Organizational Readiness for Telemedicine in Outpatient Services:

A Case Study of the Diabetes Outpatient Clinic in the National University Hospital of Iceland

Master Thesis

MSc. Business Administration and Innovation in Healthcare

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EOD	Endocrine Outpatient Department at the National University Hospital of Iceland
DOC	The Diabetes Outpatient Clinic at the National University Hospital of Iceland
LSH	Landspítali Háskólasjúkrahús (The National University Hospital of Iceland)
ORC	Organizational readiness for change
ORT	Organizational readiness for telemedicine
T1D	Type one diabetes
T2D	Type two diabetes
CGM	Continuous glucose monitor
HCP	Healthcare Professional
FL	Freestyle Libre
IHI	Icelandic Health Insurances

Abstract

High organizational readiness for change has been associated with more successful change process outcomes and is proposed to be an essential predecessor before initiating organizational change. However, there is a gap in the knowledge translation from theory to practice and how ORC affects change management. This thesis is a case study of the Diabetes Outpatient Department (DOC) at the National University Hospital of Iceland (LSH), interviewing 13 informants, including the perspective of HCPs, management, and patients. The main objective of the research is to explore the concept of organizational readiness for change (ORC) concerning the implementation of telemedicine at the DOC. Furthermore, we provide practical implications for the DOC's future telemedicine implementation processes. Our findings suggest low levels of ORC at DOC, mainly due to a lack of change efficacy. That indicates that in order to implement telemedicine successfully, the DOC needs more resources in terms of staff and space. Telemedicine is seen as the solution to the increased service demand, and we suggest that by starting with small scale changes, the organization will increasingly become more ready for more complex changes in the future.

Keywords: Organizational readiness for change, Organizational change, Telemedicine, Healthcare, Implementations, Diabetes.

1. Introduction

Healthcare organizations are continually changing and looking to improve as a response to technological advancements, changes in demographics, changes in disease patterns, and the discoveries of new treatments. Furthermore, evolving societal norms and values have created higher expectations of care by the public in terms of access, quality, patient experience, and patient involvement in care decision making (Nilsen et al., 2020). For the last three decades, many organizational change initiatives within healthcare have been health policy reforms with a top-down implementation strategy (Erlingsdóttir et al., 2018). However, the success rate of these change initiatives are low. Kotter (1995) estimated that 70% of change initiatives fail. This was twenty-five years ago, but these numbers have hardly improved. In healthcare, change is even harder than in most industries, and therefore it can be speculated that failure rates in healthcare are even higher (Brickman, 2016). High failure rates and the pressure of health systems to improve have led to an increased interest within the healthcare arena to explore and explain how the change process affects the end outcome of the change initiative (Erlingsdóttir et al., 2018). High failure rates have also been related to the organization's readiness for change; in fact, Kotter (1995) argues that half of change initiatives fail to succeed because they lack enough readiness. Organizational readiness for change (ORC) refers to the extent to which the organizations are ready for the proposed change (Weiner, 2009). To implement changes successfully, organizations need an adequate ORC (Gagnon et al., 2014). Organizational change is a challenging process, which requires alterations and adjustments of multiple work processes, staffing, and decision making (Weiner et al., 2008).

Telemedicine has many potential benefits and is considered particularly useful to improve healthcare delivery in chronic diseases. Furthermore, telemedicine holds a grand promise for better service to underserved populations with less geographical access to health care (Jennett et al., 2003). The Health Resources and Services Administration (HRSA) in the US (n.d.) defines telemedicine as *"the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health and health administration".* Telemedicine technologies include video conferencing, secure messaging, e-mail communication and more (HRSA, n.d).

Diabetes is a group of chronic metabolic conditions characterized by elevated blood glucose. The most common types of diabetes are Type 1 Diabetes (T1D) and Type 2 Diabetes (T2D). The focus of this thesis will be on T1D patients, and therefore T2D will not be described further. T1D is usually diagnosed in children and teenagers. Management of diabetes includes medication and regular blood glucose monitoring, and is essential to prevent secondary complications (International Diabetes Federation, 2020). The management of the disease occurs mainly in the primary health care setting, with regular control visits with a healthcare professional (So & Chung, 2018). Self-management is a vital factor in diabetes care. Studies have shown that patients who actively engage in their treatment

between control visits are more successful in managing their condition (McAndrew et al., 2007). However, self-management places a significant burden on affected individuals and their families. As a result, many individuals living with diabetes have a hard time meeting the treatment goals and achieving recommended standards for diabetes management (Gonzalez et al., 2016).

The most commonly used biomarker in diabetes care is Hemoglobin A1c (HbA1c). HbA1c gives clinicians an overview of the average blood sugar level over weeks or months and is measured with a blood test (Diabetes U.K., n.d.). The higher the HbA1c, the greater risk for patients to develop diabetes-related complications. Therefore, it is essential to measure HbA1c regularly to evaluate how the treatment plan is going, and if it needs to be adjusted (Lind et al., 2019).

Traditionally, patients with T1D manage their condition with a blood glucose monitor and an insulin injection pen, which can be rather exhausting for the patient and is linked to the psychological burden for patients and their families (Gonzalez et al., 2016). However, in the past two decades, new medical devices for diabetes management have emerged, for example, continuous glucose monitors (CGM) and insulin pumps. CGM is wearable devices, a small electrode placed under the skin that measures glucose levels continuously throughout the day on set intervals and sends data to a separate device, that can either be another device or a mobile application. The technology offers a solution for the data to be autonomously analyzed and presented in a useful way. It can help patients maintain better glycemic control by giving real-time feedback based on their blood glucose levels through mobile phones (Sun & Costello, 2018). Insulin pumps are also wearable digital devices that are programmed to deliver insulin continuously in small basal doses throughout the day. The patients can also give themselves a small bolus dosage if needed (Cengiz et al., 2011). These devices have significantly decreased the burden for diabetes patients' self-management and have almost become the standard of care for diabetes management (Cengiz et al., 2011; Giani et al., 2017). Furthermore, recent advancements in information technologies have made telemedicine interventions for the self-management of diabetes a possible solution for meeting the increased demand for better diabetes care (So & Chung, 2018).

1.1 Problem formulation and research questions

The Diabetes Outpatient Clinic (DOC) at the National University Hospital of Iceland (LSH) is facing increased demand and, at the same time, deficiency in resources. That has affected the quality of the service that they provide and decreased patient satisfaction. Therefore, the clinic is looking for a solution to improve service processes and has identified telemedicine as a potential opportunity for improvements. For that to become a reality, a radical change within the organization is needed. To sustain a successful change, organizations need to evaluate all factors that can influence the change process and integrate the evaluation of these factors into their change management strategy and implementation process (Jennett et al., 2003; Weiner, 2009).

According to the literature, evaluation of the ORC is a crucial factor before a change process begins. However, organizations often fail to assess the readiness of the organization and its members, partly explaining failed change initiatives (Weiner, 2009). Furthermore, the nature of the healthcare sector makes it more challenging to change healthcare organizations than in other industries (Brickman, 2016). The research of ORC within healthcare has focused on establishing tools to assess the organizational readiness to change. However, there is a gap in the literature concerning the translation of outcomes from the ORC assessment to practice, when designing a change management strategy. Being able to measure the ORC is promising in filling up the gap between knowledge and practice. Up until now there seems to be no perfect measuring instrument or standardized metric to measure the ORC which makes it difficult for organizational leaders to include the concept in their change initiatives (Jennett et al., 2003; Légaré et al., 2010).

Using the case of the DOC, we want to assess the ORC by identifying the need for change, predicting ORC, and the possible challenges and barriers that could hinder the change process. Based on these findings, we want to explore how these factors can contribute to a change management strategy and attempt to provide some empirical evidence to fill the gap between theory and practice.

The following research questions will be used to guide the research process:

> **RQ1:** What are the identified problems at the DOC which could possibly be solved with the implementation of telemedicine and how do these problems translate to a corresponding change vision?
>
> **RQ2:** How does the current state at the DOC correspond to ORC based on the theory of organizational readiness for change presented by Weiner (2009)?
>
> **RQ3:** What are the potential challenges and barriers that could prevent telemedicine's successful implementation in the case of the DOC?
>
> **RQ4:** How will the identified need for change, ORC, and potential challenges and barriers translate into the design of a change management strategy?

To answer these research questions, we use organizational theories, focusing on the literature of organizational change and ORC. Using the case of the DOC and collecting and analyzing interviews from 13 respondents, we conducted our study through the case study methodology. Our results have educational value for managers and change agents in healthcare services who want to implement telemedicine. Furthermore, we make theoretical contributions to ORC literature by adding knowledge to the gap existing between evaluating ORC and translating the outcome into action.

1.2 Scope and delimitation

The study focuses on outpatient services for T1D patients. We argue that this patient group would greatly benefit from the use of telemedicine as this group suffers from a chronic condition and is in frequent contact with the healthcare system. Furthermore, by providing telemedicine services, patient support is increased and could decrease the demand for care. We focus on the concepts of organizational change and ORC concerning telemedicine, looking at the case of DOC at the National University Hospital in Iceland. The main focus is on the perspective of HCPs. However, the patient perspective is also included but with limitations due to the small sample size. The research only focuses on organizational factors relating to behaviour and psychometric factors as well as technological context but does not include financial aspects related to organizational change.

1.3 Structure of the thesis

This section presents the structure of this thesis and describes each chapter's contents. The aim is for the reader to have a better overview of the thesis.

Section 2 - Literature review: Contains the review of the literature concerning the topics of organizational change and ORC. The objective is to explore and describe the existent literature within organizational studies on these concepts and review them in the context of healthcare where appropriate.

Section 3 - Research methodology: Describes the methodological choice made during the research process. The chapter includes reflections about our chosen research philosophy, approach to theory development, research design, research strategy, and approach to data collection and analysis.

Section 4 - Case description: Provides background of the Icelandic healthcare context and describes the case organization, describing their processes, challenges, and problems, as well as their future vision and desired state.

Section 5 - Analysis: Presents the findings which we answer through three out of four research questions. First, we identify the problems that correspond to the need for implementing telemedicine. Second, we identify how the current state at DOC corresponds to the ORC. Third, we identify what could be potential challenges and barriers to the successful implementation of telemedicine.

Section 6 - Discussions: We answer the fourth research question, describing the findings concerning the literature and presenting the theoretical and practical implications of these findings.

Section 7 - Conclusions: Provides the conclusions of all four research questions by reflecting on the original motivation for this research and summarizing all significant findings from the analysis.

2. Literature Review

The theoretical focus of this thesis is on the concept of organizational change, specifically in the organizational readiness for change (ORC), based on Weiner's (2009) theory of organizational readiness for change. The literature suggests that ORC is an essential factor in the change process of organizations; however, it is often ignored by organizations and not adequately assessed before initiating the change process (B. J. Weiner, 2009). Due to high failure rates of change initiatives in healthcare, there has been much interest by researchers in measuring the readiness to change and how that impacts the change process in the healthcare context (Gagnon et al., 2014; Helfrich et al., 2009; Légaré et al., 2010; Lehman et al., 2002; Nuño-Solinís, 2018; S. Shea et al., 2009). Many tools have been developed as an attempt to measure ORC (Légaré et al., 2010) and some of these tools are adapted to measure more specifically the organizational readiness for telemedicine (ORT) (Jennett et al., 2003; Légaré et al., 2010). Still, there seems to be a gap in the knowledge translation, moving the known into practice. Considerable amounts of tools have been developed to measure the ORT. However, they have not been tested enough for validity and reliability, and many are not brief enough and too complicated to use in busy healthcare settings (Légaré et al., 2010). Furthermore, few studies focus on how ORC/ORT impacts the development of change management strategies and how to increase ORC/ORT before initiating change (Jennett et al., 2003).

This section's objective is to review the literature of organizational change and ORC and what meaning they have within the health care sector. We will start by defining key concepts relating to organizational change such as organizational change, change drivers, the change process, and change resistance, as well as review how the structure and culture of the organization affect the process of change. Then we will dive into the concept of ORC, where we start with the definition of ORC. Then we will introduce the theory of organizational readiness to change by Weiner (2009) and define what influences ORC. Next, we will briefly review the literature of ORT and factors leading to the success and failure of telemedicine change initiatives identified.

2.1 Organizational Change

Organizational theory studies how organizations function, reach their objectives, and interact with their operational environment. The theory consists of studies about organizational structure, culture, and change and how these different elements interact and affect each other. Organizational structure and culture can be considered the way the organization is designed to achieve its goals. The organization's structure and culture evolve as the organization grows and can be managed and controlled through organizational change. Organizational change refers to when an organization moves from the present state to some future state to find new, improved ways to achieve its goals. Understanding these different components within the organizational theory and the relationship among them is essential to

successfully manage and control an organization, diagnose problems and make adjustments that will help the organization achieve its goals (Jones, 2013).

There are many different definitions of organizational change. Most define organizational change as something intentional by describing it as the movement from the current situation to a desired future state (Mack et al., 1998). Pardo-del-Val et al. (2012) gives a more thorough definition of organizational change and defines it as *"an empirical observation of the difference in form, quality or long term state of an organizational entity, coming out of the deliberate introduction of new styles of thinking, acting or operating, looking for the adaptation to the environment or for a performance improvement"* (p. 3). He defines the change as something different within the organization after intentionally introducing something new to adapt to a changing environment or improve performance. Pardo-del-val et al. (2012) definition includes three essential elements of change within one definition: the change itself, the change process, and what triggers the change to happen.

Organizational change is a dynamic process, meaning that any change in one aspect of the organization can result in a change in other parts (Cao et al., 2000). Harold Leavitt, a well-known scholar within the organizational literature, defined organizations as complex systems with at least four interacting components: task, structure, technology, and people. Leavitt developed the Leavitt's System Model, also known as the Leavitt's Diamond (see Figure 1), to analyze the full effect a change strategy will have within the organizations and understand how different components are interconnected. He argued that for change to be successfully integrated, it is crucial to understand the connection between these components, since the change in one component is likely to affect others (Leavitt, 1965).

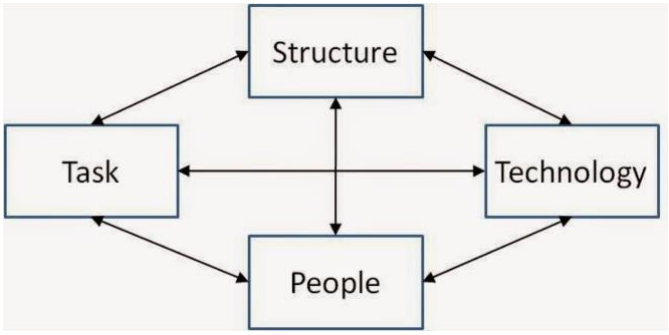

Figure 1: Leavitt's Diamond

Source: Leavitt, (1965)

Many others have built on Leavitt's work. For example, Burke & Peppard (1995) presented an extended version of the Leavitt's diamond and added the fifth component, culture, to the model as well as renaming the *'task'* component to *'processes'* (Seddon & Joyce, 1997). The literature suggests that organizational change consists of different dimensions and that different dimensions produce different types of organizational change. One frequently mentioned dimension is depth or intensity of the change, distinguishing between incremental change and radical change (Pardo-del-Val et al., 2012). Incremental change refers to smaller adaptive changes over time, which do not change the

organization's essence. Radical changes are more strategic or revolutionary changes that will modify the essence of social structures or practices within the organization (Appelbaum et al., 1998).

Another commonly mentioned dimension is the origin of the change (Pardo-del-Val et al., 2012). Origin refers to what drives the need to change or triggers the change process (Seddon & Joyce, 1997). Organizational change can originate either from within the organization itself (internal triggers) or from the external environment (external triggers) as well as a mix of the two. The literature identifies a range of both external and internal triggers. Some external triggers mentioned are changes in government laws and regulations, advances in technology, changes in competition, and economic factors (Appelbaum et al., 1998; Dawson, 2003). Appelbaum et al. (1998) mentioned some internal triggers, such as new corporate vision and mission, the purchase of new technology, mergers and acquisitions, and a decline in the organization's morale. Dawson (1994) drew on Leavitt's system model and identified four generally identified internal triggers: technology, primary task, people, and administrative structure. Additionally, he gives an example of change for each, presented in Table 1.

Internal triggers of organizational change	
Internal trigger	**Example**
Technology	Uptake of video-conferencing, robotic technology or the computerization of management accounting and information systems
Primary task	Shifting away from the main product or service of a company into a new major field of core business
People	Development and implementations of new human resources management initiatives or programs of retraining and multi-skilling in the movement towards team-based work arrangements
Administrative structures	Restructuring work and redefining authority relationship in the uptake of new forms of work organization such as best practice management and cell-based manufacturing.

