewees also found the digital visits to be less draining and less stressful, thus making them more manageable as one explained:

> *"At many traditional health centers, working full-time is hardly manageable, it can be incredibly exhausting. [...] Each interaction with a person requires an energy exchange. It can be draining. The experience through a video camera isn't quite the same, making the job more manageable. You feel less stressed and that's a huge advantage."*

The digi-physical health center could potentially offer additional benefits for the personnel. These could be more flexible work hours and working from home, motivating professionals to both seek employment at the centers, but also remain satisfied with their employment, as a professional explained:

> *"Another motivation was indeed the potential for increased flexibility in the future, given the severe shortage across all professional categories at health centers. Being able to offer digital healthcare could make an employer more attractive in the future, as colleagues could potentially begin working from home, illustrating the concept of attracting and retaining employees. This approach allows for a more flexible work schedule."*

Implementing new methods and increasing digital visits at traditional health centers require employee training. Moreover, since the personnel at well established traditional health centers are already experiencing a heavy workload, it puts an additional pressure on them to change their way of working. However, all respondents agree that even traditional health centers would benefit greatly from video consultations and that for a successful adoption of digital visits, the employees need to have a positive attitude, as one said:

> *"My former colleagues aren't resistant to new ideas. For instance, they adopted speech recognition immediately and are capable of conducting digital visits. However, incorporating these into their routine isn't part of their current workflow. It's not that they are opposed to it. It's simply challenging for them to integrate new methods because they are already overwhelmed with their existing duties. Previous to that, I was at another health center where introducing new concepts was impossible because the staff was very resistant to change and overwhelmed by everything, to the point where they weren't even open to suggestions regarding physical visits. However, ultimately, they would have benefited greatly from it [digital consultations]."*

Figure 4.8: A visual representation of the data gathered representing the vision, divided into themes.

During the interviews, both health centers had been open for about 4-6 months and had relatively low numbers of listed patients, as compared to a traditional health center which has operated for a longer period of time. Health center A had employed a lower number of employees and leveraged this to experiment with various methods. With fewer staff and patients, the employees have encouraged and invited patients to an initial digital meeting regardless if an in-person visit might be necessary later on. This way, employees at health center A noticed that more issues and conditions could be managed digitally than initially believed. Moreover, they discovered that even when the patient is in need of a physical examination, the overall time spent on one patient is generally shorter even when the visit is both digital and then in-person. At health center B, however, they initially employed enough staff to implement the initial concept description and had a larger number of employees than health center A. During the interviews, health center B did not have the full capacity of listed patients, which required them to sell their services, thus their employees' working hours, to other health centers and organizations.

The interviewees elaborated on how shortage of available appointments for relatively simpler issues or conditions at traditional health centers results in employees referring patients to other healthcare providers, or that patients seek care at private alternatives due to limited accessibility at their listed locations. This may lead to lack of patient information at the center the patient is listed at since the organizations have separate systems for medical records. However, as one respondent explains below, the digi-physical health center has the possibility of handling even the less demanding issues due to availability which can lead to a stronger competitive position and improved patient continuity:

> *"Often, a traditional health center cannot attend to simple cases because we lack the time and capability. Unfortunately, they are still forced to refer patients to emergency centers, to 1177, or to Närhälsan Online. Sometimes, they do not make referrals, but patients turn to private services, which are heavily advertised throughout the city. It seems quite unfair because these services only handle the simplest cases—basic assessments with no follow-up. Imagine if we could incorporate this system, which previously belonged to private or online services like Närhälsan Online, into a regular health center; it would be excellent. Then, we would have satisfied patients and better oversight. You may not realize that many are registered at a particular health center, but when they don't receive sufficient time or assistance there, they seek help elsewhere. and we lose some information because the medical record systems are not the same. But if we can integrate these simple things because we can offer quicker, simpler care and accessibility, then we can better monitor our patients and eliminate private actors who really just make easy money from simple cases without any follow-up or oversight of their assessments."*

The health centers plan to initiate a chat for patients to get in contact with healthcare professionals in real-time at their own convenience to further increase the accessibility to care. As one professional explained:

> *"I actually believe that this will offer yet another facilitator for individuals to quickly establish direct contact without the need for verbal communication. It will also allow for the utilization of various questionnaires, for instance, the patient can respond to and provide us with additional information to make accurate assessments. Moreover, you will also have the capability to submit photos. Even though it may pertain to matters you can presently display via video calls, this functionality will enable you to simply "click," send, and subsequently, assessments can be made in this manner as well."*

The above quote also highlights how additional information in the form of answers to questionnaires and pictures can be relayed over chat to enable an accurate assessment of the patient. However, if the information provided over chat would not be enough, a video consultation is either immediately conducted or scheduled for a later time, as explained by one interviewee:

> *"Then you can either connect directly with the other person, or you can tell the person, 'then you will get to talk to a doctor here at 1 o'clock instead, so you can prepare for that.' You should also be able to switch to video calls in this system. So it's not just a text chat."*

The first point of contact would be a nurse, who triages the patient and incorporates other professions as needed to handle the case. As the idea of the chat would be to resolve the cases in real-time, it would require the availability of employees with different roles to assist each other, as one respondent said:

> *"You primarily chat with the district nurse. The district nurse, in turn, will be able to connect colleagues from other professions and transfer the case to them so that the chat continues with that person, for example, the doctor or psychologist. The idea is, of course, that as much as possible should be resolved in real-time. The patient can initiate contact over the chat anytime between 9 AM and 3 PM. The patient is then quickly assisted in resolving their case. It will actually require some structured planning regarding availability. To emphasize that the district nurse will be the primary point of entry, we need to be able to transfer to others smoothly, which won't work if they're fully booked all day. Thus, we need to establish this structure to ensure efficiency."*

Moreover, as the professionals consult each other, not only do they need to be available to take over the case from one another, they also need to collaborate as a team and involve each other, as one professional stated:

> *"And looking ahead, there are also considerations for us to consult with each other, where the nurse might initiate a chat, and then, for instance, the secretary needs to address a matter such as 'we require copies of the medical records from the previous center. Can those be sent over?', allowing the medical secretary to engage in a chat with the patient, and if the patient needs a prescription, perhaps they should see the doctor,*

thus enabling us to involve everyone and collaborate as a team within this chat."

The professionals experience eased workload, less exhaustion, and less stress as a result of increased digital visits. A future potential opportunity could be increased flexible ways of working, for instance working from home, increasing employee satisfaction and retention while also increasing employer attractiveness. The professionals highlight that traditional health centers would benefit greatly by offering video visits. However, it requires a positive mindset among the employees which is not easily achieved when personnel experience a heavy workload. Professionals also see an opportunity for increased continuity, both informational and personal, as they have increased accessibility and available appointments. A real-time chat prompts additional opportunities, such as increased accessibility and resolving cases swiftly without verbal communication. However, this requires collaboration between different healthcare professions and structured planning.

5

Discussion

In this section, the empirical findings in the results section are analyzed and discussed by reviewing the literature in the theory section and comparing the results to previous a previous report on Swedish healthcare. The three research questions will be answered by connecting the findings to previous research and literature. This section is divided into three dimensions: what challenges and opportunities are faced by the professionals, how this new organizational structure is viewed by the residents and their perceived challenges and opportunities, how the identified needs of both professionals and residents can be met; and lastly, a comparison of the findings to previous findings in Swedish healthcare. Recommendations for the digi-physical health centers will be presented and strengthened by theory and empirical findings.