Table 1: Internal triggers of organizational change

Source: own creation based on Dawson (1994)

Based on the origin, changes are said to be either reactive or proactive. It refers to that some changes are essential for the survival of the organization, but others are favorable but not of real necessity (Pardo-del-Val et al., 2012).

2.1.1. The Organizational Change Process

In general terms, the literature considers organizational change to be a process. Burke (2008) defined the change process as *"how the change is planned, launched, more fully implemented, and once into implementation, sustained"* (p. 23). One of the most well-known organizational change process models is Lewin's (1947) three-step-model. He presented the change process steps as; 1. Unfreeze, 2. Change,

3. Re-freeze. Following Lewin's work, many other authors subsequently developed step-based models for organizational change. These existing change models have several ideas in common. Whelan-Berry and Sommerville (2010) identified five commonly presented steps in the organizational change process literature. Whelan-Berry & Somerville (2010) describe the five steps in the following way:

> **Step 1 - Establishing a clear and compelling vision:** *"Identifying the reason for the change, creating a related sense of urgency and specifying and communicating that reason or vision. This vision typically describes the desired state, that is, how particular aspects, characteristics, or outcomes of the organization will look after the changes"* (Whelan-Berry & Sommerville. 2010, p. 178).
>
> **Step 2 - Moving change vision to the group and individual levels of the organization:** *"The change vision moves to the group and individual levels of the organization, and becomes more specifically understood across different locations, teams and departments"* (Whelan-Berry & Sommerville, 2010, p. 178)
>
> **Step 3 - The individual adoption of the change:** *"Individual employees must actually change their values, attitudes, and behavior in order for organizational change to be successful"* (Whelan-Berry & Sommerville, 2010, p. 179)
>
> **Step 4 - Sustaining the momentum of change implementations:** *"the need for sustaining the change, meaning the change initiative receives attention and resources, and does not fail due to the urgency of daily operations or lack of attention"* (Whelan-Berry & Sommerville, 2010, p. 179)
>
> **Step 5 - Institutionalizing the change:** *"Change initiatives, and the related outcomes must be institutionalized, initially identified as Lewin's 're-freezing'. In this step, organizations ensure that the desired change outcomes become part of the organization's culture, ongoing operations and processes"* (Whelan-Berry & Sommerville, 2010, p. 179)

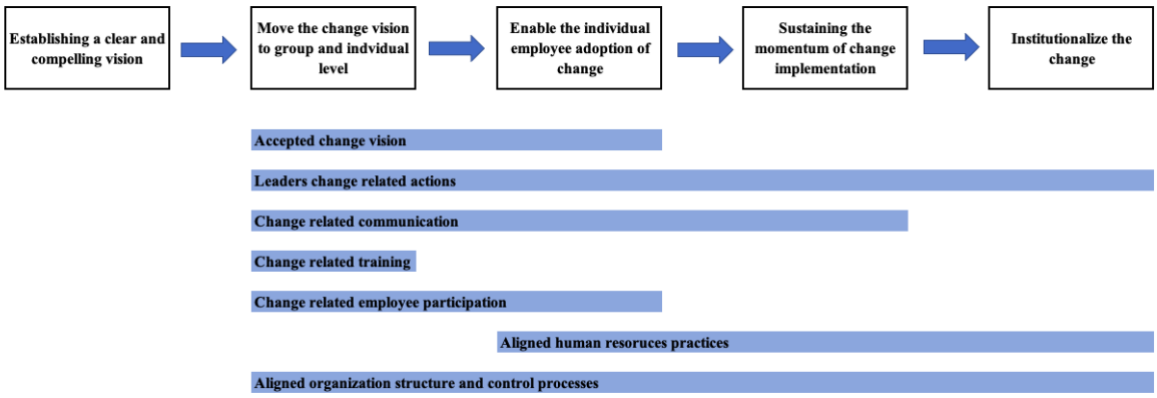

Figure 2: The change process and linked change drivers

Source: Own creation based on Whelan-Berry & Summerville (2010)

In addition to this, Whelan-Berry and Sommerville (2010) identified vital change drivers and linked them to the change process. Figure 2 shows the change process as described by Whelan-Berry and Sommerville (2010) and how change drivers influence each step. They suggested that *"it is important to have a mix of change drivers across the key steps of the organizational change process"* (p.187), and some drivers have a stronger relationship with specific steps in the change process than others. Therefore, they conclude that *"using a mix of drivers that leverage each of the steps in the change process seems important"* (Whelan-Berry & Sommerville, 2010, p. 188).

2.1.2 Change drivers

Change drivers, as defined by Whelan-Berry et al. (2003), are described as *"...events, activities, or behaviors that facilitate the implementation of change"* (p.176). However, there is some confusion surrounding the definition of the term *'change drivers'* which differs across the literature. Some have used the term change driver as defined by Whelan-Berry et al. (2003), that is, to describe what facilitates the implementation of change throughout the organization, especially the individuals' adoption of the change initiatives within the organization (Whelan-Berry & Sommerville, 2010). The term *'change drivers'* has also been used to describe drivers that trigger change initiation, what we have defined above as to *'change triggers'* (Section, 2.1, p.12). That is, the force that triggered the desire or need for the change either from the external environment or internally within the organization (Appelbaum et al., 1998; Dawson, 1994). These two definitions of drivers of change are describing two very different things and cannot be confused with one another. In this thesis, '*change drivers'* will be used to describe what facilitates change and drives individual adoption within the organization. There are several different drivers identified in the existing literature. According to Whelan-Berry and Sommerville (2010), the most extensively researched drivers are leadership, vision, participation, communication, and training.

2.1.2.1 Leadership

Leadership refers to organizational leaders' change-related actions and is one of the most frequently mentioned change drivers. For a successful change implementation, both top leadership's support and support from other leaders throughout the organization are essential (Whelan-Berry & Summerville, 2010). The literature suggests that organization leaders have critical roles to play in all of the steps in the change process. Their roles include, for example, to implement a clear vision, separate from the past, create a sense of urgency, develop enabling structures, communicate, involve people and be honest, reinforce and institutionalize change (Kanter et al., 1992). That suggests that leadership and their interactions with employees are essential to the overall change process (Whelan-Berry & Summerville, 2010).

2.1.2.2 Vision

Another critical driver of organizational change is the change vision (Whelan-Berry & Sommerville, 2010). A change vision clarifies the desired state of the organization and the direction in which it needs to move (Kotter, 1995). Establishing a clear and compelling change vision is vital for the success of the change. According to Kotter (1995), a lack of clear vision is a common mistake made by organizations during an organizational change process. He identifies that every successful transformation effort involves the development of a *"picture of the future that is relatively easy to communicate and appeals to customers, stockholders, and employees"* (Kotter, 1995). However, establishing a clear and compelling vision is not enough. The acceptance of the change vision by the employees and relevant stakeholders is also essential. They need to believe in the change and agree that the vision is positive for the organization (Whelan-Berry & Sommerville, 2010). Leadership plays a vital role in helping organizational members to achieve senior management's vision of the desired state of the organization and to ensure that the gap between the current state and the desired state or the vision is not too extensive (Appelbaum et al., 1998). If the gap is too large, change efforts are likely to fail because organizational members perceive the change to be either too threatening or impossible to achieve (Hitt et al., 1994). It is senior management responsibility to ensure that the gap is wide enough to challenge the organization but not too wide to demoralize the change effort (Appelbaum et al., 1998)

2.1.2.3 Participation

It is widely recognized that participation has a facilitating role in managing change and that participative management techniques are the best way to manage resistance. By involving the individuals that are affected by the change in some aspects of the design or implementation of the change can reduce resistance and lead to a more successful change process (Pardo-del-Val et al. 2012). That is supported by many authors, who for example propose that commitment and participation are the most potent facilitators for the acceptance of the change (Judson & Judson, 1991), and the first step in a successful change program should be to involve the individuals through participation (Eisenstat et al., 1990). The literature further recognizes that participation is especially critical when implementing change in healthcare organizations. Erlingsdóttir et al. (2017) argues that *"organizational changes in healthcare are often characterized by problems and solutions that have been formulated by higher levels of management"* (p.69), and that *"this top-down management approach has not been well received by the professional community"* (p.69). Through qualitative case studies of two successful change initiatives, Erlingsdóttir et al. (2017) showed *"how management can initiate and support successful change processes that are staff driven and characterized by local agency, decision, planning and engagement"* (p.69).

2.1.2.4 Communication

Communication is an essential driver of change mentioned in the literature. Poor communication is often given as a reason for a failed change initiative. Change-related communication should focus on building an understanding of the need to change with clear messaging of the change vision and related strategies (Whelan-Berry & Sommerville, 2010). Nadler & Tushman (1990) found that in order to be effective, the communication needs to be a discussion, not only communication to the employees but also listening.

2.1.2.5 Training

Training is also a proposed facilitator of successful change (Olsen & Stensaker, 2014) and considered as one of the critical drivers of change (Whelan-Berry & Sommerville, 2010). Training provides an understanding of the change initiative and related new knowledge, skills, or behaviors (Whelan-Berry & Sommerville, 2010). The members of the organization are expected to learn new skills and competencies to reap the benefits of the change. Therefore the success of the change initiative relies largely on either acquiring new skills through recruitment of new workers or internal training of the existing workforce. Skill requirements for the imminent change should be identified early in the change process and training program initiated so that employees and managers are ready to handle the change as well as the new task and roles (Eisenstat et al., 1990). The importance of training in healthcare is increasingly becoming recognized as healthcare becomes more complicated due to innovations, new technologies, and new treatment approaches (Bartlett & Kang, 2004). However, when it comes to introducing and implementing new technology, healthcare professionals might have different training needs than other user groups. For example, when implementing telemedicine technology, Chau & Hu (2002) found it is not as relevant to focus on detailed procedures for operating the technology during initial training. They suggest that because physicians and other HCPs have relatively high general competence and cognitive capacity, they might comprehend the use of technology more quickly. That could mean that intensive training for this user group might be unnecessary for them to become familiar with its operations compared to other more general user populations. Consequently, they suggest that initial communication and training programs should aim at how the implementation can improve the efficiency or effectiveness of patient care and service (Chau & Hu, 2002).

2.1.3 Organizational culture and change

The organization's culture shapes the behavior of the organization's members and controls how they interact with one another as well as the operational environment. The culture consists of the shared values and norms and is therefore shaped by its members and their ethics (Jones, 2013). Organizational culture has also been defined as shared underlying assumptions (Schein, n.d.) or as *"the way things get done around here"* (Deal & Kennedy, 1983). Carlström & Olsson, (2014) defined organizational culture in the context of healthcare as *"the assumptions reflecting the shared values within a specific*

hospital culture" (p. 460) and that *"such assumptions are created by combining the assumptions held by the members in the organization"* (p. 460). Different assumptions within the organizations are not always correlated, which can create frustrations, inefficiency, and resistance to change (Carlström & Olsson, 2014).

Organizational culture consists of various workgroup subcultures. As suggested by Busco et al. (2006), organizations are dependent on the internal organizational and social context that is embedded in the organization. Subcultures can be defined as groups within the organizations that differentiate themselves from the general organizational culture by their beliefs, interests, or values (Carlström & Olsson, 2013). It is essential to be aware of different subcultures within an organization when initiating a change process, as conflicts between subcultures can cause obstacles in the change process and cause resistance to change (Carlström & Olsson, 2013). That is also true for healthcare organizations. For example, Carlström and Olsson (2013) found *"a cultural difference between working groups within a hospital organization with a variety of organisational subcultures"* (p. 463). That is supported by other researchers, like Michie & Williams, (2003), who found that hospital wards develop unique subcultures. Subcultures are sometimes known to be more robust than the primary culture. Lok et al. (2005) implied that healthcare production is more affected by the ward subcultures than the general hospital culture.

Furthermore, ward subculture can affect both the leadership style and commitment of the staff. Consequently, deep-rooted subcultures can be a barrier to the change process and implementation (Carlström & Olsson, 2013). By predicting possible barriers of change related to particular cultural contexts, prior to a change process, resources can be used optimally to drive the change initiative forward. Therefore, it can be useful to analyze and pinpoint the culture of a particular healthcare setting to anticipate the possible outcome of change (Carlström & Olsson, 2013).

2.1.4 Organizational structure and change

Organizational structure refers to the formal system and authority relationships and how the organization coordinates tasks and motivates members in the organization to achieve the organizational goals (Jones, 2013). Mintzberg's (1983) description of organizational structure helps understand how organizations are structured and how it relates to their objectives. He explored elements of organizations found in the literature and combined them and suggested a typology of five ideal configurations to organizational structure. He called these five typologies simple structure, machine bureaucracy, professional bureaucracy, divisionalized form, and adhocracy. These are however, only ideal types and simplification of what reality entails, and Mintzberg acknowledges the fact that these configurations understate the real complexity of organizations (Mintzberg, 1983).

Health organizations, such as hospitals, can be described as Mintzberg's (1983) professional bureaucracy. Professionals have well-defined skills and have learned how to undertake their tasks in a professional and standardized manner (Andreasson et al., 2018). The specialized knowledge and skills

of the professionals give them considerable power and autonomy in their work. Therefore, these organizations' authority relies more on the professions and the power of expertise and limits managers' power and decision control. This power dynamic can make it difficult for management to implement changes and new ideas; therefore, healthcare organizations are often challenging to change. According to Mintzberg (1983), professional bureaucracy has a clear bottom-up decision-making structure, where both managers and professionals need to agree to the proposed changes. Therefore, professional organizations adapt very slowly to changes, and management often faces resistance from the professional workforce (Andreasson et al., 2018). Several others have supported that. For example, Steiner (2001) states that organizations with large numbers of employed professionals will not be successful if they become too bureaucratic, since they will become less flexible and less receptive to change (Steiner, 2001).

2.1.5 Resistance to change

Organizational change usually imposes some threat of personal loss for individuals involved, whether it is an actual or perceived (Lorenzi & Riley, 2000). Furthermore, the proposed change might break the work environment's continuity and create a sense of uncertainty and ambiguity. Therefore organizational change will most likely be challenged by the resistance of members of the organization (Dawson, 1994).

The literature has identified several possible sources of resistance. For example, Dawson (1994) identified several factors that are likely to lead to resistance, such as a change in skill requirements, threat to employment, psychological threat, new work arrangements, and redefinition of authority. Bedeian (1984) suggested that self-interest, misunderstanding, and lack of trust are common causes of resistance to organizational change. Besides, he notes that individuals differ in how they perceive and evaluate change and that some employees may have a lower tolerance for change, which might lead to more resistance (Bedeian, 1986). For change agents who seek to overcome resistance, many strategies have been identified in the literature. As mentioned above, participation has been identified as one of the main drivers of change and change strategy to overcome resistance (Pardo-del-Val et al., 2012). It is especially important in healthcare change initiatives due to high professional autonomy and power (Andreasson et al., 2018). However, some scholars suggest that resistance to change is not necessarily negative. Pardo-del-Val et al. (2012) found that there was a positive correlation between resistance and participation. They suggest that this positive correlation does not necessarily mean that participation will cause more resistance but that *"participative management acts as a knowledge broker, highlighting the sources of resistance to change that could improve outcomes"* (Pardo-del-Val et al., 2012, p. 13). That has been supported by other researchers, who argue that resistance can be seen as a reporting tool for questions that are important to know or take into account (Waddell & Sohal, 1998). Marci et al. (2002) state that resistance is needed as an instrument to maintain the equilibrium between stability and change.

Furthermore, through an exploratory study, Dent & Powley, (2002) found that individuals who are involved and participate in the change process provide more positive information about the change than negative. Choi & Ruona (2011) remark that individual resistance to change does not come naturally; rather, individuals resist how the change is imposed on them. On that notion, adverse reactions to change are not always dysfunctional obstacles to a successful change but rather a pivotal source of information to implement change successfully. In other words, the individual's response to or resistance to the change imposition can hold some valuable information on what obstacles need to be overcome to implement the change successfully.

2.2 Organizational readiness for change

Health care organizations are facing issues that require change, leading to rapid change in technology, strategic competence, and emerging trends. The management of healthcare organizations should mainly focus on the change when trying to overcome these issues. How the change is managed within the organization depends on the employee's engagement in the change. Employee engagement is the key to wide adoption to change that will be represented in beliefs, attitudes, and intentions toward the implemented change (Vakola, 2014).

The need for organizational change is an ongoing, necessary, and unavoidable process. However, it is essential to realize that such a change affects the organization internally, with an increase in uncertainty, stress, anxiety, and employee resistance. Despite the necessity and inevitability of the change, researchers emphasize that organizations must consider these factors as they can determine the success or failure of the change being implemented (Shah et al., 2017). Organizations determined to improve care, need an adequate level of organizational readiness for change (ORC) in order for the implementation to become successful (Gagnon et al., 2014). Organizational change is a challenging process. It requires change and adjusting of multiple work processes, staffing, decision making. Health care organizations often fail to complete their change initiatives fully. Moreover, they become a complete failure (B. J. Weiner et al., 2008). Kotter (1995) argues that half of change initiatives fail to succeed because change leaders fail to establish enough readiness. Furthermore, many change experts agree that ORC is a vital predecessor for successful change initiatives (Armenakis et al., 1993; Hardison, 1998; Herscovitch & Meyer, 2002; Kotter, 1995).

ORC refers to what extent the organizations are ready for the intended change. When the ORC is high, members of the organization are more likely to participate in the change process, which overall results in more effective implementation of the change. On the contrary, if the ORC is low, members of the organization are likely not to participate or resist the change, leading to less effective change efforts or failure (Shea et al., 2014). The readiness to change assessment will declare to what extent the organization is ready to implement and adopt technology and how much change efforts are needed. The

assessment may help organizations identify people who lack the necessary skills needed for the change. Thus the change leaders can take necessary measures (Appelbaum et al., 1998).

Like already mentioned, resistance to change in healthcare organizations is well known in the history of change management for several reasons. Pettigrew et al., (1992) propose the reasons being: partly because of the highly segmented nature of the organization (silos), partly because of the veto power clinicians have, and partly because of the highly political nature of healthcare delivery (Pettigrew et al., 1992). It is also well known that many organizational change initiatives fail because organizational leaders fail to establish enough ORC (Shea et al., 2014), indicating that the key factors that lead to success in change are insufficiently managed (Nuño-Solinís, 2018). Moreover, it confirms the need for a well-established, valid, and reliable instrument to measure ORC and guide change leaders to increase it (Gagnon et al., 2014; Nuño-Solinís, 2018).

2.2.2 What does organizational readiness for change mean?

Scholars and practitioners have widely discussed the importance of ORC and how to create it (Armenakis et al., 1993; Hardison, 1998; Herscovitch & Meyer, 2002; Kotter, 1995). Hardison (1998) describes ORC as "how "ready" your organization appears to be for organizational transformation". Armenakis et al., (1993) say that "readiness is reflected in organizational members' beliefs, attitudes, and intentions regarding the extent to which changes are needed and the organization's capacity to make those changes successfully. Readiness is the cognitive precursor to the behaviors of either resistance to, or support for, a change effort". Herscovitch & Meyer, (2002) describe readiness in terms of "a force (mind-set) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative commitment to change to refer to "

In the light of how diverse ORC has been defined by researchers and the inconsistency in how it is conceptualized and measured, Weiner et al (2008) performed a review of the literature assessing how ORC has been conceptualized and measured in health care and other fields. Subsequently, Weiner wrote an article where he conceptually defined ORC and theorized its determinants and outcomes. Weiner (2009) defines Organizational readiness for change as "a multi-level and a multi-faceted construct". The term 'readiness' refers to being 'willing and able' both psychologically and behaviorally prepared to take action. Readiness can be assessed both at the individual level and supra-individual level, which can be organizations, groups, units, or departments. On a supra-individual level, Weiner (2009) defines readiness for change as: *"member's shared resolve to implement a change (change commitment) and shared belief in their collective capability to do so (change efficacy)"* That is, ORC is a function of how much organizational members value the change (commitment), and how they evaluate three determinants of implementation capability (efficacy): task demands, resource availability and situational factors (Weiner, 2009). In the two following chapters, we will further describe these concepts proposed in Weiner's theory.

2.2.2.1 Change commitment

According to Weiner (2009) *"'change commitment' refers to the organizational members' shared resolve to pursue the course of action associated with change implementation"*. He emphasizes the shared resolve, as change implementations are complex and require a collective effort from many people, each of whom contributes something to the implementation process. Organizational members' commitment to change differs between individuals, and it can be problematic when some employees feel more committed than others (Weiner, 2009). According to Meyer & Allen (1991), commitment is a psychological state or mind-set that makes the employee more likely to maintain as a member of an organization. Based on the theory constructed by (Herscovitch & Meyer, 2002), commitment to change is a force (mind-set) that binds an individual to a course of action considered essential for the successful change implementation.

Weiner (2009) argued based on motivational theory, that change commitment is largely based on change valence, that is how much the organizational members value the change. He further argues that the more the members value the change, the more willing and committed they become to implement the change, as Weiner (2009) described it *"the more resolve they will feel to engage in the courses of action involved in change implementation"* (p.3). There are many different reasons why organizational members might value an organizational change. For example, it could be based on the belief that some change is urgently needed or that the change will effectively solve a critical organizational problem. Other reasons might be that the organizational members anticipate some benefits that will increase the value for the organizations, patients, employees, or them personally, or the change resonates well with their core values. They might also value the change because management, opinion leaders, or their peers support it (Weiner, 2009). However, Weiner (2009) argues that it is highly unlikely that organizational members will share the same individual reasons for why they value the change. He suggests that: *"change valence resulting from disparate reasons might be just as potent a determinant of change commitment as change valence resulting from commonly shared reasons"* (Weiner, 2009, p.3).

Herscovitch and Meyer (2002) suggest that employees' commitment to change can be reflected in the employee's feelings about supporting a change and presented commitment to change in a three-component model. These three components of commitment can be described as: affective, continuance, or normative. Affective commitment means that the employee wants to support the change and values their intended benefits, often described as 'want to' motives. Continuance commitment is when the employees feel like they have little other choices than to support the change, or 'need to' motives. Normative commitment is when the employees feel obligated to support the change, or 'ought to' motives. Differences in how the employee commits to the change can reflect on his work performance and how he will carry out the change Herscovitch and Meyer (2002). Affective commitment 'want to' motives return in the highest level of commitment to implement change (Weiner, 2009).

2.2.2.2 Change efficacy

Self-efficacy is about people's beliefs in their ability to influence something that's affecting their lives. That is the core belief fundamental in human motivation and performance accomplishments. Many other factors motivate people; however, they are rooted in the core belief that one can make a difference with their actions. If people do not believe they can make a difference with their participation, they are not likely to participate in the action, or to conquer difficulties that come up on the way (Bandura, 2010). On this notion, Weiner (2009) defines change efficacy as the shared beliefs of the organizational members in their collective capabilities to arrange and execute the actions needed to complete the change implementation. He emphasizes on the shared beliefs in their collective capabilities because implementation requires collective effort across boundaries. Collective capabilities in an organization are when the organization can arrange action across many individuals, units, and departments. Change efficacy is higher when the members of the organizations have shared beliefs and confidence in their collective capabilities to execute the actions needed to implement a change. In other words, they believe that together they can make a difference with their actions (Weiner, 2009). Bandura (2010) mentions that if the employees do not feel confident in their capabilities to execute the course of action, it can decrease their motivation to engage in the course of action. The most effective way of developing a strong sense of efficacy is to succeed in one's actions for change. Successes build up a powerful belief in oneself, and at the same time, failures undermine it, especially if frequent failures happen early in the development of competencies (Bandura, 2010). Furthermore, fear and other negative emotional states can lead to underestimating one's capabilities (Weiner, 2009). The members formulate their change efficacy judgements based on information bearing on three questions: *"do we know what it will take to implement this change effectively; do we have the resources to implement this change effectively; and can we implement this change effectively given the situation we currently face?"* (Weiner, 2009. p4).

2.2.2.3 Contextual factors

Organizational readiness to change can as well be measured on more structural terms. Organizational structure and resources shape how the members perceive readiness. The organizations' members take into account the organization's structural assets and deficits when they formulate their change efficacy judgment (Weiner, 2009).

Organizational readiness can also be bound to situations. When implementing systematic transformations, there is an increasing interest in the importance of analyzing the receptive contexts for change in the implementation process; how ready the organization is for the upcoming change. ORC is an important angle to consider in change management projects, as there is a proven link between failures in change initiatives and the lack of readiness to change (Nuño-Solinís, 2018). The metaphor 'receptive' and 'non-receptive' contexts were introduced by Pettigrew and his colleagues in 1992 when they studied a case from the National Health Institution (NHS). They looked at reasons for variability in the

rate and pace of strategic service change in the NHS. They also introduced an eight sign and 'symptoms' model of receptivity related to a faster pace of change (See Figure 3). These signs and symptoms distinguish organizations that are more ready for change than others, the more of these eight signs the organization has, the more receptive they are for the change, the more ready they are. These eight factors identified are: environmental pressure; quality and coherence of the policies; key people leading change; managerial and clinical relations; supportive organizational culture; the fit between the change agenda and the local context; the simplicity and clarity of organizational goals; and co-operative inter-organizational networks (Pettigrew et al., 1992).

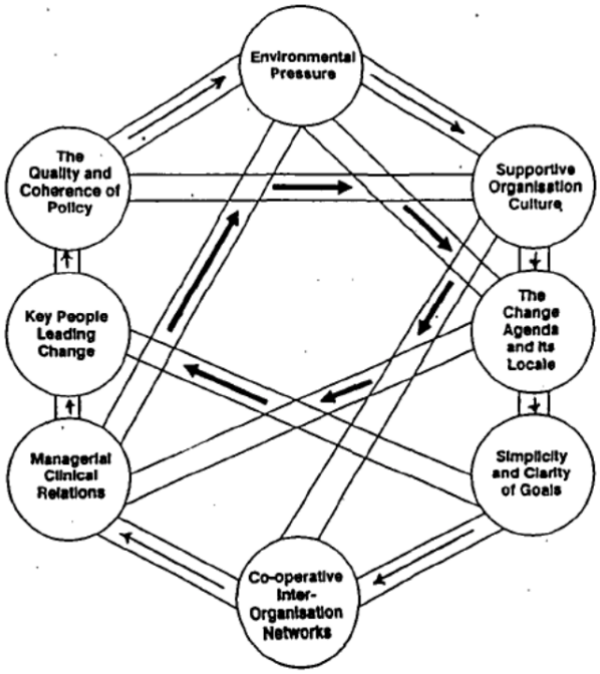

Figure 3: Receptive concept for change: the eight factors

Source: Pettigrew et al. (1992)

Weiner (2009) further mentions the contextual readiness; some organizational features seem to include more receptive context for change. However, receptive context does not directly convert to readiness; the content matter of change is as important as the context matters of change (Weiner, 2009).

2.2.3 Organizational readiness for telemedicine

When it comes to implementing telemedicine and measuring the readiness for change, some factors need to be included additionally to the measurement criteria. Most literature, theories, and models on ORC focus mainly on psychometric, structural and managerial factors (Jennett et al., 2003; Légaré et al., 2010).

There is not much literature about the readiness for telemedicine implementation in health care organizations. However, there is a considerable amount of studies investigating the success and failure of technology implementation in healthcare. The majority of these studies describe failed initiatives,

and only a few studies have focused on success (Jennett et al., 2003; Légaré et al., 2010). Jennet et al. (2003) explored the concept of organizational readiness for telemedicine (ORT) and tried to understand why telemedicine initiatives succeed or fail. They talk about two components contributing to success: 'planning readiness' and 'workplace readiness.' They found four key factors contributing to planning readiness: telemedicine strategic plan, needs assessment and analysis, business plan, and leadership readiness. The workplace readiness they divide into two components: human resources and structural readiness. Human resources include: preparing staff, telemedicine coordinator, and change management readiness. Structural readiness includes: Technical readiness, policy, access, communication, and participation (see Figure 4). At last, they address three factors contributing to failure: inadequate needs assessment and lack of buy-in, lack of staff preparation, and resistance to change (Jennett et al., 2003).

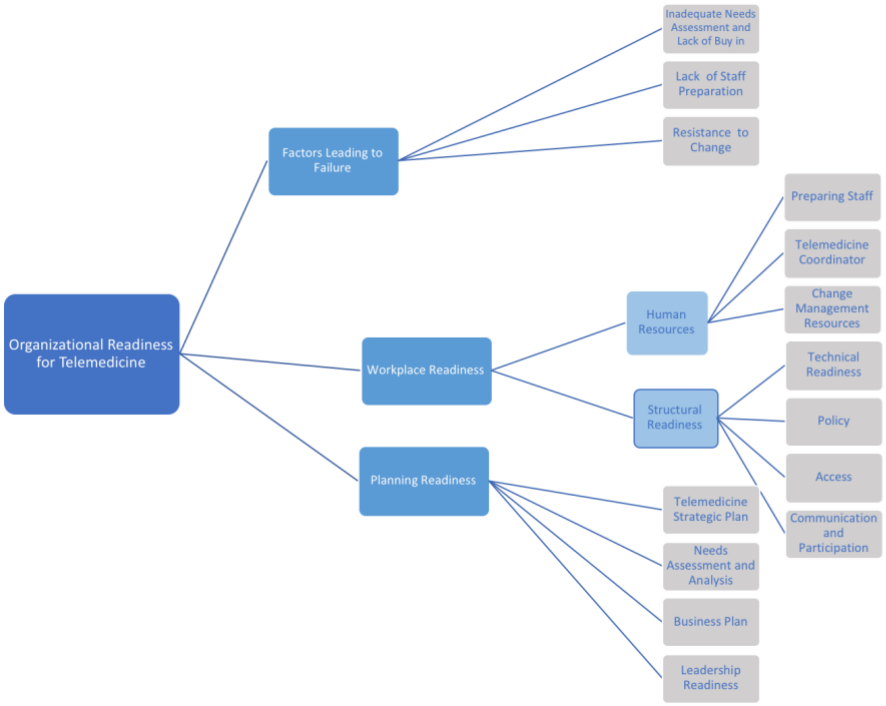

Figure 4: Factors determining Organizational Readiness for Telemedicine

Source: Own creation based on Jennett et al. (2003)

2.2.4 Available measurement tools

Even though the importance of establishing ORC to implement changes successfully has been realized by many scholars and practitioners, only until recently, researchers have started theorizing about how to empirically assess and measure ORC (Weiner, 2009). In order to develop and evaluate implementation strategies, there is a need for an easy-to-use tool to measure the readiness in organizations (Stamatakis et al., 2012). Shea et al. (2014) further mentions that it will not be possible to provide evidence-based guidance to organizational leaders on how to increase readiness until a brief, valid and reliable measurement tool will be developed. Several measurement tools have been developed over the last decade, however, they present some limitations. The limitations acknowledged are; lack of validation and reliability; lack of standardization and guidance to increase ORC; the tools are not brief enough to be implemented into busy healthcare practices (Gagnon et al., 2014; Nuño-Solinís,

2018; Puchalski Ritchie & Straus, 2018; Shea et al., 2014). This inconsistency and lack of standardization of measurement tools might contribute to the reason why many leaders conducting change projects neglect the assessment of ORC (Nuño-Solinís, 2018). A brief and valid measurement tool of ORC is needed to guide change leaders and increase successful change initiatives (Shea et al., 2014).

2.2.4.1 Review of the literature of available ORC measurement tools

Légaré et al. (2010) conducted literature research intending to identify available measurement tools to measure readiness when implementing telehealth projects. They found six questionnaires; however, only two of them had any information on their reliability and validity, and only one was generic enough to be used in different contexts with different groups of participants. Furthermore, Gagnon et al. (2014) reviewed instruments to assess the organizational readiness for knowledge translation in health care. They found 26 eligible instruments measuring ORC in the healthcare domain. They conclude that there is limited evidence for validity and reliability in all of the instruments included, and only 18 of them fulfilled their validity and reliability criteria. Authors of this study reviewed five of the most commonly mentioned measurement tools, findings can be found in Appendix 9.1, describing their function and limitations.

Based on their findings, Gagnon et al. (2014) developed a measurement instrument of their own where they try to overcome existing limitations. They developed a 59 item instrument to assess Organizational Readiness for Knowledge Translation (OR4KT), which is a six-dimensional questionnaire, that aims to measure the organization's readiness to implement evidence-informed change. The six dimensions measured are contextual factors; change content; organizational climate for change; leadership/participation; organizational support, and motivation (Gagnon et al., 2014). This tool is thought to be promising for several reasons. Even though the instrument was initially designed for changes related to chronic illness care, the instrument is generalizable to assess readiness for change related to implementation interventions in various healthcare settings. In the design of the instrument, they involved experts and potential users, as well as it has a strong theoretical background. The authors validated the tool; however, it needs to be applied to different contexts to increase the validity, reliability, and generalizability. Another limitation to this instrument is, as many others, it does not provide any guidance on how to increase ORC or what implementation strategies should be used to increase success in change in initiatives (Nuño-Solinís, 2018).