5.1 The Professionals' Perceived and Experienced Opportunities and Challenges

This section highlights the identified challenges and opportunities from the perspective of professionals by linking the challenges to the identified themes, which include accessibility, health literacy, continuity, and feedback. While addressing these challenges and opportunities, recommendations for improvements are suggested for the health centers.

5.1.1 Accessibility

The increased accessibility, highlighted by professionals through the multiple entry points and geographic independence, allows residents to seek care that best suits their needs, irrespective of location. However, while beneficial for residents, this accessibility presents challenges for healthcare professionals. They perceive that residents now book appointments for non-essential issues due to the expanded booking options beyond traditional methods. Additionally, this confusion can lead residents to seek care for the same condition through multiple channels, increasing workload and causing frustration among healthcare employees. These issues reflect a misalignment in the co-creation of value between healthcare providers and patients, as outlined in section 2.2.3 (Skålén et al., 2015; Aarikka-Stenroos & Jaakkola, 2012; Damali et al., 2016). Co-creation emphasizes the interactive nature of service delivery, where value is jointly created by providers and patients. For co-creation to be effective, both parties must understand their roles and contributions to the healthcare process. This includes clarity on why and how to engage healthcare services

appropriately.

In this context, the availability of multiple entry points can lead to confusion and an impairment of the co-creation process, particularly when patients are not clear on the best ways to use these new, and multiple, access points. For instance, the ability to book appointments through various digital platforms might encourage some patients to seek immediate but unnecessary consultations, burdening the system and detracting from the care of patients with genuine needs.

Moreover, the results suggest that while the multiple entry points enhance service accessibility and patient autonomy, they also require a higher level of coordination and management from healthcare providers to maintain efficiency. This is because these entry points are not integrated and require manual oversight.

To address these challenges, there must be strategic efforts to align the operational and strategic objectives of healthcare providers with the behaviors of patients. The following recommendations are proposed:

1. Educating the residents on how, and when to use the different entry points, helping patients make informed decisions, emphasizing that all entry points are equitable and thereby reducing the use of multiple. Damali et al. (2016) outline the positive impact of customer training and education on service design, emphasizing that informed patients who understand their roles within the healthcare system tend to have better health outcomes. This supports the recommendation to educate residents about the use of different entry points, ensuring they understand the best ways to engage with healthcare services to avoid unnecessary usage and reduce the system burden
2. Enhancing digital information to ensure clarity in all the options available online, reducing the booking of non-essential issues. Damali et al. (2016) argue that customer training can significantly enhance the customer's readiness and ability to participate effectively in the healthcare process, which in turn can improve the efficiency of healthcare services. Enhancing digital information aligns with this by helping patients make better informed decisions about when to seek care, potentially reducing unnecessary appointments.

However, another recommendation that will both minimize the use of multiple entry points and discourage the booking of non-essential issues involves:

3. Establishing one clear entry point for all digital matters. This approach would streamline access and reduce confusion. Possible implementations could be the chat, which is going to be implemented at the health centers, or having short video triage meetings for all digital matters, similar to the approach at health center A. This aligns with Skålén et al. (2015) who indicate that clarity in service interaction points is crucial for effective co-creation of value.

However, implementing this step will restrict residents' ability to freely choose the option that best suits them, thereby limiting their perceived accessibility.

By implementing these measures, the health centers will ensure that enhanced accessibility leads to better healthcare outcomes without imposing extra manual labor or causing frustration for professionals. The value co-created will be improved by providing clearer guidance for residents in understanding how to contact the health centers correctly and why these are the relevant steps to take. Additionally, these measures highlight the significance of patient engagement in the evolving landscape of digi-physical health services to maximize value.

The results of the study by Levy & Janke (2016) showed that low health literacy is a significant barrier to accessing healthcare services, independent of other factors. The authors also explain how individuals with low health literacy are significantly more likely to experience difficulties in accessing healthcare. As a result, the benefits of improved accessibility offered by digi-physical health centers cannot be realized without adequate digital health literacy. Consequently, the following section will analyze the requirements of and need for health literacy and digital health literacy.

5.1.2 Health Literacy

Examining the digi-physical health centers, which integrate both physical and digital healthcare, it is evident that they necessitate visitors to possess both digital and physical health literacy to some extent to use the options available. However, the burden of literacy requirements does not only fall on the residents, as shown by the interviews. The professionals report that they face the greatest demands for health literacy when delivering these new digi-physical services as they are required to adopt, learn and use the digital tool. Furthermore, it is their duty to inform and educate the residents, noting that no formal requirements are imposed exclusively on the residents. The actions towards educating and informing residents are usually done during encounters at the health center, for example when technical difficulties arise regarding the self-check-in. When technical issues arise, it presents an opportunity for medical secretaries to engage with residents to improve their digital health literacy and thereby increase their perceived accessibility to healthcare. Thus, despite the move towards automation, the presence and availability of medical secretaries remain essential to address any disruption that might occur. The speech recognition tool has also presented new possibilities for medical secretaries. Since clinical personnel are now responsible for proofreading and signing off on documents themselves, this change has added extra steps to their workflow. Previously, these tasks were handled by medical secretaries, thus reducing their involvement and altering the roles of both clinical and administrative staff. The medical secretaries are now a resource that could be used to educate, involve and inform the residents to improve their health literacy and the service quality.

During the interviews, professionals emphasized that digital care could enhance observation capabilities for assessments compared to phone-based assessments. For example, subtle cues in a patient's movement or behavior, observable in video consultations, can offer critical insights into their overall health. However, the digital

approach also presents challenges, particularly a diminished capacity to assess physical conditions such as mobility, which are more readily evaluated in person. This necessitates a more supportive and nurturing communication style from professionals to compensate for these observational limitations.

Digital health literacy, which encompasses patients' ability to understand and utilize information provided digitally, plays a crucial role here. By effectively imparting knowledge, professionals can positively influence patients' digital health literacy, thereby enhancing the quality of care. As Palumbo et al. (2022) articulate, digital health literacy involves a dual responsibility: patients must access and comprehend information to make informed decisions, and professionals must tailor their services to meet patients' needs and ensure equitable access to care. This dual perspective highlights that it is not only about enhancing patients' skills, organizations must also develop strategies to effectively navigate the digital landscape, thereby improving both access and quality of care. However, the results section identifies a triple perspective. Firstly, professionals must enhance their digital capabilities. Secondly, residents need to improve their individual digital literacy to access care effectively. Lastly, there is a two-sided perspective: professionals must communicate in a manner that enables patients to comprehend, understand, and act on the information provided digitally.

Davey & Grönroos (2019) provide a framework for understanding the roles of health service literacy in resource integration and value co-creation. They identify that healthcare professionals and patients engage in complementary roles to enhance health outcomes. Professionals act as knowledge brokers and enablers, facilitating the patient's journey through the healthcare system. These roles require professionals to provide tailored support and education, enabling patients to navigate digital health environments effectively. The emphasis on complementary roles highlights the importance of mutual understanding and co-creation in healthcare interactions.

The professionals stated that they are provided support and training to improve their individual digital literacy and also strive to improve patients' digital skills during in-person encounters at the health centers or through informative videos and walking groups performed at health center A. Palumbo et al. (2022) recommend tailoring educational programs and involving patients in value co-creation as a solution to issues experienced within health literacy. The initiatives taken at health center A along with the education regarding digital tools for the employees align with the theoretical principles. However, the educational efforts that employees undertake during in-person interactions should be further refined to guarantee that all residents have equal access to information and, consequently, equitable opportunities to receive care. Therefore, the following recommendations are proposed:

4. Enhance the digital communication between patient and provider through professional educational programs. Including specific training on digital communication. This can help healthcare providers better explain complex health information in ways that are easily understandable for patients. As Davey

& Grönroos (2019) suggest, healthcare professionals acting as enablers and knowledge brokers can significantly improve patients' understanding and engagement.

5. Implement structured educational programs for residents to ensure they receive information consistently, whether or not they interact with a professional in the waiting room. Distribution methods could include flyers or verbal announcements at community gatherings. This is supported by Palumbo et al. (2022) who recommend tailored solutions to promote digital health literacy at both the individual and organizational levels to effectively engage patients in value co-creation.
6. Continue the successful initiatives from health center A and introduce them at health center B. Collaborate with local organizations like preschools, utilize social media for information sharing, and educate residents about digital options at organized events, such as walking groups for the elderly. These initiatives foster a sense of community and shared learning, enhancing both individual and organizational health literacy (Davey & Grönroos, 2019). According to Palumbo et al. (2022), promoting digital health literacy involves addressing the digital information needs of patients and creating environments to enable co-creation and service improvements.

These recommendations are steps towards enhancing the digital communication capabilities of healthcare providers and improving the digital literacy of patients, ensuring that all residents have equal access to health information and care. By focusing on these areas, health centers can improve health outcomes and foster a more informed and engaged patient population, aligning with the overarching goals of the Swedish Health and Medical Services Act. The act has three strategic goals; to increase accessibility, increase the involvement of patients and a more personalized care, and an increased continuity within primary care. The latter will be further discussed in the next section.

5.1.3 Continuity

During the interviews, professionals noted a decrease in continuity at traditional centers when patients with minor ailments sought care from digital healthcare providers, leading to gaps in patient information. The professionals indicated that digi-physical health centers can maintain continuity by offering both digital and in-person visits, effectively managing minor ailments that might have previously been addressed by digital healthcare providers and incurring costs for the region. Additionally, medical personnel have expressed a willingness to share this information and, consequently, the benefits with traditional health centers to enhance their continuity and reduce patient loss to digital providers. However, the interviews did not reveal any existing initiatives to share information within Närhälsan's health centers.

The use of follow-up visits and video triage represents a significant advancement in maintaining continuity of care. Follow-up visits, whether conducted physically or through video, ensure that patients receive consistent communication with their healthcare provider, and enhance their trust in healthcare. This ongoing engage-

ment helps in building a more personal connection with healthcare providers, which is often less feasible through phone calls or messages alone. Video triage, in particular, allows healthcare providers to assess patients' conditions visually, enabling more accurate evaluations and accurate care planning. This method not only streamlines the process of determining the urgency and type of care required but also reinforces the patient-provider relationship, crucial for long-term healthcare service delivery.

At health center A, they always begin with a video triage meeting, enhancing continuity by building a personal connection. If necessary and feasible, they may later transition to an in-person meeting or sampling. This approach increases continuity as the patient has already met their healthcare provider digitally before the physical interaction. Although health center A does not operate according to the concept of two separate teams, one digital and one physical, the method still reinforces enhanced continuity without following the original concept.

Given the existing proposals of changes to the Health and Medical Services Act (Socialdepartementet, 2023), which aim to address challenges linked to private digital healthcare providers and the reimbursement method mentioned in section 2.1.3, health centers should now focus on retaining their patients and enhancing their continuity of care. The recommendations for enhancing accessibility in the digi-physical health centers are supported by the empirical findings outlined in this thesis. The interviews with professionals highlight several critical aspects that reinforce these proposed recommendations:

7. Implementing digital video triage as a standard first point of contact can streamline the initial assessment process, allowing healthcare providers to quickly determine the necessary level of care without requiring the patient to visit in person. This approach not only improves continuity of care compared to triage via phone or messaging but it has also proven to be more time-efficient when implemented at health center A.
8. Enhance continuity in customer information by handling minor ailments digitally. Since minor ailments are the most common reasons for out-of-county visits with digital providers, as noted by the professionals, these actions can prevent patients from turning to alternative digital providers. This capability is already in place, as residents can book video consultations on 1177. To clarify further for patients that this option is also suitable for minor issues, enhanced information should be provided on 1177 and through their online channels.
9. Follow-ups via video can further enhance continuity by ensuring that patients receive consistent care from their healthcare provider, or primary care physician.
10. Ensure information flow between traditional and digi-physical health centers through collaboration measures or workshops. Since the digi-physical health centers have the time and resources to test and evaluate, the results from these tests should reach the traditional health centers with less resources and abilities to test new ways of working. Since the health centers have different approaches

in their ways of working, information flow between the health centers should also be implemented to learn from each other.

The recommendations presented are intended to leverage digital technology to improve relational continuity in Swedish healthcare. Health centers can improve operational efficiency, patient trust, and care quality by incorporating video triage, digital management of minor ailments, and consistent video follow-ups into their regular care protocols. These steps are in response to the entry of digital healthcare providers in 2016, with the goal of ensuring continuity and quality of care while minimizing patient loss to private actors. To ensure that all health centers within Närhälsan are involved in testing and evaluating the digi-physical ways of working, collaboration mechanisms should be initiated. Finally, these strategies ensure that health centers continue to offer patient-centered care.

5.1.4 Feedback

At the digi-physical health centers, feedback is recognized as a critical element of post-core service encounters, yet the collection and utilization of such feedback appear to be individually initiated and unstructured. The professionals within these centers acknowledge the importance of feedback but often rely on informal interactions to understand patient satisfaction and gather insights. For example, some employees take initiative to ask patients about their experiences directly after their visits or when new systems like self-check-in are used. However, there is no systematic approach to capturing this valuable information where many interactions and patient experiences remain undocumented and are not formally analyzed or acted upon.

Even though there are no formal efforts to gather feedback from the residents, some employees make personal efforts to engage with patients and solicit feedback, demonstrating a commitment to improving patient experience even in the absence of formal systems. The professionals highlighted that their perception is that most patients are pleased with their experiences, particularly regarding digital meetings. This could imply that while positive feedback is noted, negative feedback or constructive suggestions may not be adequately captured or addressed. Without structured feedback, health centers may miss critical insights that could lead to service enhancements as feedback is an important resource for continuous improvements.

According to Damali et al. (2016), understanding the roles in co-creation, along with motivating and educating customers in how to contribute, is crucial for maximizing value. Damali et al. (2016) also stated that in order for a customer to provide necessary feedback, they must be aware of why and how to do so. In the context of digi-physical health centers, educating residents on the importance of feedback and how to provide it effectively can enhance their readiness to participate actively in the co-creation of healthcare services. This also implies that there needs to be ways for residents to easily provide feedback in a structural manner. The proposed recommendations to improve the feedback process are:

11. Implement a feedback system for digital video consultations and digital tools where the patients, in a structured manner, provide their inputs in order to improve the service delivery.
12. Inform the residents on why and how to give feedback. If residents know the reward of feedback, they will be more willing to provide their inputs.
13. Make informed decisions on improvements by structuring and utilizing the feedback given. When the feedback system is implemented, the health centers can make informed decisions on challenges and opportunities provided by their customers.
14. Engage with residents through co-creation workshops or by communicating with them during physical encounters. Similar to what the health centers are doing now, feedback can also be provided by word of mouth or through workshops. This could be a way of getting feedback but also receiving suggestions and ideas for improvements simultaneously.