3. Research methodology

This section will describe our research methodology and account for the methodological choice made in our research. There are two main objectives of this research. First, is to identify and analyze the ORC in the context of the change process related to the implementation of telemedicine at the DOC, and based on our findings suggest practical guidelines for future change processes. Second, from the case analysis, we want to contribute to the existing gap between theory and practice by exploring how ORC can be translated to change management. Based on these research objectives, we followed the layered structure of '*the research onion,*' initially introduced by Saunders et al. (2016), to make choices concerning our methodology (See Figure 5).

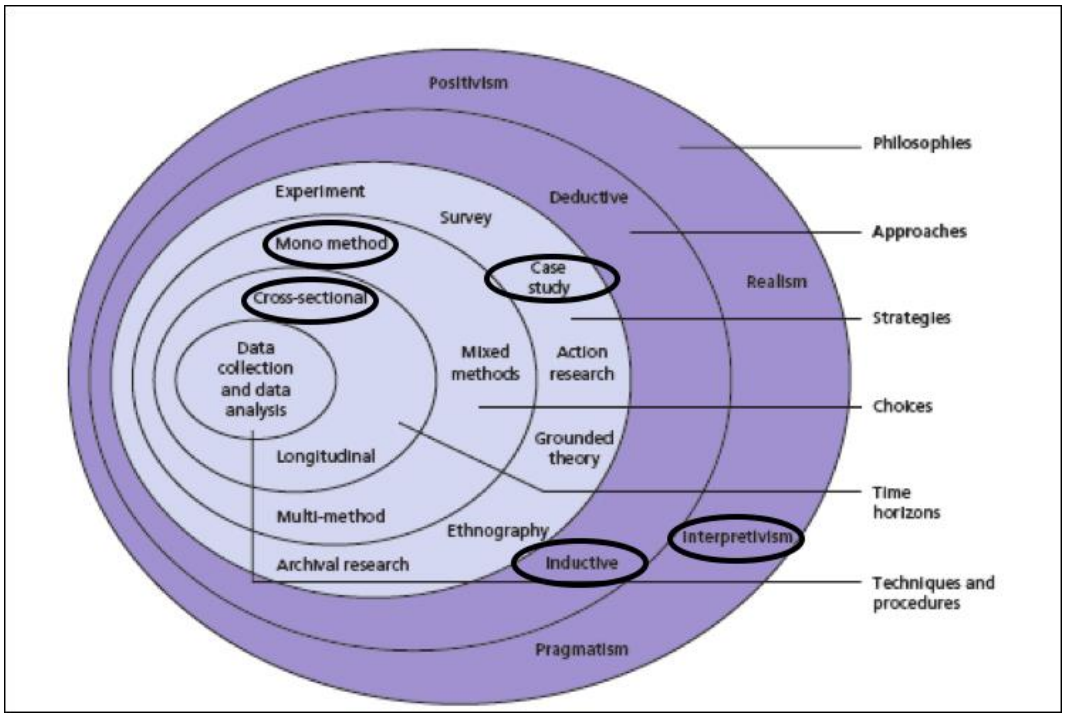

Figure 5: The research onion, highlighting our research choices

Source: Saunders et al. (2009)

In the following sections, we will discuss our choices and their argumentation as well as describing the research process and how the research was conducted.

3.1 Research philosophy

The term philosophy in research refers to the development of knowledge and the nature of that knowledge. Research philosophy describes the underlying beliefs and assumptions of the research and reflects the researcher's view of the world. Choosing an appropriate research philosophy is an integral part of the research methodology, as it will determine the research strategy and methods. The development of knowledge in this empirical investigation will rely on the philosophy of interpretivism, as our objective with this research aims to provide an in-depth understanding of individual behavior

and feelings in a specific and unique social context. According to Saunders et al. (2016), some argue *"that an interpretivist perspective is highly appropriate in the case of business and management research, particularly in such fields as organizational behavior"* (p.116). Organizational situations are complex and unique and are *"a function of a particular set of circumstances and individuals coming together at a specific time"* (Saunders et al., 2016, p. 116). Therefore, it can be argued that an in-depth understanding is required to understand what forces influence organizational change and organizational readiness for change, as the behavior of the organization is extensively impacted by individual behavior.

Interpretivism aims at understanding human nature and their varying roles as social actors (Saunders et al., 2016). An interpretivism approach is founded on the arguments that it is impossible to understand social context without interpretation (Leitch et al., 2010). It is based on the assumption that there is no single reality, as the nature of reality is socially constructed. That reality can only be perceived intersubjectively based on meaning and understanding of social and experiential levels. The knowledge generated from interpretivism research is subjective meanings and social phenomenon, focusing on details of a situation and the reality behind these details. Therefore the knowledge generated will be relative to time, context, culture, and value. "*This is achieved by generating thick and rich descriptions of actual events in real-life contexts that uncover and preserve the meanings that those involved ascribe to them"* (Leitch et al., 2010, p. 70). Interpretivism allows the researcher to view problems holistically and get close to the subjects, entering their reality and interpreting what they perceive. Interpretivism argues that people can not be separated from their knowledge, and therefore, the research will be value bound and subjective. The researcher becomes part of what is being researched, and the relationship between the subject and the researcher is interactive and cooperative (Saunders et al., 2016). Based on our objectives and these assumptions presented, we find the interpretive perspective to be the best fit in our efforts to answer the research questions presented in the introduction.

3.2 Research approach

Research approach refers to the approach to theory development and how the research involves theory. It is necessary to be explicit about how the theory will be used from the beginning of the research process, as the approach taken will have implications for the choice of research strategy.

There are two main approaches to research: deductive and inductive. Deductive research approaches explore established theories or phenomena and tests if they are valid in given circumstances, moving from something general to something specific. Inductive research approaches start with in-depth observations of the world and then move towards more abstract generalization and ideas' and, therefore, move from something specific to something more general. An inductive research approach is traditionally associated with qualitative research and deductive with quantitative research (Saunders et al., 2009).

We decided to take an inductive approach to our research, as that will allow us to remain open and explore the data to develop theories that could be related to the literature. However, a preliminary literature review was done before the data collection process was started to identify main theories concerning ORC, which partly guided the data collection process.

3.3 Research design

The research design is the general plan of how research questions will be answered, that is turning research questions into a research project. The research design process is focused on the next three layers of the research onion; research strategy, research choices, and time horizons (Saunders et al., 2016). Since this study is focused on looking at the ORC at a specific point in time and is based on interviews conducted over a short period, it will be stated here that our research is a cross-sectional study (Saunders, 2009), and will not be discussed further.

Before describing how the research process was designed, it is crucial to identify the purpose of the research project. According to Saunders et al. (2009), *"Research can be designed to fulfil either an exploratory, descriptive, explanatory or evaluative purpose, or some combination of these"* (p. 174). According to Robson (2002), exploratory research is concerned with finding out *"what is happening, seeking new insights, and to ask questions and assess the phenomena in a new light"* (p. 59). In contrast, descriptive research is more concerned portraying *"an accurate profile of persons, events or situations"* (p.59). Finally, as described by Saunders (2009), the purpose of explanatory research is to *"establish causal relationships between variables [and] studying a situation or a problem in order to explain the relationship between variables"* (p.140).

This research project resembles the characteristics of descriptive or explanatory purposes, depending on what research question is to be answered. For instance, the first research question is concerned with identifying problems at the DOC and exploring the corresponding need for change, that is what problems in the current state could be solved by implementing telemedicine and translated into need for change to be included in the change vision. This research question is twofold, and aims to both answer the question of "what" and "how". Therefore, we say that the question resembles both an exploratory and descriptive study's characteristics as it attempts to find out *"what is happening"* and describing the need, thus portraying an accurate profile of a certain situation. (Robson, 2002. p.59). The second research question, which aims at describing the current level of readiness at the DOC, and is thereby portraying an accurate profile of a current situation, resembling descriptive research. In the third research question, we aim to identify potential challenges and barriers and therefore explore what factors could prevent successful telemedicine implementation by seeking new insights, both from the members of the organization as well as other change management experts. Therefore we argue that the third research question has exploratory purposes. Finally, our forth research question focuses on how our findings from the previous research question translates into the design of change management

strategy, resembling the purpose of descriptive research. From the above argumentation we conclude that this research project is both a descriptive and exploratory study.

3.3.1 Research strategy: case study

Research strategy can be defined as *"a plan of how a researcher will go about answering her or his research question"* (Saunders et al., 2016, p. 177). According to Saunders (2009) *"your choice of research strategy will be guided by your research question(s) and objectives, the extent of existing knowledge, the amount of time and other resources you have available, as well as your own philosophical underpinnings"* (p. 141). First of all, this suggests that the choice of research strategy must be suitable with respect to our research questions, objectives, and research philosophy. As described in section 3.1, we have chosen interpretivism as our philosophical standpoint. It is based on our objective to provide an in-depth understanding of individual behavior and feelings in a specific and unique social context, guided by our research questions. Second, the choice of research strategy must be feasible, taking into account *"the amount of time and other resources"* available. Based on this, we concluded that a case study design would be the best fit for our research project and answering our research questions.

Robson (2002) describes a case study as *"a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence"* (p.178). This definition further supports our choice of research strategy. As stated in the research objectives, we wish to provide more understanding of the concept of ORC when implementing telemedicine in healthcare. According to the literature, ORC is very much dependent on context, and therefore, it can be argued that it is most appropriate to investigate ORC in its social context. Furthermore, Yin (2003) argues that the choice of case study as a research strategy also depends on the research questions one wishes to answer. He argues: *"the more that your questions seek to explain some present circumstance (e.g., how or why some social phenomenon works), the more that case study research will be relevant. The method also is relevant the more that your questions require an extensive and "in-depth" description of some social phenomenon"* (Yin, 2003, p. 4). Based on Yin (2003), we argue that this further supports our choice of strategy.

According to Yin (2003), there are four basic types of case studies, based on two separate dimensions, that is single case vs. multiple cases and holistic case vs. embedded case. For better visualization, this can be presented as a matrix seen in Figure 6.

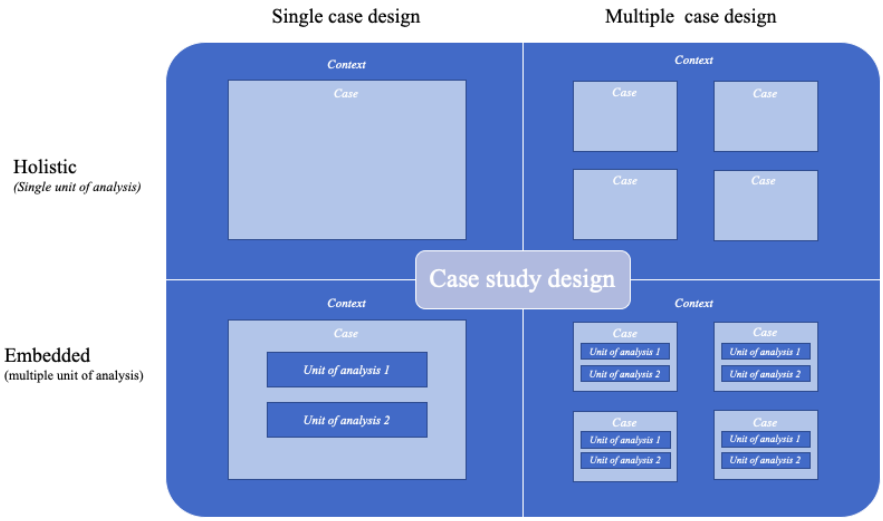

Figure 6: Case study design Matrix

Source: Own creation, based on Yin (2003)

In order to apply the case study methodology, the specific case study design needs to be considered. Based on the case study matrix, the single holistic case study design was deemed the best fit for our research project. A single case study refers to the fact that only one case is being researched, in our case, the DOC. Holistic refers to the fact that there is only one unit of analysis, as in our case, we are investigating the department's current state, their ambitions, and level of ORC on the intra-organizational level.

Yin (2003) stated a case study's unique strength is *"its ability to deal with a full variety of evidence such as documents, artifacts, interviews and observation"* (p. 12) and "*a good case study will, therefore, want to use as many sources as possible"* (p.12). In this case study, two sources of data will be utilized for the analysis. One source is primary data gathered with interviews, and the other is secondary data from DOC's internal documents as well as public documents, such as those found on the DOC's homepage.

3.3.2 Research choices: Multi-method qualitative research design

Research choice is concerned with how data collection techniques are chosen to be combined. That refers to the choice of research design and methods. Research design can be either quantitative or qualitative. Quantitative research design is a systematic research that utilizes quantifiable data that are analyzed with statistical, mathematical, or computational techniques (Saunders, 2009). Qualitative research is traditionally related with social science research and is concerned with collecting and analysing non-numerical data. It seeks to interpret the meaning of this data to gain understanding of a social context. Researchers can either choose to restrict themselves to either one of these designs or some mixture of the two. In relation to our research objectives and research questions, we have chosen the qualitative research design.

Research methods can be split into mono-method and multiple-methods. Mono-method uses a single data collection technique and the corresponding analysis procedures. Multiple-methods use more than one data collection technique and analysis procedures. This method can be further divided into two categories, multi-method, that utilize multiple data collection methods but are restricted within one research design, and mixed methods, referring to the use of multiple methods utilizing both qualitative and quantitative research design (Saunders, 2009). Based on the above, it can be concluded that we use multi-method qualitative research design in this research project.

3.4 Data collection and analysis

The data used for the analysis of this thesis consists of both primary data and secondary data. Using a qualitative and interpretive approach, we will view problems holistically and get close to the subjects by conducting mainly semi-structured interviews. To get the clearest possible grasp of practitioners vision, motivation and culture, our in-depth interviews aim to enter their reality and interpret what they perceive (Saunders, 2009). We mostly draw upon our primary data source for the data analysis. Primary data was gathered using both unstructured and semi-structured interviews with a total of 14 interviewees. Data was collected over a period of 8 weeks from March 3rd until April 28th. Furthermore, we use secondary data from the DOC to fully describe the organization's operation. This secondary data includes: process maps, shift plans, booking system operations, numbers on HCP's positions, and other organization management files.

3.4.1 Selection of case

Our interest in telemedicine led to our selection of the case organization. We wanted to investigate the implementation of telemedicine in outpatient services in the Icelandic healthcare system. Our interest in this field was enlightened when we read the Icelandic Health Policy framework 2020-2030. One of their policies is to encourage and strengthen the use of telemedicine. Therefore we saw an opportunity to investigate that topic. In the first stages of the project, we did a preliminary search of the literature. and reached out to multiple stakeholders concerned with innovation in welfare technology. Based on that we decided to investigate the topic from the perspective of the readiness of organizations to implement telemedicine. Therefore to conduct our empirical research, we actively searched for collaboration with organizations planning to implement telemedicine solutions. With this case-study, we wanted to produce results that can be useful for the case organization involved as well as more generalizable results that can be useful for other organizations in different contexts.

3.4.2 Selection of informants

In order to get a full understanding of the concept being researched, multiple perspectives were important, both within the organization and externally. Therefore, interviews were conducted with various stakeholders, including various health care professions, managers, and a lawyer as well as

patients. A total of 13 interviews were conducted. Most of the interviewees were employees working at the DOC. Others were various specialists from both within the hospital as well as outside of the hospital. Table 2 provides the interviewees' list, what organization they are from, and the purpose of the interview. Interviewees were named after their profession/specialty to ensure anonymity. We felt that keeping the interviewees anonymous was essential to capture honest opinions and beliefs, as some of the questions demanded the interviewees to criticize management and the organization itself.

3.4.3 Interviews

Interviews are helpful to gather valid and reliable data relevant to the research questions. Interviews can be either highly structured or unstructured. Structured interviews use standardized questions to collect quantifiable data, often used in quantitative research methods. Unstructured interviews are less formal and unstructured, in a more conversational form of interviews, often associated with qualitative research methods. The level of formality of the interviews is often categorized as structured interviews, semi-structured interviews, and unstructured or in-depth interviews (Saunders et al., 2009). We gathered the primary data for the analysis with interviews, using both semi-structured and unstructured interview methods. We had a clear idea of what we wanted to gain from the interviews. However, we wanted them to remain open and leave opportunities for new ideas to emerge.

Two types of interviews were conducted during the data collection process; focus interviews, and supportive interviews. Focus interviews produced the primary data for the analysis and consisted of interviews with employees of the DOC. The objective of these interviews was to provide understanding about the current state at the department, explore possible problems and identify factors relating to ORC. The focus interviews were conducted using semi-structured interview methods. We developed semi-structured interview guides before conducting the interviews to reveal and understand the „what " and the „how" relevant to our research questions. We developed the interview guide with specific questions and themes based on the research questions and relevant literature to make sure to cover specific topics during the interviews. However, some questions varied between interviews depending on context and the interviewee. We developed two interview guides, one for HCPs and one for patients. The interview guides can be found in the Appendix 9.2.