The theoretical framework provided by Damali et al. (2016) supports these recommendations by emphasizing the importance of customer education and engagement in the co-creation of value in healthcare services. According to Damali et al. (2016), educating customers on how to provide feedback effectively increases their motivation and ability to engage in meaningful interactions, which enhances service quality and customer satisfaction. Furthermore, structured feedback mechanisms align with the authors findings that well-informed and actively participating customers can lead to improved health outcomes and reduced healthcare costs.

The proposed recommendations aim to improve the service delivery by establishing a structured feedback system that captures, analyzes, and responds to patient input through digital platforms and direct interactions. This system will educate residents on providing feedback, empowering them to actively participate in co-creating healthcare services and enhancing their engagement and satisfaction. By making the feedback process more accessible and understandable, residents will feel valued and motivated to contribute, fostering a dynamic healthcare environment driven by patient input.

5.2 The Residents' Perceived and Experienced Opportunities and Challenges

This section highlights the identified challenges and opportunities from the perspective of residents by linking the challenges and opportunities to the identified themes, which include awareness, accessibility, health literacy, and digital care. While addressing these challenges and opportunities, recommendations for improvements are suggested for the health centers.

5.2.1 Awareness

The majority of answers gathered from the residents emphasized that the residents are unaware of the digi-physical health centers. While a minority of the residents could guess that the health center offered both in-person and digital visits, the majority assumed the digi-physical health centers to be exclusively digital and referenced other digital healthcare providers. The residents' instant connection and familiarity with the digital healthcare providers indicates a disruption by the digital healthcare providers, thus supporting the theory of disintermediation by competitors in the relationship archetypes by Wagner et al. (2018). For the digi-physical health centers to remain competitive against digital healthcare providers and prevent being bypassed, residents should be made aware of the health centers, and what the digi-physical health centers offer. The following recommendations are proposed:

15. Initiating community outreach programs, similar to the partnerships health center A has established to inform the residents about the health center, and establish a personal connection with the residents. This is supported by the professionals at health center A, where residents in direct interaction have been informed of the center and actively chosen to re-list themselves at the digi-physical health center.
16. Launch a marketing campaign to make residents aware of the digi-physical health centers and their offer of both digital and in-person visits. This recommendation is empirically supported as there is a gap in outreach and residents awareness of the digi-physical concept and location of the centers.

The data underscores a critical awareness gap among residents regarding the service offerings at digi-physical health centers. This lack of awareness not only hampers resident engagement but also positions digital healthcare providers as the default option for digital care. Addressing this challenge through targeted community outreach and clear marketing campaigns is essential to educate the public about the integrated care models available at digi-physical health centers. Moving from the broader implications of community awareness, the next section will cover the enhanced accessibility that digi-physical care provides.

5.2.2 Accessibility

The video visits increase accessibility to care according to the residents, as they can be **triaged** digitally and do not need to make unnecessary trips to the health center, saving them time. The multiple channels of contact provides a broader range of entry points, improving accessibility as the patient can access healthcare through their preferred way of contact. Moreover, the residents think video consultations increase accessibility as it allows patients to have consultations from their preferred location, regardless of where they are. The accessibility to care was also seen as a more direct and faster way to get in contact with the health center, making it more time efficient for the patient. Thus, the increased accessibility to care through video consultations aligns with the goal of enabling health literacy through digital platforms (Palumbo et al., 2022), as the communication channel ensures the convenience

of remote consultations.

5.2.3 Health Literacy

As the residents were made aware that the digi-physical health centers offered digital care if possible and physical care when necessary, they instinctively compared video consultations with in-person consultations, therefore mainly focusing on the core service encounters. The communication between patient and healthcare professionals during video consultations is perceived to be challenging in multiple regards.

Firstly, the residents expect professionals to be less skilled at both noticing details of the patient's condition and interpreting the patient's body language over video, when compared to in-person consultations. Secondly, the residents fear that the professionals are not as thorough in assessing the patient over video as they do in-person and that something might get overlooked. Thirdly, the personal contact between patient and professional is not only of importance for the professional in order to correctly assess the patient, but also for the patient to interpret the professional to feel comfortable and safe in sharing information. For digital health literacy, it is important that the patient can communicate their health status over video and why they seek care such that the healthcare professional can treat or resolve the patient's issue. Establishing a personal connection to enable efficient communication is also of importance as care is co-created. Aarikka-Stenroos & Jakkola (2012), highlight how the value of the service is dependent on what the firm can contribute with, the involvement of the customer and the degree to which the customer is able and willing to participate and dedicate resources. In the context of video consultations, this means that healthcare professionals not only need to use their medical expertise, but also ensure that the patient can interpret the professional to make the patient comfortable during the interaction. Once the patient feels comfortable and safe, they are more inclined to share their health information with the professional, who can then make an improved assessment of the patient. Considering the importance for the patient to feel safe and comfortable and for both parties to efficiently communicate to co-create of care, the following recommendations are proposed:

17. If the initial visit to the digi-physical health center is over video, the healthcare professional should spend some additional time such that both parties familiarize themselves with each other to create a comfortable and safe interaction. This recommendation is supported by the empirical findings, highlighting residents need for a personal connection to feel safe and their need to interpret the healthcare professional.
18. The first consultation at the digi-physical health center could be in-person for both parties to become familiar with each other. Then video consultation can be encouraged when a second visit is needed as both parties have initiated a personal relationship. The empirical findings support residents preference for face-to-face interaction in order to establish a personal connection, learning how to interpret the healthcare professional, and establish trust.

In light of the challenges and potential barriers identified in video consultations, it

is evident that fostering a comfortable and effective communication environment is crucial. Health literacy in a digital context requires more than just the conveyance of medical advice; it necessitates building trust and understanding, ensuring patients are comfortable and well-informed. Investing time in building a positive relationship during initial video consultations or beginning with an in-person visit can greatly improve interaction quality. This method helps overcome digital limitations and combines the benefits of both digital and physical care, thereby enhancing patient care and co-creation of value through strengthened personal connections.

5.2.4 Digital Care

While the improved accessibility to care was perceived as positive, residents feared the quality of care would be lower compared to in-person consultations as communication (**health literacy**) is less efficient over video. The perceived lower quality of care can further explain why residents are generally comfortable with video consultations for minor ailments, but for more serious matters, in-person consultations are preferred.

Residents also feared that the increased accessibility to digital care would make in-person care **less accessible** as they would be hindered from in-person visits. This fear is twofold and partly due to the perception that the healthcare professionals would try to manage the issue digitally even when a physical examination is needed. Thus, wasting time on a digital consultation before the patient can receive their suitable in-person care. Then residents' also believed that professionals would be reluctant to see the patient in person when patients seek care for something which can be handled digitally. Considering the residents' perception that they could be declined in-person visits, the following recommendations are proposed:

19. Clearly inform the residents that the digi-physical health centers offer in-person visits. This could be achieved through multiple channels: information on the digi-physical health centers websites, marketing campaigns with posters in the residential area, Facebook groups and workshops. This recommendation is supported by the misalignment between the empirical findings of residents misconception of digi-physical care and professionals requirement that all channels of contact are equally important.

Based on the gathered data, the younger generation is both confident and comfortable with digital care, indicating a higher level of digital health literacy. Meanwhile, the older generation is less comfortable with digital care, and finds it challenging to know where and how to seek care digitally, indicating a lower level of **digital health literacy**. These findings align with Dunn & Hazard (2019) in that technology can serve as a barrier for patients without the necessary skills or devices. Furthermore, in conjunction with Levy & Janke (2016), who found that patients with low health literacy are more likely to experience difficulties in accessing healthcare, patients with low digital health literacy are more likely to experience difficulties in accessing digital healthcare. To ensure that healthcare remain accessible to all residents, the following recommendations are proposed:

20. Continue to educate patients during in-person interactions at the health center on how to access the region's digital information, how to contact the health center online and how to schedule appointments to increase digital health literacy, minimize digital exclusion and ensure accessibility, as supported by Levy & Janke (2016).
21. For equal accessibility, regardless of patients' level of digital health literacy, it is of importance that in-person visits remain an available option even when the patient's condition could be handled digitally, as the patient's digital literacy may hinder the patient from seeking care at the health center otherwise. This is supported by the professionals in the empirical findings.

The introduction of digital care has undeniably improved access to healthcare services, but concerns regarding the perceived lower quality of care, especially for serious medical issues, highlight a need for clarification. Residents' apprehensions about digital care potentially replacing in-person visits emphasize the importance of maintaining the availability and visibility of physical consultations. Communication and educational strategies are essential to bridge the gap between digital skills and health literacy, ensuring all demographic groups can benefit from the advancements in healthcare delivery.

Throughout this chapter, opportunities and challenges brought up both by the healthcare professionals and the residents have been acknowledged. As a summary, the opportunities and challenges have been visualized in tables 5.1, 5.2, 5.3, 5.4 and 5.5 for both respondent groups and will be further presented in the following section.

Table 5.1: Summary of service encounters within Accessibility and their impact expressed by Healthcare Personnel (HP) and Residents(R). Challenges (-) and Opportunities (+) are visualized based on what respondent group provided the input.

Service Encounters		**Pre-Core**	**Core**	**Post-Core**
Accessibility	HP	+ Video triage decrease unnecessary travels to health center + Quicker access to healthcare - Patients seeking care through multiple channels simultaneously - Too accessible for patients - Lack of booking system integration, manual labor	+ Video consultations from patients preferred location + Video consultations shorter, can assess more patients	
	R	+ Geographical independence + Time efficient		
	R	+ Ease of contact + Multiple channel access - Fear of being denied in-person care		

5.3 Service Encounters: Concluding Opportunities and Challenges for Professionals and Residents

The range of opportunities and challenges encountered by professionals and residents has been divided according to different stages of service encounters: pre-core, core, and post-core. This categorization is aimed at highlighting the impact of these opportunities and challenges on both the service experience and its delivery. They have been systematically arranged as follows:

During the **pre-core** phase, marketing and raising awareness present significant challenges for health centers as shown in table 5.4. Moreover, the challenges faced by professionals in having to inform and support patients about the digital options and how to book appointments are also challenges faced during the pre-core service encounters. These challenges are aspects within health literacy and are displayed in 5.2.

On the positive side, enhanced accessibility, ease of contact, and quicker access to healthcare represent beneficial aspects within the pre-core service encounters. However, the professionals raise concerns regarding over-accessibility and the lack of system integration, which can lead to increased manual labor for the personnel at the health centers. Additionally, residents express apprehension that the growth in digital care options might limit their access to in-person care, should they need or prefer it, as shown in table 5.1. This concern is closely linked to the issues of health literacy and awareness that are prominent during the pre-core phase. Since residents may not be fully aware of the digi-physical structure and operational methods, it is essential to educate them on how to seek care and obtain support for their health-related concerns.

The opportunities and challenges encountered during the **core** service encounters predominantly relate to health literacy, as shown in table 5.2. Professionals struggle with the nuances of digital communication and adapting their communication styles for video consultations. Conversely, residents express concerns about the perceived lower quality of care during these digital consultations. Technical difficulties frequently arise during video consultations, however, professionals note that patients generally show understanding towards these issues, which does not significantly impact service delivery. Additionally, residents highlight the risk of digital exclusion, particularly affecting the elderly and those with limited digital literacy.

The **post-core** service encounters are primarily characterized by the insufficient feedback mechanisms at the health centers and is shown in table 5.5. These centers depend on individual initiatives to collect feedback in an unstructured manner. Additionally, health centers undertake individual educational initiatives to improve digital health literacy during physical visits, where employees inform residents about digital options and encourage them to consider these for future visits, as shown in

table 5.2.

Some opportunities and challenges spanned across the whole service delivery and are therefore included in all three phases. The first one being residents opportunity for digital visits, highlighting their geographical independence and time efficient interactions with the healthcare professionals, as seen in table 5.1. Moreover, professionals have the possibility to handle simpler issues digitally in all phases, in comparison to traditional health centers, thus presenting the opportunity for increased continuity, as shown in table 5.3. Meanwhile, residents are concerned that the personal relationship could be hindered during digital visits and therefore prefer in-person interactions as demonstrated in table 5.3.

5.4 Meeting the Identified Needs of Professionals and Residents

When comparing the opportunities and challenges from the residents and from the professionals perspectives, similarities and differences have been encountered. Both residents and professionals identify the increased accessibility offered by digital tools as a significant opportunity. Residents appreciate the convenience of accessing healthcare from anywhere, which aligns with professionals' emphasis on the ability of digital tools to facilitate care irrespective of geographic location. A shared concern is digital health literacy, where residents struggle with effective communication during video consultations and are apprehensive about potentially losing access to in-person care due to a heavy emphasis on digital services. On the other hand, professionals are concerned about their own effectiveness in communicating during digital encounters and about whether residents can competently use digital tools.

Some differences in perspectives have also been acknowledged. From the residents' viewpoint, the primary opportunities lie in improving awareness and outreach since many residents currently perceive these centers as purely digital. A significant fear among residents is that the emphasis on digital care might lead to a reduction in available in-person care options, particularly when such visits are necessary for thorough examinations. The professionals, however, find it difficult to coordinate care effectively across multiple digital and physical entry points, which can lead to patient confusion and operational inefficiencies. Even though the professionals do not raise residents' awareness as a specific challenge, they mention issues in feedback, marketing and misuse of the service, which could imply that there is a lack of information flow. The professionals also highlight the competition from digital healthcare providers, which often offer quick, convenient, and sometimes lower-cost options for patients, as a challenge. This challenge creates issues related to maintaining continuity of patient information, which can be compromised when switching healthcare providers. The differences and similarities in challenges and opportunities encountered are highlighted in tables 5.1 for accessibility, 5.2 for health literacy, 5.3 for continuity, 5.4 for marketing and awareness, and 5.5 for feedback.

Table 5.2: Summary of service encounters within Health Literacy and their impact expressed by Healthcare Personnel (HP) and Residents(R). Challenges (-) and Opportunities (+) are visualized based on which respondent group provided the input.