Informant	Organization (Department)	Date	Duration	Interview purpose/topic
Chief doctor (CD1)	LSH (DOC)	4. Feb 2020	23:23	Project intake; project possibilities, current service challenges
Nurse 1 (N1)	LSH (DOC)	5. Mar 2002	30:47	Focus interview; Service process, service role, readiness for change
Nurse 2 (N2)	LSH (DOC)	5. Mar 2002	31:32	Focus interview; Service process, service role, readiness for change
Nurse 3 (N3)	LSH (DOC)	5. Mar 2002	24:47	Focus interview; Service process, service role, readiness for change
Specialist 1 (SP1)	LSH (DOC)	3. Mar 2020	37:01	Focus interview; Service process, service role, readiness for change
Specialist 2 (SP2)	LSH (DOC)	4. Mar 2020	27:43	Focus interview; Service process, service role, readiness for change
Nutritionist (NUT1)	LSH (DOC)	4. Mar 2020	28:00	Focus interview; Service process, service role, readiness for change
Physiotherapist (PT1)	LSH (DOC)	4. Mar 2020	43:47	Focus interview; Service process, service role, readiness for change
Nursing assistant (NA1)	LSH (DOC)	5. Mar 2020	17:09	Focus interview; Service process, service role, readiness for change
Patient 1 (P1)	N/A	3. Mar 2020	31:01	Focus interview; patient experience
Patient 2 (P2)	N/A	4. Mar 2020	33:06	Focus interview: patient experience
Lawyer (LAW1)	LSH (Law department)	17. Mar 2020	38:48	Supportive interview; law and regulations, GDPR
IT department manager (IT1)	LSH (Department of medical and information technology)	3. Mar 2020	32:58	Supportive interview; Information technology/ systems, implementation,
External Interviewee: CEO (X1)	Akureyri Nursing Homes	11. Mar 2020	42:09	Supportive Interview; change management in healthcare, telemedicine

Table 2: Overview of informants

Source: Own creation

We conducted supportive interviews with other individuals outside of the department, both within LSH and outside of the organization. The objective of these interviews was to get more insight and explore the topic area, in general, to get a more in-depth vision of our topic, and possibly bring in light aspects that had not been considered before (Saunders et al., 2009). Therefore unstructured interview methods were deemed relevant, and no interview guides developed. During these interviews, interviewees were given more freedom to talk about events, beliefs, and opinions about the topic area. However, in order to make sure that the data would be useful for this research, we established clear objectives about the desired outcome of these interviews, based on the interviewee's specialty concerning our research. We conducted all interviews in Icelandic, except for one in English. Interviewees were asked to sign an informed consent, which stated that the interview would be recorded, how data would be handled, and that the interviewees would remain anonymous. All interviews were recorded and transcribed in preparation for data analysis.

3.4.4 Coding

Coding is a method or a process to analyze qualitative data. The primary goal of coding is to find repetitive patterns of action and consistencies in human affairs, as documented in the data. The data is arranged in a systematic order and then categorized based on some shared characteristics that form a pattern. The outcome of a coding process is a theme that emerges from the data and reflects analytical reflections. The coding process can be split into two cycles; first cycle coding methods and second cycle coding methods. First cycle coding methods refer to the initial coding process (Saldaña, 2016). Saldaña (2016) describes many different first cycle methods. For our coding process, we choose to use descriptive coding methods as our primary approach to coding our data and a foundation for future coding cycles. The process of descriptive coding involves using codes that summarize in a word or a short phrase and describes the basic topic of the passage being coded. These basic labels for the data served as an inventory for their topics and allowed us to get a holistic overview of the data and its description (Saldaña, 2016).

Second cycle coding methods refer to more advanced methods of coding the data and build on the foundation provided by the first cycle coding. It involves reorganizing and reanalyzing the data coded through the first cycle. The primary goal during this process is to organize the data and develop categories, themes, concepts and/or theories from the first cycle codes. Before embarking upon the second cycle of coding, we reviewed all codes derived from the first cycle and developed a codebook based on Saldaña's (2016) recommendations. According to Saldaña (2016), codebooks *"become especially critical as a set of coding standards when multiple team members work together on the same project data"* (p.21). Saldaña further recommends that each codebook entry should contain *"the code, a brief definition, a full definition, guidelines for when to use the code, guidelines for when not to use the code and examples"* (p. 21). That was essential in order to increase consistency and the internal

validity of the data analysis process. We used two second cycle coding methods. First, we used what can be referred to as 'pattern coding.' Pattern codes are described as *"explanatory or inferential codes, ones that identify an emergent theme, configuration or explanations, they pull together a lot of material into a more meaningful and parsimonious unit of analysis"* (Saldaña, 2016, p.152). That allowed us to develop major themes from the data and examine social networks and patterns of human relationships (Saldaña, 2016). Second, we used the 'elaborative coding' method or "top-down" coding to capture the theoretical constructs from the theory of ORC (Weiner, 2009) and to refine those constructs by coding relevant text selected with those constructs in mind (Saldaña, 2016).

To further organize and subcategorize, we did a third cycle of coding, as well as the re-coding of some codes, which resulted in the final code list. Table in appendix 9.3 lists the final codes, their description, and the number of references.

3.5 Quality of research

When conducting a study relying on the philosophy of interpretivism, there is a great risk for bias on behalf of the researchers because of its subjective nature. Therefore it is challenging to achieve the validity and reliability of such studies. However, interpretivism allows for studies in a significant level of depth in areas such as culture, motivation of organizational members, and factors impacting leadership. Empirical data from studies using interpretivism have been considered to be associated with high levels of validity, because the data in the study is honest, transparent, and trustworthy (Saunders et al., 2009).

3.5.1 Validity

Validity is concerned with how much our findings will be generalizable in other situations. That is, if the results from this study will be equally applicable to other research settings (Saunders, 2009), for example, other outpatient services in other organizations. This thesis is a case study based on a single case, and the unit of analysis is very context-specific, which is also confirmed in the literature. In this study, we will not try to develop a theory that is generalizable to all populations. The study uses the concepts of the Organizational Readiness for Change theory, and the aim with this study is rather to add evidence into the existing theory and enhance further study to test the robustness of the ORC theory. Furthermore, for educational purposes the results of this study can be used for change agents in healthcare to learn from.

Having two researchers conducting the coding in qualitative research can threaten internal validity. To ensure internal validity during the coding process we developed a cookbook. like already mentioned. The codebook served as a tool for us to make sure that we were coding consistently (Saldaña, 2001).

3.5.2 Reliability

Reliability is the concern of to what extent the data collection technique will provide consistent findings. If the same technique is used by other researchers, the extent to which they would get the same or similar findings (Saunders, 2009). Before conducting the interviews, an interview guide was formulated based on the literature review. We had some predetermined topics we wanted to cover during the interviews. However, the interviews were semi-structured, and the interview guide was only used to lead the conversation allowing the interviewees to express their thoughts freely. In order to increase the reliability of the study, both authors were present in the interviews. One led the conversion, and the other was making sure that the predetermined topics were being covered. However, that might lead to an observer bias because we alternated the position of an interviewer. Therefore we assume that we had two different styles of asking the questions, and as the interviews were semi-structured, it allowed for both interviewer and interviewee to put their tone to the questions (Saunders et al., 2009). However, we argue that by using an interpretivist approach we are not able to separate ourselves from the knowledge obtained and what is being researched, and therefore the research will be valuebound and subjective to some extent. Therefore, there will always be some level of bias in our results.

To increase the reliability of our results and minimize subject bias we felt it was important to keep our interviewee anonymous in our research to capture honest opinions and beliefs, as some of the questions might demand the interviewees to criticize management and the organization itself (Saunders et al., 2009)

3.6 Project management

In order to successfully execute this project we will utilize some project management tools to structure our work and keep track of different activities. We used Gantt charts to set the timeline for the project and project goals, and revised it throughout the research process. The Gantt chart changed considerably because of the COVID-19 pandemic, as our research process was delayed. Furthermore, we used a Kanban board to keep track of different tasks and smaller activities concerning the project. We used a software program called '*Trello*' to help us organize the Kanban board.

4. Case description

This project is a case study of the DOC at LSH. The aim of this chapter is to describe the case and other relevant background information that is essential for the reader to have knowledge of in order to understand the context of the case. This chapter begins with a short background description of the Icelandic healthcare system to give the reader insight into its organization, provision, finance, HIT infrastructure and the new Icelandic health policy for 2020-2030. The second part of the chapter describes the case of the DOC, who want to transform their service by introducing telemedicine

services. We will start by describing the current state at the clinic and their clinical processes for T1D patients as well as their future vision and why they want to change.

4.1 The Icelandic Healthcare system

The Icelandic healthcare system is a national health service system, with a single centralized payer with government provision, financed mostly by general taxation. Around 80% of total healthcare spending comes from public sources. The remaining 20% comes from private spending, mostly in the form of out-of-pocket payments. Hospitalization and in-patient services are free at the point-of-care. However, specialist consultations in private clinics, outpatient operations, dental care, and pharmaceuticals are paid out-of-pocket in the form of partial payments, shared with Icelandic Health Insurance (IHI) (Sigurgeirsdóttir et al., 2014).

The Health Service Act (2007), provides the basis of how healthcare is organized in Iceland and divides the country into seven healthcare regions, with the capital region being the biggest one. Every healthcare region has at least one functional healthcare organization responsible for providing general healthcare service to the inhabitants in that region. LSH is the central hospital in Iceland. It provides specialized care for all citizens in Iceland that includes outpatient services and other specialized services, as well as general hospital service in the capital region *(Healthcare regions structure, The Health Service Act 2007).* The role of the hospital is to serve patients, teach and train clinical staff and scientific research. LSH offers several clinical services in outpatient clinics, day patient units, in-patient wards, critical care units, clinical laboratories, and other divisions (Landspitali, e.d). The hospital's organizational structure can be found in Appendix 9.4.

4.1.1 HIT Infrastructure

Iceland has a well-established HIT infrastructure, the below describes the three main pillars of the IT systems used in the Icelandic healthcare services.

Saga is a coordinated electronic health records (EHR) system, used throughout the country, in all public healthcare organizations as well as some private clinics and nursing homes. It keeps track of patient data and enables health workers to access the necessary information on patients no matter where they have come for help (Government of Iceland, n.d.)

Heilsugátt is a digital platform owned by LSH and gives healthcare providers access to clinical information from all software applications in one place. The design of the platform aims to support clinical workflow and minimize mouse clicks when healthcare professionals need to access data when providing patient care. Apart from providing access to clinical systems, specialized functionalities have been developed within the platform, for example, solutions for laboratory requests and reports, patient

categorization systems, display monitor for emergency room and inpatient/outpatient departments, performance indicators, and more (Þórisson, 2017).

Heilsuvera is a secure website where citizens can have secure communication with their healthcare provider and is interconnected with Saga. Citizens can access some of the data stored in their EHR, such as prescriptions and vaccinations. The communication between a citizen and a healthcare provider automatically becomes a part of the EHR. Individuals can ask for the renewal of prescriptions and book appointments if the healthcare provider offers that functionality (Heilsuvera, n.d.).

4.1.2 Telemedicine in Iceland

In 2019, the Minister of Health introduced a new policy for Iceland's health service until 2030. The policy's objective is to ensure that every citizen in Iceland has guaranteed access to reliable and efficient health services. Based on that guiding principle, the policy presents a future vision for the Icelandic health care system:

> *"Iceland's health services stand comparison with the best in the world; public health work focuses on the promotion of health, and preventive measures play a part in all services, particularly those of the primary health clinics. The health services' performance is assessed by measuring the quality of services, their safety, their accessibility, and their cost"*
>
> (Government of Iceland, n.d., p.15).

To be able to reach the objective of the policy and the future state presented, the health policy is planned to be implemented with five-year action plans that are updated every year during the policy period.

One particular aspect highlighted in the health policy is accessibility to healthcare. Access to health service is generally considered good in Iceland. However, access is uneven in some respects. Specialist services are concentrated in the capital region, and 40% of the population lives in rural areas. Therefore, their access becomes more difficult in proportion to the distance from the capital. It is stated in the health policy that measures must be taken to remedy this and provide equal access for health care services to all citizens in Iceland. Telemedicine is stated to offer many opportunities to provide distant healthcare and equalize access to the service for people that are living in more rural areas. The health policy envisions that by 2030: *"Access to primary health centers and specialist services outside the metropolitan area will be improved by means of distance health services"* (Government of Iceland, n.d., p. 24).

In August 2019, a working group of professionals from all major healthcare organizations published a report about telemedicine's future in Iceland. In the report, they proposed that the authorities emphasize developing a telemedicine strategy in Iceland. Further, the report proposes that the focus will be on five projects, and that it should be the objective of every healthcare organization to participate in at least

one of these projects. One of the five projects described is the introduction of telemedicine at the Endocrine Outpatient Department at LSH.

4.2 The Diabetes Outpatient Clinic

Diabetes management for T1D is considered a specialized healthcare service, and is, therefore, the responsibility of LSH. The hospital runs a big medicine outpatient department (A3), which consists of many smaller units for different specialized services, including the Endocrinology Outpatient Department (Göngudeild Innkirtlasjúkdóma; EOD). The EOD services patients with endocrine disorders such as obesity, diabetes, thyroid disorders, and osteoporosis. Based on these disorders, the EOD is divided into several different clinics consisting of different patients groups. One of these clinics is the Diabetes Outpatient Clinic (Göngudeild Sykursýki; DOC).

The DOC serves adults with complicated diabetes management that includes T1D and complicated T2D. DOC serves around 700-800 patients with T1D yearly. The service is provided by a multidisciplinary team consisting of specialists, doctor's associates, nurses, nurse assistants, nutritionists, physiotherapists, and podiatrists. The DOC's operations can be split into four activities; diagnosis of new patients, regular patient follow up, screening of complications, and consultation inside and outside the hospital.

As the only specialized department in T1D management, the DOC at LHS is responsible for providing care for all citizens in Iceland, not only the ones that live in the capital region. Doctors from DOC travel 1-2 times a month to Akureyri, the biggest town in the country after Reykjavik, to follow up with T1D patients living in that area. The travel distance is 387 km by car and 249 km by airplane (See Figure 7). Other patients living in rural areas will have to travel at least once a year to Reykjavik for their appointment and screening.

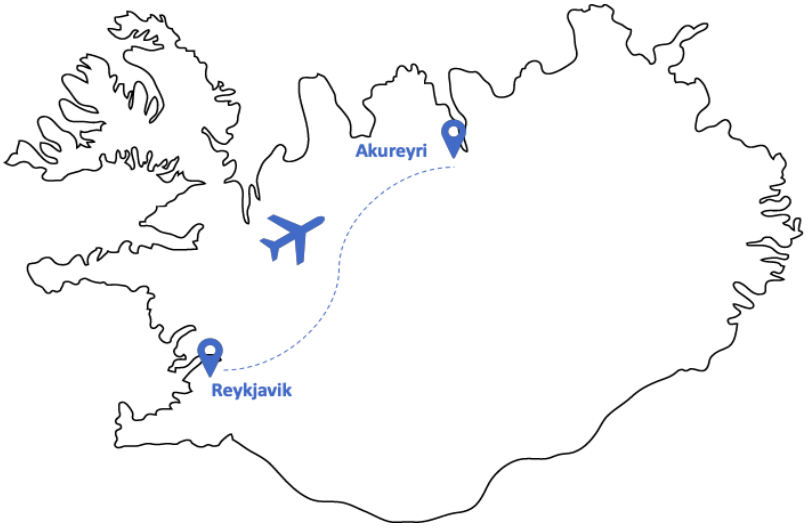

Figure 7: Iceland, showing the distance between Reykjavik and Akureyri

Source: own creation

4.2.1 Clinical processes and the patient pathway

Two main clinical processes have been defined at the DOC; the clinical process for newly diagnosed patients and the clinical process for the continued treatment control, follow up and screening. The T1D patient pathway starts with a diabetes diagnosis, and because T1D is a chronic condition, it will continue throughout the rest of the patient's life cycle.