<table>
<tr><th>Service Encounters</th><th></th><th>Pre-Core</th><th>Core</th><th>Post-Core</th></tr>
<tr><td rowspan="4">Health Literacy</td><td rowspan="2">HP</td><td>+ Improved anamnesis compared to phone triage
+ No new requirements on patients, seek care as usual
- Professionals need to inform and support patients to become accustomed to the digital options available
- Patient confused in what/how to book appointments</td><td>+ More information relayed over video than over phone
+ Patients are sympathetic for technical issues
- Less personal connection, less polite small talk
- Less observations for assessment than in-person consultations</td><td>+ Individual efforts to educate regarding digital tools in conjunction with in-person visits or walking groups
- No formal educational efforts or programs</td></tr>
<tr><td colspan="3">+ Professionals receive support from organization to adopt digital tools and ways of working
+/- Continuous learning demand for professionals for new tools and ways of working
- Professionals required to be more detailed and nurturing during video consultations
- Digital communication does not allow for the same interpersonal cues as face-to-face conversations
- Frustration form professionals when technology is not working as expected</td></tr>
<tr><td rowspan="2">R</td><td colspan="3">- Fear of digital exclusion</td></tr>
<tr><td></td><td>- Cannot read body language as well over video compared to in-person consultations
- Loss of personal connection with professional
- Cannot interpret the professional as well, less comfortable in sharing information</td><td></td></tr>
</table>

While analyzing the similarities and differences in challenges, the recommendations have been assessed and linked to develop a cohesive strategy that aligns with the challenges and opportunities encountered. Firstly, the differences in challenges and opportunities imply a lack of knowledge flow between professionals and residents, however the similarities indicate that these areas are especially important for all stakeholders, and must be taken into consideration. Open innovation plays a crucial part in forming strategic improvements to the health centers and is explored in the following section.

Table 5.4: Summary of service encounters within Marketing & Awareness and their impact expressed by Healthcare Personnel (HP) and Residents(R). Challenges (-) and Opportunities (+) are visualized based on which respondent group provided the input.

Service Encounters		Pre-Core	Core	Post-Core
Marketing & Awareness	HP	+ Health center A informative videos through Facebook + Inform patients during in-person visits - Resistance from the organization for local marketing inside the center - Local challenges of distribution of flyers - Slow organizational efforts to support marketing initiatives by health center personnel - Lack of information on the health center website regarding what digi-physical means - No local marketing efforts in ads or billboards, in comparison to private actors		
	R	- Majority of residents are unaware of the digi-physical health centers and what digi-physical care entails - Many residents think that digi-physical care is exclusively digital - Many of the unaware residents associate digi-physical care with digital competitors		

Table 5.3: Summary of service encounters within Continuity and their impact expressed by Healthcare Personnel (HP) and Residents(R). Challenges (-) and Opportunities (+) are visualized based on which respondent group provided the input.

Service Encounters		Pre-Core	Core	Post-Core
Continuity	HP	+ Professionals can handle simpler issues, due to available appointments and time efficient practices. In comparison to traditional health centers → enhanced continuity & competitive position		
	R	- Prefer in-person consultations to retain personal relationship		

Table 5.5: Summary of service encounters within Feedback and their impact expressed by Healthcare Personnel (HP) and Residents(R). Challenges (-) and Opportunities (+) are visualized based on which respondent group provided the input.

Service Encounters		Pre-Core	Core	Post-Core
Feedback	HP			- No structured feedback collection process + Informal efforts to collect feedback by individual employees - No overview of patient experiences

5.4.1 Open Innovation

Open innovation is a modern business paradigm that breaks down the traditional barriers of organizational research and development. Initially defined by Chesbrough (2003), it promotes the leveraging of both external and internal ideas to advance

technologies and solutions. In its essence, open innovation suggests that companies can, and should, use external ideas while developing and enhancing their own innovations. Open innovation in healthcare has also been examined, highlighting the various benefits in incorporating various stakeholders to create value and healthcare solutions. Wass & Vimarlund (2016) explain how open innovation in healthcare can facilitate the dissemination of knowledge across various stakeholders, including residents, healthcare providers, and external organizations. This increased transparency and flow of information help raise awareness about healthcare challenges and innovations, bridging the gap of their perceptions of healthcare.

The benefits of open innovation are mainly acceleration of innovation, expansion of markets, enhanced innovation capabilities, and greater economy of scale (Chesbrough & Bogers, 2014). However, since the focus of this research is about leveraging the gaps of challenges and opportunities between residents and professionals within healthcare, the focus will be the increased innovation capabilities. However, since one of the main challenges identified for the residents was the lack of awareness, there is also a benefit of expanding the market and increasing awareness of digiphysical health centers. Open innovation facilitates co-creation of value with external actors and involves interactive knowledge exchanges, characterized by mutual and shared objectives (Chesbrough & Bogers, 2014). As noted earlier, establishing a clear purpose and 'why' in co-creation is essential for engaging other stakeholders in enhancing service delivery, since the stakeholders have a mutual purpose during the open innovation process.

Chesbrough & Bogers (2014) highlight three different forms of open innovation: outside-in (inbound), inside-out (outbound), and coupled (combining inbound and outbound). Since there is a gap to bridge between the perception and knowledge amongst the residents and the perception and knowledge amongst the healthcare personnel, the coupled approach is suggested. The coupled approach integrates external knowledge from residents and stakeholders into the healthcare system and includes outbound strategies that enable healthcare innovations to reach broader markets, thereby increasing awareness. It encourages active participation from patients not just as recipients of care but as contributors to the innovation process, aligning with the growing emphasis on patient-centered care and empowerment (Wass & Vimmarlund 2016).

The recommendations brought up were coupled together, and by using aspects of open innovation these were assessed according to themes.

5.4.2 Recommendations

Feedback
Currently at the health centers, they have no structured feedback loops and might miss critical insights that could lead to service enhancements as feedback is an important resource for continuous improvements. Similarly to open innovation, this is a way for the organization to get external input from residents and make in-

formed strategic decisions based on data. As highlighted by Paasi (2016), involving customers in service innovation through structured feedback processes like surveys, digital platforms, and in-person interactions can provide valuable insights. While surveys may fall under inbound open innovation, they are still crucial for gathering external input. Workshops and co-creation sessions further facilitate real-time, dynamic exchanges of ideas, ensuring that feedback is continuously integrated into service improvements.

Enhancing Awareness and Accessibility
To bridge the gap in service awareness and utilization, it's essential to engage residents directly in the development and communication strategies. Wass & Vimarlund (2016) discuss how open innovation in healthcare can facilitate the dissemination of knowledge and bridge perceptual gaps between different stakeholders. By adopting open innovation, health centers can work collaboratively with local organizations and residents to tailor marketing and educational initiatives, ensuring they are relevant to local needs and preferences. This approach not only raises awareness but also addresses residents' concerns about the availability of in-person services, thereby reducing fears and increasing service accessibility.

Misalignment
There are some misalignments in the recommendations based on the empirical findings from the residents and the empirical findings from the professionals. Since the residents have the perception that they will be denied physical care, the idea to have the first meeting physically was suggested. However, since the health centers are working according to the slogan of "digital when possible" they intend to take all meetings possible digitally. To address this misalignment, an open innovation approach could be beneficial. By involving patients directly in the co-creation of the service, the resulting solutions can more accurately reflect both the needs of patients and the professionals' capabilities. This strategy ensures that the innovations are not only effective but are also more likely to be accepted and adopted by all stakeholders (professionals and residents). This method aligns with Wass & Vimarlund's observations on how open innovation in healthcare promotes the sharing of knowledge and bridges gaps in healthcare perceptions (Wass & Vimarlund, 2016).

Enhancing Digital Literacy
Within open innovation, health centers can collaborate with technology providers, educational institutions, and residents to develop comprehensive digital literacy programs. By incorporating feedback from these stakeholders, the programs can be tailored to meet the diverse needs of different demographic groups, ensuring effective utilization of digital healthcare services (Chesbrough & Bogers, 2014; Paasi, 2016).

Collaborations Between Health Centers
The willingness to increase the information flow between digi-physical and traditional health centers were evident throughout the interviews. However, no formal efforts on how to do this were presented. The collaboration between the two health centers were not brought up as an implemented initiative and implying no joint inno-

vation strategies between the health centers. Open innovation provides a framework for sharing knowledge and best practices across different types of health centers, as suggested by Chesbrough & Bogers (2014). By establishing formal channels and platforms for exchange, these institutions can benefit from shared insights and innovations, ultimately leading to improved patient care.

5.5 Comparison of Findings to Previous Reports

Previous research has been conducted to examine residents and healthcare employees expectations on digital care. Although the focus of this study was digi-physical care, examination of the findings associated to digital care provides a new perspective as digital care is usually put in contrast to physical care. In 2020, a government agency published a report regarding the population's, patients' and healthcare personnels' expectations and perceptions of digital care. Myndigheten för Vård- och Omsorgsanalys (2020) concluded the following findings prior to the major increase of digital care:

1. Short waiting times are the most valued quality aspect of digital video visits.
2. The respondents prefer physical healthcare visits over digital video visits.
3. Primary care physicians see risks with digital healthcare visits, but also opportunities.
4. Patients and primary care physicians with experience in video visits are more positive towards this form of consultation.

While this study cannot confirm (1), short waiting times are the most valued aspect of digital video visits, the findings indicate that residents expect digital healthcare to increase accessibility to healthcare. This includes benefits such as quickly getting in contact with a healthcare professional, time efficient consultations and that patients can receive care over video from their own preferred location.

Comparing the results and analysis with (2), this study provides additional insights that residents are amenable to video visits when they themselves consider it a minor ailment. However, residents prefer physical healthcare when they themselves consider it to be a more severe condition.

The healthcare personnel which now have experience with digi-physical healthcare see both opportunities and challenges. In alignment with the report, (3), our findings support that digital visits increase accessibility and that it saves patient travel time to the center. The results further support physicians' belief that patients overuse the healthcare system in context with greater digital access; we have shown that this is because patients seek care through several entry points at the same time and for needless reasons. This highlights the need for patients enhanced digital health literacy in order utilize the option of multiple channels appropriately.

6

Conclusion

This study aimed to understand how the concept and new way of organizing at the digi-physical health centers is viewed by the residents and identify the challenges and opportunities encountered by the professionals in delivering high quality care in a new type of setting. This research will also focused on identifying the discrepancy between residents' perceptions of the digi-physical health center and the information provided by healthcare professionals working at the health centers. Based on the analysis, the study offered actionable recommendations for the organization to effectively bridge these gaps.

From the perspective of the professionals, digi-physical health centers offer increased accessibility as patients can chose their preferred way of contact among multiple channels. However, for professionals this leads to an increased workload in managing bookings as patients seek unnecessary care and utilize multiple channels simultaneously. Digi-physical health centers has the possibility to manage minor ailments, which might have been deferred to other actors at traditional health centers. Thus, digi-physical health centers can obtain both personal and informational continuity which would otherwise have been interrupted. The absence of a structured process to collect feedback from the patients results in health centers potentially missing valuable information and opportunities for improvement. Healthcare professionals experience high demands in adopting new digital tools and implementing these in their way of working. Additionally, healthcare professionals, especially medical secretaries, educate and inform patients about the digital tools.

The majority of the residents are unaware of the digi-physical health centers and what digi-physical care entails. Meanwhile, many of the residents are aware of digital healthcare competitors. The residents misconception that the digi-physical health centers exclusively offers digital visits indicates a misalignment of information and knowledge between the organization and the residents. The residents are concerned that the focus of digital visits would result in patients being declined in-person care and that digital care may not match the high quality of physical healthcare. Residents see potential in utilizing digital visits for minor ailments, but prefer in-person care for more severe conditions. While the younger generation has a higher level of digital health literacy, the older generation has a lower level of digital health literacy and prefers in-person care. Overall, residents see a great potential for increased accessibility to care through digital visits. Moreover, they appreciate the option of accessing care regardless of their location.

6.1 Implications for Practice

To better align the needs of residents and healthcare personnel at the digi-physical health centers, it is recommended that the centers implement a structured process to collect feedback from residents. To increase residents awareness of the digi-physical health centers and their service offering, the centers are recommended to collaborate with local organizations such as preschools and customize communication channels to educate for increased health literacy. The health centers are also recommended to implement marketing aimed towards residents in their local area to increase awareness.

The proposed recommendations could potentially be investigated by implementing open innovation, as both internal and external ideas and perspectives can be incorporated to enhance technology and solutions. Open innovation has previously been utilized to facilitate the dissemination of knowledge across multiple stakeholders within healthcare. For Närhälsan, this presents an opportunity to raise residents awareness of digi-physical care, while also incorporating their traditional health centers to learn and adopt their ways of working.

6.2 Implications for Theory

Healthcare initiatives in Sweden emphasizes the importance of continuity in transitioning to good and close care. However, enhanced continuity related to the digi-physical care was not as evident in the findings as initially believed based on the theory. Digital video interactions were perceived by professionals as a potential to offer patients increased relational and informational continuity, as minor ailments could be handled digitally. In contrast, residents preferred in-person interactions and are yet to realize continuity through digital means as a benefit.

Communication is not explicitly mentioned in theory regarding health literacy och digital health literacy. The study found that communication between patient and healthcare professional is of importance in establishing a personal relationship and facilitating both professional and patient to interpret each other when the interaction occurs through video.

7
Future Research

This study aimed to understand the perspectives, experiences and concerns regarding digi-physical care. While the study highlights residents perceptions of digi-physical care, to better understand the complexities in meeting patient needs and how the different service encounters form the overall experience of the service offering, it is recommended that future research include patients in their study. By gathering data from patients who utilize the service, a deeper analysis regarding their health literacy and adoption of digital tools could be explored.

This study was conducted before the implementation of a real-time chat at the health centers. Future research is suggested to investigate if a team based approach to resolve patient cases is manageable and meets the needs of patients. Moreover, researching how the real-time chat effects the perceived and experienced accessibility, continuity and health literacy.

Lastly, the digi-physical health centers are in their initial state of operation and purposely developed to offer digital services. Future research could investigate how the insights gained at the digi-physical health centers regarding digital care and digitalization can be best applied at traditional health centers with higher levels of listed patients.

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A

Appendix 1

Below, the interview guides used to conduct interviews with residents and healthcare professionals in the study are presented.

A.1 Interview Guide Residents

Figure A.1: Interview guide in Swedish utilized for structured interviews with the residents.

Intervjuguide till invånare

Hej, vi gör vårt masterarbete på Chalmers och skriver om digifysiska vårdcentraler. Går det bra om vi frågar dig några frågor, det tar ungefär 2 minuter? Du kommer givetvis vara anonym.

- **Vet du om att det finns en digi-fysisk vårdcentral här i området?**

- **Vad tror du är de största skillnaderna mellan en digifysisk vårdcentral jämfört med en traditionell?**

Förklaring för att sätta invånaren i rätt perspektiv: digital vård när det är möjligt och fysisk vård när det behövs.