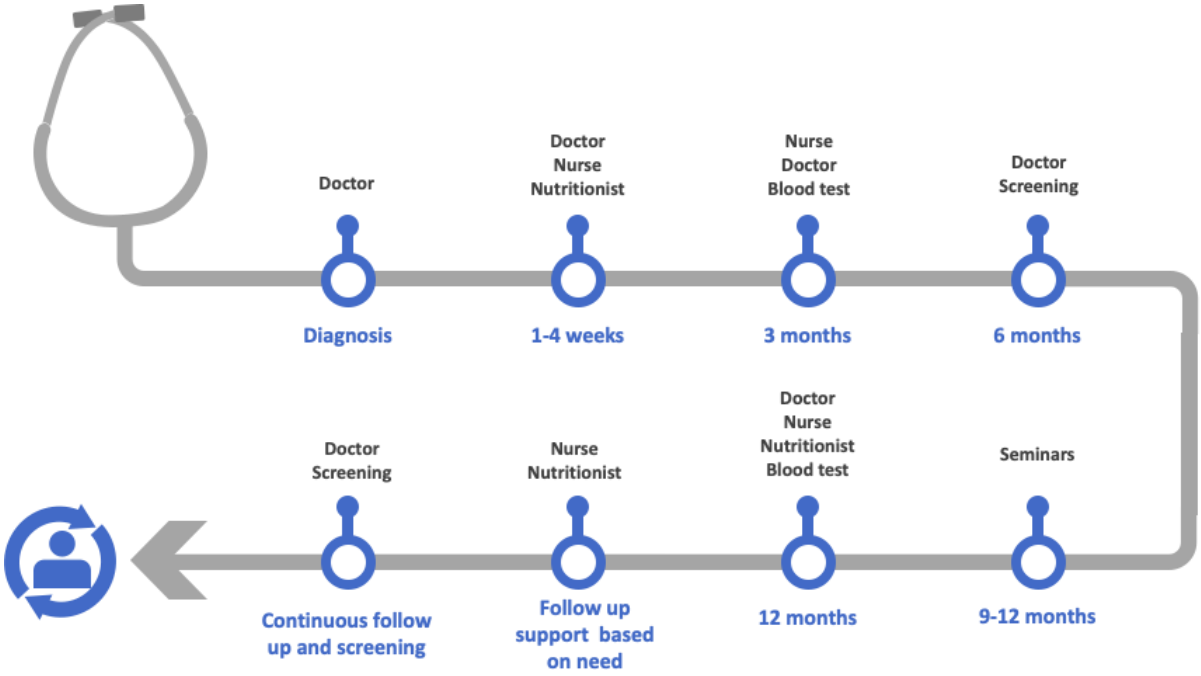

Figure 8: The patient pathway for T1D patients, from diagnosis and throughout their life course

Source: Own creation based on internal files from LSH

The above figure (See Figure 8) visualizes the T1D patient pathway, and the patient's touchpoints with the healthcare system. The care pathway aims to monitor the patient's health regularly and provide the support that the patient needs to be as independent as possible, giving him the tools and knowledge to manage his health. The following will describe each of these touchpoints.

Touchpoint 1 - Diagnosis: The pathway begins at diagnosis where the patient is referred to DOC. The patient sees a specialist to get a confirmed diagnosis and set up an initial treatment plan.

Touchpoint 2 - The first month: In the first month after diagnosis, the patient is booked to see a nutritionist at least two times over four weeks. In the first appointment, the nutritionist provides education and gives general recommendations about nutrition. In the second appointment, the nutritionist introduces carbohydrate counting. During this time, the patient will also receive a follow-up phone call from a nurse to see how the treatment is going and how the patient feels. If needed the patient is booked to see a doctor for an urgent appointment.

Touchpoint 3 - Three months: After three months, the patient is booked for an appointment to see a doctor, and blood samples are drawn. The patients will also see the nurse for further support, guidance, and education. If needed, the patient will be booked to see the nutritionist as well.

Touchpoint 4 - Six months: After six months from diagnosis, the patient will come in for an appointment with the doctor to further refine the treatment plan. The patient will also be screened for diabetes-related complications for the first time. If the patient needs further support and guidance with his treatment and lifestyle, the doctors may refer the patients to see a nurse or the nutritionist.

Touchpoint 5 - Seminars: Between 9-12 months after diagnosis, the patient will receive further education and training. The training is in the hands of the nurses and the nutritionist. The training included various topics such as diabetes and the treatment, blood glucose monitoring control, diet, nutrition and carbohydrate counting, self-management, and other lifestyle-related topics.

Touchpoint 6 - One year: After one year of diagnosis, the patient gets appointments with a doctor, nurse, and nutritionist, and blood samples are drawn again to see how the treatment is going.

After the first year of diagnosis, the patient meets a doctor and sometimes other HCPs on a regular basis, and regularly attends screenings for complications. According to the process map, this control should happen 1-2 a year. However, that varies between patients and their health status, how often they have follow-up appointments, as this control is based on the individual and his needs. The patients can additionally receive support both from nurses and nutritionists.

Before attending the follow-up appointments, the patients hand in a urine sample for testing and get their blood drawn. It is recommended that this is done two days prior to the appointment to ensure that the results are available at the time of the appointment. When the patient arrives at the follow-up appointment, the secretary registers the patient. The nursing assistant measures blood pressure, weighs the patient, and downloads data from medical devices (such as insulin pumps and CGM) if relevant. Generally, the patient is then screened for complications before seeing the doctor, who examines the patients, reviews lab results, and other data for the adjustment of the treatment plan. The clinical process of follow up appointments is visualized in Figure 9.

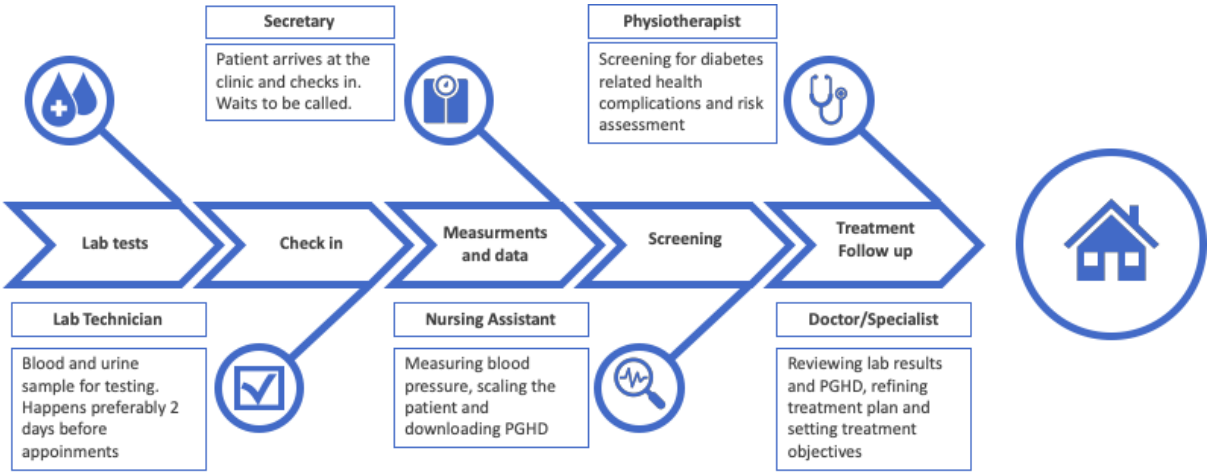

Figure 9: The clinical process for follow up appointments - patient perspective

Source: Own creation based on internal files from LSH

4.2.2. Facilities

The EOD moved two years ago to be a part of a larger outpatient department for all medical conditions, Department A3. Before the move, the EOD had their own workspace and breakroom. The facilities at that place were not optimal, and therefore the decision was made to move the department to become part of A3. Now they share both workspaces, patient rooms, and break rooms with other outpatient clinics. Furthermore, the offices for doctors are one another floor in the hospital, floor 7.

4.2.3 The booking system

The booking system for appointments was changed about two years ago. The current booking system is a so-called "group booking" system, where the year is split up into four groups, shown in Table 3. Instead of immediately booking the patients for their next appointment after their visit, the patients are placed in one of these four groups. After each appointment, the specialist evaluates when there is a need to see the patient again, and puts the patients in the appropriate group depending on how soon the specialist needs to see the patient again.

Group	***Period***
Group 1	January - March
Group 2	April - June
Group 3	August - October
Group 4	November - December

Table 3: Overview of groups in the booking system

Source: own creation based in internal files from LSH

The booking system is for the whole EOD. The maximum capacity for each group spanning three months is 400 patients. After the maximum is reached, the group is closed for booking.

Since the DOC is a part of a larger outpatient department, they share offices and patient's rooms with other clinics. DOC has access to two patients rooms every Thursday for the T1D patients follow up appointments. Then, one room is assigned to newly diagnosed patients every Tuesday. Each doctor can meet a maximum of 8 patients a day.. Each appointment is booked for 30 minutes. Booking a maximum of 8 patients a day gives the doctors time between appointments to finalize their notes and other administrative tasks that they need to take care of after the patients have gone.

4.2.4 Current state of telemedicine

As mentioned earlier (in section 4.1.1), there is an external pressure by the new health policy for the DOC to integrate telemedicine service into their current service processes. Furthermore, in the report regarding the future of telemedicine in Iceland, they mention implementing telemedicine for the EOD as one of the five projects that should be prioritized.

During the project intake interview with the Chief doctor, several problems related to efficiency surfaced. The DOC is currently not meeting the demand for care and cannot keep up with their own processes. Which has led to patients not getting the follow up as regularly as they need. In response to this unmet demand, and driven by the external triggers earlier mentioned, the department has been looking into increasing the use of technology in their processes.They are hoping to increase the support to patients with telemonitoring and telemedicine solutions. At the time of data collection, the DOC was using more simple telemedicine practices such as telecommunication through telephone and the use of the secure messaging service ‘Heilsuvera’.

They had not begun any formal telemedicine implementation. However, there have been some telemedicine test projects, such as using video conferencing solutions. However, they are still facing many technological and organizational challenges concerning those solutions. Therefore these solutions have not yet been implemented into the service process.

4.2.5 Diabetes medical technology

Most of their T1D patients now have a CGM which collects data about blood sugar levels every five minutes. Furthermore, many patients have insulin pumps. At the time of project intake, the only available CGM was from Medtronic. However, patients were not all happy with the Medtronic devices because of technical problems. Furthermore, the CGM from Medtronic requires patients to calibrate the device twice a day and replace the sensor every five days. Compared to other devices on the market, the calibrating and the sensor replacement adds an extra burden for patients who already have a high psychological burden in their self-management related practices.

According to the Chief Doctor, they were expecting to get a CGM from another medical device producer, Freestyle Libre (FL), which offers better-advanced technology. It offers sensors that are more user-friendly and do not have to be calibrated and replaced as often as the Medtronic sensors. Additionally, the FL offers features that make the management of the disease less of a burden. Freestyle Libre has three application services additional to its sensor and reader:

(1) *'LibreLink'* is an app you can connect directly to the sensor, and it collects real-time glucose data, keeps glucose history, and creates trends and patterns indicating how the glucose is changing over the day.

(2) '*LibreLinkUp'* is an additional feature where you can share the data with anyone you like, ideal for HCPs.

(3) *'LibreView'* is a platform where you can keep an overview of all your FL glucose data in one secure cloud-based solution.

Users can automatically use the LibreLink to sync the data to the cloud or use the FL reader to upload the data via a computer. The app creates trends and patterns in the data, giving the user an intuitive report with the information needed to make further decisions in the treatment. The whole glucose history can be accessed online from any internet-connected device, and users can easily share the reports with HCPs at any time (FreeStyle Libre, n.d.). During the data collection the DOC was in the process of introducing the FL technology to the patients.

4.2.6 Future vision

The future vision of the employees at the DOC reflects in solving the main current problems they are facing. Employees described their future vision in ways to solve their problems, and some even had ideas for a possible solution to their problems.

The clinic is scheduled to move to another facility this year, and the staff hopes for the new facility to solve some of their problems—for example, lack of space and scope to optimize their clinical work processes. The respondents hope for better organized work processes, more teamwork, and more continuity of care. When the focus interviews were conducted, the respondents were asked about their future vision of the clinic. Almost all of the respondents mentioned telemedicine's utilization and saw the benefits of its use.

The DOC's chief doctor had a vision that in the future, the DOC could benefit from automatic decision-making and Artificial Intelligence (AI). During the data collection process, the chief described a possible solution to how their service could be organized using cloud storage services and AI. The data that patients collect with their CGM could be sent directly to a cloud service where the data could be accessible for HCP with permission from the patients. Furthermore, they would use automatic decision

making or AI to prioritize patients in the system so the clinic can have a better overview of their patient's blood glucose status. Currently, their system does not offer a convenient solution to sort out and prioritize patients. Therefore with the solution, more time can be spent on those patients who have trouble with their blood sugar control and less time spent with patients who have blood sugar under control.The procedure would be for a team of two to three doctors every week to provide service for 100 patients. They would use a cloud service that would be fed by the patient's data collected with CGMs and directly sent to the cloud. A built-in algorithm would then sort the patients into green, orange, and red zones based on their long-term blood glucose level (Hb1Ac). The green zone represents patients within the controlled sugar range, and the orange and red zone represents patients outside the range.

5.Analysis

In this section we present the findings from our analysis. We will review the data with the aim to answer our first three research questions. The first section (5.1) explores the current state at the DOC and seeks to identify the need for change and how telemedicine can respond to their need. The next section (5.2) describes the level of ORC corresponding to the current state at the DOC, to understand their level of readiness for telemedicine implementation. The third and final section (5.3) explores challenges and barriers that could possibly prevent successful implementation of telemedicine. The empirical data that provides the foundation of the analysis was generated from the interviews conducted for this study. Relevant references from our respondents have been translated from Icelandic to English and can be found in the Appendix 9.5. References from each respondent can be found in separate tables for each respondent including a reference number and the corresponding coding.

5.1 The need for change

In this section, we wish to explore and identify the problems that the DOC is facing and could be solved, at least partly, by implementing telemedicine solutions. By identifying the problems, we argue that they can be translated into a corresponding need for change, when it comes to implementing telemedicine. By identifying the need, we can examine how certain factors might influence the acceptance of the change. The purpose of this section is to answer our first research question: *What are the identified problems at the DOC which could possibly be solved with the implementation of telemedicine and how do these problems translate to a corresponding change vision?*

Our data in the analysis revealed many *'problems'* that could be translated into opportunities for improvement. Some of these identified issues could possibly be solved with the introduction of telemedicine into their existing service processes. These problems were coded and identified during the first cycle of coding as the theme *'need for change'*. During the second cycle of coding, this theme was further sub-categorized into five categories: *'Resources', 'Continuity', 'Support', 'No-Shows'* and *'Access.'*

5.1.1 Lack of resources

One problem identified in the data was the lack of resources that were described under the code *'Resources'*. This issue was mentioned several times during our interviews by multiple HCPs. As an example, one of the respondents says: *"We need people. There is a need for nurses, we need psychologists, we need rooms […], So a lot is missing"* (Interview, SP2.R2). This quote suggests that there are mainly two types of resources lacking: human resources and resources in terms of workspace.

A lack of human resources was discussed and mentioned by all the HCPs during the interviews. As suggested by the previous code, there is a shortage of nurses, and they need a psychologist, since currently there is no psychologist in the team. However, the deficiency in terms of doctors is more

highlighted in the data: "*The number of doctors is decreasing. There are only two doctors in 100%, and one of them is the department chief. He also has management duties […], So there is a huge burden on this one doctor, which is unbearable* (Interview, N1.R3). Another respondent states something similar and expressed: *"There is worry and concern right now about some doctors who have left or going on to different roles. One of them was a specialty physician with tons of experience that we trusted and relied on and is now leaving to go to a different position […] But then we are a bit worried like this is all going to fall on […] one doctor"* (Interview, N2.R3). The previous codes highlight the extent of the problems concerning the deficiency of doctors and their worries about only having one doctor to rely on to meet the service demand.

The data suggest that a lack of resources affects their capabilities of meeting the service demand. One of the respondents describes the problem :

> *"I feel that patients are not coming often enough for control visits. It is recommended that they come twice a year, every six months, but that is just not possible with the resources that we have, especially with the doctors. It is regularly discussed to solve that problem by booking appointments with us [nurses], Where we call the patient in for a follow up in-between yearly appointments with the doctor […] But we do not either have nursing resources for that, to meet all T1D patients. But maybe we could do that for some patients […] But that has not been standardized or clearly defined. It is shameful that people are only coming once a year, and sometimes it is even longer than that between appointments.[…] That needs to improve, but we just do not have the resources for that."*
>
> (Interview, N3.R2)

According to this statement, there is both a deficiency in terms of doctors and nurses. Because of that, they are not able to follow the recommendations for care according to clinical guidelines. Patients are not coming in for follow up appointments as often as they should. Like mentioned, it has been discussed that nurses take some of the follow-up appointments, but there seems to be also a shortage of nurses. Other HCPs supported that view during interviews. However, one respondent sees it differently: "*Three nurses can access a computer each day; one can take in patients, and the other two are in a working space. So if the fourth nurse comes in, then there is no room." (*Interview, N1.R9). That suggests that the problem is not that there is a lack of nursing resources. Moreover, the problem seems to be that their time is not efficiently spent because of a lack of space.