- **Vilka fördelar och nackdelar ser du med en digifysisk vårdcentral?**
    - **Beskriv innan under efter, om problem förklara kontinuitet, tillgänglighet och hälsokunskap/digital hälsokunskap**

A.2 Interview Guide Professionals

Figure A.2: Interview guide in Swedish utilized for semi-structured interviews with healthcare professionals.

Interview guide physicians

Ämne	**Fokus**	**Frågor**	**Tillägg**	**Tid**
Introduktion	Vilka är vi? Varför gör vi detta?	Agnes & Klara, vi studerar på Chalmers och skriver nu vår masteruppsats där vi analyserar hur arbetet på de 2 nystartade digifysiska vårdcentralerna går med fokus på digitalisering, möjligheter och utmaningar.		
	Hur gör vi detta?	Vi har några frågor att ställa och vill att intervjun ska vara mer som en diskussion som kommer ta 45-60 minuter.		
	Anonymitet	Du kommer att vara anonym i vår rapport. Vi kommer inte att benämna dig vid namn eller din arbetsroll.		
	Vad ska vi göra med resultatet?	Vår slutrapport kommer att publiceras via Chalmers samt skickas till de ansvariga på Närhälsan, där vi hoppas kunna lyfta teoretiska rekommendationer för utvecklingen av digifysiska vårdcentraler. Vi kommer inte att publicera intervjuerna.		
	Kontaktuppgifter	Kan vi ta dina kontaktuppgifter för framtida kontakt och verifiering av potentiella citat? Vi kommer även att skicka rapporten till dig när den är klar. TA NAMN OCH MAIL		
	Inspelning	Är det ok att vi spelar in den här intervjun? Det är för vårt minnes skull, och det kommer att raderas när vårt examensarbete är över.		
	— STARTA INSPELNING —			5 min
Bakgrund	Introduktionsfrågor	1. a) Vad är din titel? b) Hur länge har du arbetat som “enter title"? **c) Kan du beskriva din roll och vad du arbetar med**		
	Digifysisk vård	**2.** **a) Vad var det som lockade dig att jobba på denna vårdcentral?**		
Organisationsstruktur och arbetssätt	**Intro organisation**	**Nu kommer vi gå in på strukturen och arbetssätten av en digifysisk vårdcentral**		
	Organisationsstruktur och arbetssätt	3. a) **Med egna ord, hur skulle du beskriva konceptet digifysisk vårdcentral?** b) Tycker du att beskrivningen av konceptet överensstämmer med verkligheten och hur ni arbetar idag? c) Vad ser du för utmaningar och möjligheter kring hur ni arbetar på denna digi-fysiska vårdcentralen? d) Upplever du att det finns en specifik patientgrupp som söker sig till denna typ av vård?	Förändringar i arbetsroller, vårdkvalitet och feedback från patienter	12 min
Patientkontakt	**Intro patientkontakter**	**Nu kommer vi gå in på patientkontakter som ni har på vårdcentralen, både digitala och fysiska möten. Vi delar upp patientkontakt i 3 delar: innan, under och efter vården. Innan kan röra sig om triagering t.ex. medan under är själva kontakten, eller mötet med patienten och efter rör all kontakt med patienten efter ett möte har skett.**		
	Innan	4. **a) Hur tar patienterna kontakt med er? Vad har patienten för olika vägar in till vården?** i) Vilka 3 sätt är vanligast? ii) Vad för utmaningar och möjligheter finns det för vägarna in till den digi-fysiska vården? *1) Nämn triagering om de inte nämner det* b) Hur tar ni kontakt med patienterna för vård, om ni gör det?	Kontinuitet Tillgänglighet Hälsokunskap Digital kunskap Digital hälsokunskap	15 min
	Under	5. a) **På vilka olika sätt har ni vårdmöten?** *Konsultationer* b) Vilka digitala verktyg är involverade i processen under/ i samband med ett vårdmöte/konsultation? *För er och patienterna.* i) Hur tycker du att dessa olika sorters möten fungerar för er och patienterna? *1) Vad fungerar bra, vad fungerar mindre bra?* c) Hur har det digifysiska arbetssättet förändrat vårdmöten för dig? *Utmaningar och möjligheter*	Kontinuitet Tillgänglighet Hälsokunskap Digital kunskap Digital hälsokunskap	22 min

	Efter	6. **a) På vilka olika sätt har ni kontakt med patienter efter vårdmöten?** i) Tar ni kontakt eller tar patienterna kontakt? Hur? **b)** Vilka digitala verktyg är involverade efter ett vårdmöte? *För er och patienterna.* c) Skiljer sig efterarbetet på en digifysisk vårdcentral sig gentemot efterarbetet på en traditionell vårdcentral? d) Sker det någon slags feedback efter ett vårdmöte? Relaterat till patientens eller din upplevelse av vårdbesöket? i) Vad säger denna feedback? Problem/upplevelser? Bra/dåligt?	Kontinuitet Tillgänglighet Hälsokunskap Digital kunskap Digital hälsokunskap	29 min
	Intro feedback	**Nu när vi har varit inne lite på feedback, tänkte vi kolla med dig…**		
Vårdkontakter	Patienternas upplevelse	7. Vad din bild är av hur patienter upplever den digifysiska vårdkontakten som helhet? *Om de kanske har sagt något i samband med möten eller om du bara fått någon uppfattning under/efter ett möte.*	Eva Tannaz: Statistik, de får rating från slutet av varje möte där patienter får ge feedback	
Marknadsföring	Till invånare	7,5. Hur når ni ut med information om vårdcentralen och det digifysiska konceptet till invånarna? *Marknadsföring/utbildning/allmän info på hemsidan/när man listar sig?*		
Digitala verktyg		8. **a) Finns det några digitala verktyg som du använder i din roll som vi inte pratat om hittills?** *Vilka?* b) Finns det några digitala verktyg som är tillgängliga men som du inte använder i dagsläget? *Varför?* i) Av verktygen som du använder och som finns tillgängliga, finns det några som fungerar bra och andra som fungerar mindre bra? Vilka? c) Hur upplever du att patienternas kunskap är kring de olika verktygen som finns tillgängliga för dem? i) Utbildar ni patienterna, eller informerar ni dem om de digitala verktygen som finns tillgängliga för dem? Hur?	Tekniska svårigheter Adoption Tillgänglighet Digital hälsokunskap	37 min

		d) Nu har vi gått igenom den digi-fysiska vården och vårdprocessen innan under och efter ett vårdmöte. Om vi då jämför den här strukturen med den traditionella, eller fysiska strukturen; **Vilka krav upplever du att den digifysiska vården för med sig för patienterna och er? Alltså för att ni ska kunna utföra ert arbete och för att patienten ska kunna få den vård den behöver.** *(Krav: något man behöver bidra med som är annorlunda mot tidigare arbetssätt/användning: t.ex. teknisk utrustning, kunskap om vården, beskrivningar av tillstånd)*		
Erfarenhet		9. Hur är din generella motivation och inställning till det digifysiska arbetssättet idag? Hur skulle du beskriva att den digifysiska vårdcentralens struktur påverkar vården?	Om tid kvar!	45 min
Avslutning	Tillägg	10. Är det något som vi ännu inte diskuterat som du skulle vilja lägga till eller framhäva från intervjun?		
	Tack!	Tack för att vi fick intervjua dig, vi uppskattar att du tog dig tid att svara på våra frågor och vi kommer att sammanställa allt i en rapport som vi kan dela med dig.		

DEPARTMENT OF SOME SUBJECT OR TECHNOLOGY
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden
www.chalmers.se

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