The lack of space was further mentioned during interviews. One nurse states: "*One of the things that limit us is that we need more space, and we need more patient rooms to accept patients. So if someone comes in that we need to take in acutely, we will not have any room"* (Interview, N1.R9). This quote suggests that lack of space is affecting the delivery of service to patients. Along the same lines, the lack of space is affecting the availability of a nutritionist. The nutritionist articulates: *"There needs to be a*

nutritionist here always. But it comes back to exactly, facility issues. We are only here on the days when there is space for us, there is no space for us here more than two days a week" (Interview, NUT1.R1). This message is in coherence with the previous ones and further confirms that lack of space is affecting the clinic capabilities to meet demand.

The patients also experience the impact of the resources deficiency. According to their descriptions, they can feel the increased demand, and that DOC is not meeting the demand. That was mentioned several times during the interviews by both patients. One of the patients said: *"I think they [the DOC] are trying, and I do no doubt that. Nevertheless, this has exploded. They are just not able to handle this anymore. It has exploded with a big bang"* (Interview, P2.R9). Both of the patients feel that this has affected the quality of service. One of them expressed: *"According to my experience, this is a terrible service. I am sorry to say so but it is just terrible. Absolutely horrible service […] I just cannot say that there is quality in this service"* (Interview, P2.R10). The other patient agreed with this view: *"I do not think that this is a quality service. They [The DOC] are just not meeting the demand"* (Interview, P1.R10). According to these statements, the patients feel that the service needs to improve. The patients are frustrated with not getting their follow up appointments on time. They both mention wanting more feedback from the providers and more continuity in terms of what healthcare providers they meet.

5.1.2 Lack of continuity

Lack of continuity of care was described under the code *'Continuity'* and refers to high variability in the care that the patient receives or, more specifically, the issue of not being able to see the same care provider in follow-up appointments throughout the whole care pathway. This issue was mentioned both by HCPs and patients. One of the specialists mentions that continuity is an integral part of the service and creates value for the patients: *"There must be some sort of continuity, that patients get the same messages no matter if he is talking to me or someone else"* (Interview, SP2.R14). That is supported by another respondent who stated: *"It is better for people to see the same physician or care worker throughout, especially being newly diagnosed. If there are issues [with the treatment], then they know what we tried to change last time and can follow up [with the patient] in a better way than someone who's just coming into it "* (Interview, N2.R4). The nurse further adds that the main reason for this inconsistency in the care is that there are not enough doctors, and many of them work only part-time. Therefore ensuring continuity becomes very challenging.

A new booking system for patient appointments further catalyzed the lack of continuity of care. The implementation of the new system was a response to the deficiency of doctors and aimed at ensuring resource efficiency, but with that, the continuity of care decreased. One of the nurses described this change: "*After we changed the booking system for patients, it is no longer possible for the doctor to book the patient back to see him after six months […] Rather, the patients are put into a group and are just booked for T1D appointments but not to that specific doctor"* (Interview, N3.R5). One of the

specialists further articulated: *"You are no longer personally responsible for the patients. You just see random patients, they are randomly put in a random group, and they only meet doctors randomly. So that the service has changed a bit"* (Interview, SP1.R8). That is further suggested that there is a lack of continuity because patients are meeting the doctors randomly. Other respondents also infer that this change has decreased the quality and value of the service.

Furthermore, this lack of continuity and not having specific care providers responsible for individual patients or groups can be problematic. One of the nurses shared her view: "*What is missing is maybe that just some specific people are responsible for specific patients or groups […] Every patient has met every doctor […] It is a fact that patients are seeing way too many people, and if you have some difficult cases, that complicates things further to have too many people involved"* (Interview, N3.R5, N3.R10). In addition to this, the nurse exemplified: *"We are left a bit confused as to whom we should turn to for assistance with a specific patient if he has maybe met all the doctors. We want and should turn to the doctor that has an advisory role that day. Still, then he may have never met the patient and does not want to take responsibility for that patient"* (Interview, N3.R5). That suggests that the lack of continuity makes the work of nurses more challenging and decreases the quality of the patient's service, as no one is personally responsible for the treatment.

Our data analysis also revealed that the continuity of care is crucial to the patients. Both of the patients mention several times during the interviews, their frustration with not being able to see the same doctor. Asked what they define as quality of care, they both reply that seeing the same doctor is most important to them. One of the patients expressed: "*For me to be able to say that this is quality service, I would need to meet the same doctor always […] If there is one thing that I can complain about then it is not meeting the same doctor. For me, that is number one, two, and three. Absolutely top three* (Interview, P2.R4, P2.R3). The other patient stated something similar and said: "*For me, quality in service is a follow-up and that you meet the same doctor. […] I need to have the same doctor […] I am a bit "addicted" to seeing my doctor. It is just so comfortable […] You know, just not having to have to go over all of my history over and over again"* (Interview, P1.R2). In the quote, the patient described the dependence of meeting the same doctors as an "addiction". The patient further expressed having had diabetes for over 30 years and seeing hundreds of doctors throughout a lifetime, meeting the same doctor provides stability and comfort. The patient's willingness to pay from out-of-pocket emphasized the importance of continuity to the patient: *"I had to pay 50% more [at a private clinic], but then I at least met the same doctor"* (Interview, P1.R1).

5.1.3 Insufficient patient support

Patient support was described under the code *'Support'* and was defined as the support that patients receive additionally from their healthcare providers, apart from the regular control appointments. The data suggested that this support is in many forms, including education, training, emotional support, and

motivation. The objective of the support is to enable the patients to self-manage their condition effectively at home and increase their independence, like stated by one of the respondents: *"It all revolves around the fact that people need to take responsibility for themselves and know what they need to do"* (Interview, SP2.R9).

The data infers that the HCPs feel that the access to the additional support could be improved. For example, some of the HCPs describe issues relating to lack of 'on-demand' access to the care system and that the department *"should have better access to the office and the clinic"* (Interview, S1.R1). Another specialist agrees with this view and states: *"But then diabetes is that way that we know that people are dealing with it daily and things can happen […] they have to have the option to contact us if they feel there is a reason for it, but not just when some group booking system tells them that it is their turn"* (Interview, SP2.R8, SP2.9). In this quote, the specialist highlighted how important it is for the patient to have access to their terms and that living with diabetes requires patients to have the ability to seek support, especially when things are not going so well. However, even though the HCPs describe lack of access, the data also suggest that there are several access points for patients to seek additional support services in between their regular follow-ups, which are listed in Table 4. Some of these access platforms are in the form of telecommunication, such as phone calls and messaging services. However, as suggested by one of the respondents, there might be too many platforms for the patients to access and connect to the care system: *"I think that is one factor that needs to really improve. This access to the clinic. It is quite good, but there are too many access entries […] And the doctors are also complaining that there are too many gateways […] we need to change a bit this access"* (Interview, NA1.R3). In this quote, the respondent expressed the need for change in regards to the access to these communication platforms. Along the same lines, others expressed that there is a need for a defined work process around these platforms. For example, one of the specialists expressed: *"It [Heilsuvera] was just implemented without even thinking about it and just with no controls"* (Interview, SP2.R10). Here the specialist was referring to the implementation of 'Heilsuvera', a secure messaging service for patients to connect to their health care provider and suggest that the messaging service needs to be defined better.

The data suggest that there are no work processes or guidelines of how this messaging service should be used, for example, defining when the doctors should answer these messages: "*When am I supposed to answer this? […] we have just been answering these messages in our free time or in between appointments"* (Interview, SP2.27). Furthermore, it has not been defined how this service should be used by patients, for what purposes: *"We have "Heilsuvera" which only created more problems, yet, than it solves. Because people have free access […] I am not supposed to be treating someone for an infection in the nail"* (Interview, S2.R10). Here the specialist emphasized the need for defining work processes around the access points, and how both patients and HCPs should use these platforms.

Support and service access	Empirical evidence
Urgent appointments with specialists/doctors: There are four urgent appointments available each week to see a specialist or a doctor. Those are available for patients that need care that cannot wait. Nurses control who are booked to these appointments.	"And so sometimes then these people will land into an issue, nurses will pick it up and then try to get them an appointment sooner. So we do a lot of, I guess it is sort of like a triage but when things are more urgent than others, and we can make that decision and get them" (N2.R5)
Appointments with a nurse: Specialists can refer patients to get an extra support form a nurse either by an appointment or a phone call if they think that the patients need it. Patients can also call and book an appointment with a nurse themselves	"It is the same thing that goes for all of us nurses, that people are coming in to see the doctors 1-2 a year and they are referring patients to us that need more comprehensive management, education and support" (N1.R1) "The doctors can book time with us […] and then people can also call and ask for an appointment with a nurse" (N1.R2)
Phone call from a nurse: Patients can call the clinic themselves to ask for a phone call from a nurse. If they call before 10 a.m. the nurse will call the same day.	"They send people home with the information that if they run into some trouble and are not meeting the treatment goals then they can get a phone call from a nurse but you have to call yourself and ask for it […] We call the same day if people call in before 10 a.m" (N1.R2). "Before we had phone calls booked in advance and we called. But now we are asking people to call us and ask for a phone call back" (N3.R6). "Also just putting the responsibility back to the patients themselves. They will call when they want to discuss something" (N3.R7)
Heilsuvera - secure messaging service: Patients can send messages to the clinic through a secure messaging service. This is commonly used to renew prescriptions but can also be used for other purposes.	"But then we have 'Heilsuvera' from the Director of Health, and there you cannot download any files or data, yet. And we are most often talking to the patients because of their insulin pump report or some standard data that we need to have the ability to share the screen. To be able to see it." (SP.R12) "But in 'Heilsuvera', I just connect the message directly to the doctor the patient is asking for. But this opens a channel to the doctors, which can be overwhelming. So there are both advantages and disadvantages" (NA1.R7)
E-mail communication: Patients can access the clinic's email on their homepage. According to the homepage this can be used to book appointments.	"Patients are sending e-mails with all sorts of requests and questions. We are trying to limit that and have more information available on our website" (N1.R8). "We are trying to discontinue using e-mail communications […] strictly speaking we are not allowed to forward e-mails. Then I have to find some other way, for example, send the message to the 'Heilsugátt' or to the message list" (NA1.R7)
Homepage: Patients can access important information about the clinic's operations and processes as well as educational material.	"We are in fact trying to limit that [email communications] and have more information available on our website" (N1.R8).

Table 4: Patient's on demand access

The ill-defined work processes around these platforms affect the information flow from the patients to the providers. The secretary and the nursing assistant are in the front line and get all of the messages, phone calls, and requests and are responsible for forwarding them to the right HCPs. However, like the nursing assistant expressed: "*We get these questions loaded on us, the secretary and me. We are sometimes having difficulties with finding the right pathway for these questions. And then people will get frustrated and are calling again and again and want to know the results of something […] and we have nothing to say to them except that we will try to get this message to the right person"* (Interview,

NA1.R3). That suggests that this insufficient information flow is also causing frustration for the patients.

The analysis above suggests that it is essential for the patients to have more access to the service, and there is a need for standardizing the on-demand service. However, the service's structure needs to be in a way that it will not be used irresponsibly, as the goal is to make patients more independent. One of the HCPs described this: *"Of course, it matters to young people with T1D and just all people that have diabetes to have the best blood sugar control possible. That naturally demands that people get the time that they need. But it also cannot be about what people are calling every other day, and there are 1000 words written about the people that meet the HCPs because no one reads that kind of text"* (Interview, PT1.R5). Here the physiotherapist described that there is a balance that needs to exist between the support and independence. If the on-demand service is not clearly defined, the risk is that it can result in overuse of the service, which could increase the demand for care.

5.1.4 No Shows

The code *'No-Shows'* was used to describe patients' actions, either not showing up for their appointments or canceling on a short notice. No shows were described by several of the respondents as problematic and that they happened regularly. For example, one respondent mentioned: "*It is a problem that we have a lot of no shows, people are skipping their appointments"* (Interview, NUT1.R10). Others confirm this: *"It happens that people are not showing up"* (Interview, NA1.R4). One respondent gave an example of the extent of the problem: *"Thursday last week, […] I think that there were 2 out of 8 that showed up"* (Interview, CD1.R3). Here the Chief Doctor exemplified the issue and described a case where only 25% of the patients showed up for the appointments.

The respondents described no shows as an issue leading to inefficiency. Others expressed that "*The main issue is with no shows. Then you feel like your time is being wasted"* (Interview, NUT1.R12) and that *" It is just wasted time that is lost"* (Interview, SP2.R6). The HCPs feel that this is frustrating since the demand for care is high, and there are waiting lists for appointments: "*We have a long list of people waiting for an appointment while 3 or 4 people out of 8 do not show up that day, then others are waiting at home […] it would be best if you could know with some certainty and have some opportunities to book someone else"* (Interview, PT1.R7). Here, the physiotherapist expressed the need for a solution that would allow the clinic to use the time that is lost when patients do not show up and see other patients on the waiting list for appointments.

The staff has been trying to find ways to minimize the impact of no shows to maximize resource efficiency. For example, as the nutritionist explains: "*So I book my appointments very tight because I just know that 2-3 will not show up, but it is challenging if everyone shows up"* (Interview, NUT1.R10). Many of the informants mentioned that they would like a solution to use the time that is being wasted because of no show and short notice cancellations better. They have gone as far as calling patients to

ask them if they are planning to show up: *"We are trying to call in advance and remind them of the blood test and checking if people are really planning to show up"* (Interview, NA1.R4). Nevertheless, since there is a pressure on resources, they do not always have time to do that like one of the respondents said: *"We cannot call every single one of them the day before and say: Hey, are you going to show up tomorrow? That is not possible"* (Interview, PT1.R7).

Some of the respondents speculated about why there are so many no shows. For example, one of the specialists suggested that one reason might be that there are no financial consequences for not showing up and said: *"No shows are free in Iceland. People do not pay anything if they do not show up"* (Interview, SP2.R6). The Chief Doctor suggested another reason and described: *" The patients get an appointment time with six weeks' notice, and maybe it does not fit their schedule. […] So we are not negotiating with the patients what appointment he gets, but instead, we tell him that he gets an appointment on this date. But we are seeing that people are just deciding the day before that they want to change the appointments […] and even are just not showing up, which means of course inefficiency"* (Interview, CD1.R3). Here, the Chief Doctor described how the booking system works and that because the patients do not have any control over what appointment they get assigned, they are deciding not to show up. This suggestion is supported by one of the patients who expressed: *"I have not showed up for the last two appointments […]I just find it absurd that I do not even get some flexibility to tell them when I can show up. I think that I do not even have the opportunity to change the appointment time if it does not suit me"* (Interview, P1.R5). This supports the need to add more flexibility to the booking system and allow the patients to choose appointments that suit them the best.

The respondents can see telemedicine as being an opportunity to fix no shows. For example, one respondent articulated, *"you are talking about telemedicine. Then it does not matter to me if the patient is sitting in front of me or somewhere else.[…] if it would be possible somehow for patients to have access to the clinic in a way that our time will be used in a better way"* (Interview, NUT1.R10). One respondent mentioned a possible solution: *"Then you can also offer 'flex-appointments', where the patients do not need to take time off work, for example. So there are a lot of economic factors that need to be calculated into this"* (Interview, SP1.22). Here the specialist discussed the possibility of using flexible appointments to make up for lost time when other patients do not show up. The specialist also mentioned a lot of environmental and economic factors that weigh in: "*It is also just this environmental factor, like traveling, costs, gas, pollution. These are all things that weigh in and support the adoption of telemedicine services. As a patient, you will not need to get dressed, brush your teeth, and pay for the gas and all that. You are just at home in your pajamas and talking to your doctor or a nurse"* (Interview, SP1.22). This quote suggests that this might be appealing for some patients, not needing to go anywhere to talk to their healthcare provider and offers flexibility that could reduce the rate of no shows.

5.1.5 Lack of equity in access.

The code *'Access'* was used to describe equity in terms of access to healthcare. Some proportion of the T1D live in rural areas and do, therefore, not get the same service as the people living in the capital region or short driving distance from the capital. One of the specialists said: *"We do not service the rural areas well enough. They do not have the same access as those who live in a driving distance"* (Interview, SP2.R13). Patients living in rural areas are required to come yearly for control and screening. However, as described by the specialist, this patient group does not get the same service and support as patients living closer to the capital region.

In relation to discussions about equity in access to healthcare and adoption of telemedicine, one of the specialists expressed: *"Telemedicine could be an option for patients between these regular follow-ups and maybe for certain groups where the distance is too great. You do not want to make people travel 400 km to meet you and talk to you for 20 minutes"* (Interview, SP1.16). Other HCPs agreed with this view. One of the nurses said: "*[Telemedicine] would be very beneficial for people like I was saying before, living outside of the city and in faraway places. Because sometimes they'll only come to the city once a year, and they have that whole 12 months where they might not be getting the support they need"* (Interview, N2.R9). By adopting telemedicine service, the DOC would be able to service the patients in rural areas better and offer them more support regularly, based on their needs.

5.2 Organizational readiness for change

As described in the literature review, the term organizational readiness for change refers to the extent to which organizations are ready for the intended change. In this section, we will present our empirical data concerning ORC and related concepts. The purpose is to answer our second research question: *How does the current state at the DOC correspond to ORC based on the theory of organizational readiness for change presented by Weiner (2009)?*

During the first line of coding, all descriptions that indicated ORC and related concepts were coded under the code *'Readiness'*. During the process of second-line coding, references codes under *'Readiness'* were further categorized under specific concepts related to ORC and mentioned in Weiner's (2009) theory, such as *'change commitment'*, '*change efficacy*', and '*contextual factors'*. Furthermore, teamwork emerged as an important theme in the data during coding. The first line of coding, revealed a theme that was originally described under the code *'Teamwork'*. However, during the second line of coding it developed further into the code *'Unity'* that was used to describe how the staff works together as a team and assesses their capabilities to collaborate, or behave collectively as described by Weiner (2009). We argue that unity goes further than teamwork, as it reflects more than just working together as a team in patient care. The next sections will present our findings concerning our second research question.

5.2.1 Unity - collective beliefs and behavior

According to the ORC theory, collective beliefs and behavior of the organizational members matter for the change implementation. Therefore we argue that unity of the team matters in the context of the change process and how ready the DOC is for change. This was reflected in the respondents view on how they work together as a team. According to the data, teamwork and collaboration between HCPs is something that needs to be improved. Many HCPs mentioned this during interviews, and most considered teamwork as something that is lacking or nonexistent. For example, one respondent described: *"I would just like to see teamwork which frankly I do not think is happening here. And I just want more collaboration. […] The group is divided […] I think that the clinic can become really good. There are a lot of good people here, but we just need to make the people work together"* (Interview, N1.R3, N1.R11). From this statement it can be inferred that lack of teamwork and collaboration affects the clinic's ability to improve and change. Another respondent expresses something similar: *"We are lacking more collaboration and the team is maybe a bit dysfunctional […] Many experience that we are not working so much as a team and there are stations scattered here and there that do not interconnect"* (Interview, SP1.R18). This statement further confirmed that many of the HCPs feel that teamwork is lacking at the clinic.

The data suggest that the teamwork changed and was affected negatively when the clinic moved to be a part of a larger outpatient department within the hospital two years ago. The reason for this change was to improve working conditions and provide better facilities; however, it had unintended consequences: "*We moved to be a part of A3 [the large outpatient department], where the facilities are much better, indeed. Still, it is busier, and we are then a part of another outpatient department, and therefore less by ourselves […] the facilities are better but there is less intimacy"* (Interview, SP1.18, SP1.R19). By becoming part of a larger department, they lost their privacy and solitude. The specialist further exemplified what was lost with the change: "*For example, we had our own break room where we could have discussions and maybe review professional matters. Now we do not have that option anymore because the break room is shared with other people, and you do not want to discuss the patients anymore. That decreases the team's intimacy"* (Interview, SP1.R19). Others also highlight the importance of the breakroom: *"I have just realized that, like with the break room, how crucial it is. Even though it was not very compelling where we moved from, but it was just for us"* (Interview, N1.R4). Another respondent further confirms the significance of the breakroom and what changed with the move: *"Some things changed with the move. I think that everyone felt that. It changed this team spirit. We were by ourselves at the old place, or you know we had our own break room and things like that […] You are not talking about the patient in the breakroom now, like we used to do. Because there are many other clinics there. So I think that was not necessarily a good change"* (Interview, NUT1.R14). The previous quotes suggest that the way the move impacted their team spirit and ability to work as a team was not anticipated. They consider that this has negatively affected the quality of the service by not having any common space to discuss their patients as a team.

Becoming part of a larger department unit also changed the work environment itself, which further impacts the foundation for teamwork to blossom. This is described by one of the specialists: *"It becomes impersonal and bigger. The offices are here and there and people have less contact ground with each other"* (Interview, SP1.R19). Here the specialist described that offices are scattered and it impacts the unity of the HCPs. Another respondent further elaborated and described how this impacts teamwork since now there are: *"A little bit longer communication paths"* (Interview, NUT1.R14).

The data suggest that the staff is aware of how this change has affected their team spirit and how their current environment does not foster teamwork. Most of them agree that this needs to be improved, for example: *"We are maybe not all working towards the same objective, so the unity of the staff members could be increased"* (Interview, SP1.R9). This quote suggests that one thing that they need to do is to define better what their objectives are as a unit and work together as a team to reach those goals. According to one respondent, there is some work happening to strengthen the team spirit, and that teamwork is improving: *"It is getting much better. So that's what we're working on correcting. So I would say last year was horrible […] We didn't work together, and now we're trying to change that"* (Interview, N2.R10). However, according to the data, they are far from being where they want to be with their teamwork capabilities and will need to keep working on it and become a stronger unit.

5.2.2 Change commitment

Change commitment reflects the organizational members' motivation for change and how much they value the change. The HCPs saw the potential for the adoption of telemedicine and valued the change in one way or another. Some valued the change because they saw that it was urgently needed and could solve some of their problems, for example: *"There is a high deficiency for doctors. So if there was any sense in this organization, then it would utilize our workforce to see as many patients per time unit as possible […] No matter if the patient is in 'Ísafjörður' or here. You can use the technology to treat them at home"* (Interview, SP2.R1). In this quote, the specialist describes how telemedicine could be valuable to meet service demand by efficiently utilizing human resources. Another respondent expresses something similar: *"But in the future, if there would be a way to use the time in a better way. No matter if it is through some telecommunication or just more access to us, rather than always booking these appointments that people do not show up to"* (Interview, NUT1.R11). This statement suggests that telemedicine could be of value as an opportunity to use time more efficiently and minimize no shows by patients.

Furthermore, telemedicine could also be an opportunity to utilize the time that is lost because of no shows, like exemplified by one respondent: *"Then you can also offer 'flex-appointments', where the patients do not need to take time off work for example"* (Interview, SP1.R22). Here the specialist highlights the use of 'flex-appointments'. When a patient does not show up for their appointments, the time lost could be utilized by offering other patients that need further support a spontaneity appointment

through telecommunication devices. That would allow for increased resource efficiency and also increase the ability to meet the service demand.

Some HCPs saw value in the change of adopting telemedicine because it would benefit patients. Especially patients living in the rural areas: *"That would be very beneficial for people like I was saying before, living outside of the city and in faraway places […] I think that would be beneficial, and especially if we could have like, see a report, and then talk to the person on some sort of video conference that would be beneficial"* (Interview, N2.R9). Others agreed with this view. One HCPs expressed: *"I think it will be very beneficial, as a different kind of service, in addition to the service we have […] especially if people are coming from the rural areas, then this kind of service can be of great help"* (Interview, N3.R17). Finally, it is also mentioned that telemedicine's adoption would be valuable by offering environmental and economic benefits.

It was evident that the value of the adoption of telemedicine is not as a substitute for the service that they currently provide, but instead as an addition or a different kind of service. As one respondent describes, telemedicine could work for some patients groups but not others: *"With certain groups, you need to meet them in person, just having them eye to eye, especially the older generation […] if people are coming with the whole package [many health problems] and do not have any idea what to do, then you need to sit down with people and find out what the problem is"* (Interview, N1.R12). Here the nurse explained that for some patient groups and in certain situations, it is necessary to see patients face-to-face, especially if they have complicated problems. This view is also shared with another nurse who stated: *"But then it is a question about do I necessarily need to see them in person, in some situations that is necessary "* (Interview, N3.R18).

The data suggest that this combination of telemedicine and face-to-face appointments is sensible. When asked if willing to commit to the implementation of the change needed to adopt telemedicine, one respondent expressed: *"I would be willing to do that in combination with direct healthcare services, if we can combine this on a reasonable, effective and accessible manner, then I would we willing to commit to this"* (Interview, SP1.R26). This quote highlighted the implementation of telemedicine as additional services and that it is not possible to altogether discontinue meeting patients face-to-face. The specialist further adds that *"When you are looking to adopt telemedicine services, you need to be sure that if you are going to provide such service, that you are providing at least as good as or even better services than in the current system. So if you are looking at that the service is in lower quality, and this you can measure with quality indicators or other measurements scales, then I think that we are taking a step back. But some combination of telemedicine and direct healthcare services is desirable"* (Interview, SP1.R26). The key message taken from this quote is that when implementing telemedicine, it is important to make sure that the value of the service is not decreased and preferably should improve the value of the service.

5.2.3 Change efficacy

According to Weiner (2009) members of the organisation formulate change-efficacy judgments based on information bearing in three questions:

1. Do we know what it will take to implement this change effectively?
2. Do we have the resources to implement this change effectively?
3. Can we implement this change effectively given the situation we currently face?

In order to realize the DOC's members' shared belief in their collective capability to implement a change such as telemedicine, empirical data from the interviews will be presented concerning these three questions.

Do we know what it will take to implement this change effectively?

Information bearing in this question is whether the members realize what this implementation initiative involves, do they share the belief that they have what it takes to change? There seems to be a considerable awareness among the staff at the DOC of what it takes to implement changes. Among the things that need to be in place according to one of the specialist doctors was: *"The work processes, good administration, staff that is ready to work according to the procedures, and staff that is satisfied with their jobs"* (Interview, SP1.R27). However, it is also described that they lack some of these things, and some work is in progress, like one doctor described: *"What is lacking are the work processes. We are developing them. We are maybe not all working towards the same objective, so the unity of the staff members could be increased. Better defined management and better booking system"* (Interview, SP1.R9). There is more evidence in the data that indicate that the members believe they have what it takes to implement telemedicine. However, they often described some things that need to happen before they are ready, as one respondent articulated: *"We are working on streamlining a bit our processes through that facility. I see that if that works out, then there is nothing in the way. If we can establish teamwork, we could provide excellent service and have good processes and just help the ones who need help"* (Interview, N1.R5). In this quote, the nurse described a need to both work on streamlining their processes and establish better teamwork before they can provide better service. Another respondent stated something similar: *"I think that we have a lot to offer, the clinic. But we need staff and more structure around everything and define everyone's role in a better way. However, I think it is positive how many professionals we have [...] We can solve many things together. But there is a lot of work ahead. It is in progress, so it is exciting to see how it will turn out to be"* (Interview, N3.R4). Here the nurse emphasized the need to solve some of the problems they have before they are ready to take the next steps in the change process towards telemedicine. However, the nurse described a belief in their ability to solve many things together.

In a broader organizational context, the hospital's lawyer was positive that LSH is ready for the implementation and the use of telemedicine. The lawyer remarked: *"I do not see why we should not be*

able to do this; there is nothing in the way. We are rather technology-minded, and now we are working fast at implementing healthcare service through video calls, so I think we are ready for this. I think the doctor's mindset towards it is very positive, at least the ones I have talked to" (Interview, LAW1.R6). According to the lawyer, the hospital is considered to have a technology-focused mindset, and the staff has positive feelings towards telemedicine. When the lawyer was interviewed, the Covid-19 pandemic had already spread in Iceland. When it is said: *"now we are working fast at implementing healthcare service through video calls,"* it is being referred that due to the Covid-19 pandemic, they are working faster at implementing telecommunication services.

According to the above discussion, the members of the organization seem to know what it will take to implement telemedicine, and the sequence of change activities. But the question remains, if they have the resources needed for a successful implementation.

Do we have the resources to implement this change effectively?

This question holds information on whether or not the organization's members consider the organization to have the human-, material-, financial, and informational resources needed to implement change. It has already been highlighted that the members at the DOC consider they lack resources in general. For that reason, they do not consider the organization ready to implement telemedicine, as one of the specialist doctors said: "*Maybe not technologically, no, and facility wise no. It could be ready [for change], but it is not now. We need more staff and better facilities"* (Interview, SP1.R4). In this quote, the specialist doctor mentioned that first of all, they need more staff, more space, and better technology to be ready to implement telemedicine. However, it was further mentioned that telemedicine would be possible if the need for resources would be fulfilled: *"But telemedicine is possible, and now we have begun to look into that, now maybe more in relation to T2D and the rural areas"* (Interview, SP1.R3). This respondent mentioned that, in fact, they have started doing some speculations of implementing telemedicine already.

The empirical data holds many evidence of their lack of staff-, -technology and space resources like earlier described (Section 5.1.1). One of the nurses described the lack of resources concerning their readiness for change: "*I think that it will be difficult. I do not believe that there will be much change while the staffing is so inadequate, and both with doctors and nurses. We need more staff. So it is hard to be planning to do big things, in my opinion. We need staff resources, and also workers that are here full time"* (Interview, N3.R1). The same goes for technology. Most of the staff mention lack of technology resources to be able to implement telemedicine, like one of the specialist doctors described: "*We have old computers which do not even have video cameras."* (Interview, SP2.R2). That is further supported by the physiotherapist:*"We do not have a proper computer system"* (Interview, PT1.11). Moreover, the HCPs see the need for better facilities in order to implement telemedicine. They lack rooms to see their patients, which is one of the reasons why they are unable to meet their service demand. As they see it, they need rooms to conduct the telecommunication appointments. One of the

respondents says: *"We need to make sure that the HCP involved has the space and privacy needed"* (Interview, N1.R10). Here they emphasized on the need for space to conduct the telemedicine appointments, to ensure privacy of the conversation.

When conducting the interviews, the clinic was testing a new version of telecommunication technology. That system was causing some problems, as described by the chief doctor: *"There are some technical problems that are about that this needs to be within a secure system so that no one can hack into it"* (Interview, CD1.R10). Integrating the system properly into their EHR system is crucial to protect the conversations that happen within the system. Therefore they can not utilize just any available system. Besides the cybersecurity problems, the respondents described other problems such as insufficient image resolution and inability to share screens. One respondent said: *"We are testing it, and we are building such a system here, but the image resolution sucks"* (Interview, PT1.R8). Therefore, they do not have any available system yet to utilize for conducting telemedicine services.

These findings suggest that the members consider that they lack resources needed, in every possible aspect, to implement telemedicine. They do not have the human resources. Neither do they have the technology nor the space to conduct the services in the privacy needed.

Can we implement this change effectively given the situation we currently face?

With this question, we try to realize how the DOC members consider situational factors contributing to their ability to change, such as having the time needed to participate in the change process for the implementation to become successful. Another aspect that will be considered is if the members experience political will that supports the implementation.

The HCPs at the DOC, as already mentioned, are very pressed. In their day to day work, they are struggling to make ends meet and live up to the service demand. Furthermore, many of the HCPs are in part-time jobs. Therefore it can be anticipated that they will not have the time and scope needed to dive into participation in the change process fully. The following quote suggested this to be true: *"Every other week on Mondays there are department meetings at noon, I can almost never attend because I only work 4 hours, and I have patient appointments before noon on Mondays. So I ask myself, is it more important for me to take these appointments, or have one less appointment on Mondays and go to the meeting, and who wants to decide that?"* (Interview, N3.R19). In this quote, a nurse is describing that every other Monday, they have department meetings where the chief doctor mediates information about all kinds of things happening at the clinic, including news on improvements and changes. Because the nurse works part-time and only four hours a day, it is an expensive trade-off to lose one whole appointment to go to the meeting, because there is no slack in their system that affords loss of appointments.

From a political point of view, the staff described little will from the top management in the hospital to support implementation. One of the respondents described: *"There is no will for change. There is no will to execute all these fancy statements they talk about in their meetings"* (Interview, SP2.R25). The HCPs experience that the top management declares that they are very fond of the idea of telemedicine and like to discuss it a lot at higher-level meetings, but then it does not go any further than that.

The current situation does not seem to offer members of the organization the possibility to participate in change and improvement initiatives. There are no resources available for improvements and change, as participating in the improvement has to be a trade-off. The HCPs have to sacrifice meeting patients who are already on a waiting list in order to be able to participate in improvement projects. Furthermore it is suggested that the top-management of the hospital does not provide the support with action to facilitate the change process.

5.2.4 Contextual factors

It is further mentioned by Weiner (2009) that some broader, contextual conditions affect the ORC. Some organizational features seem to include a more receptive context for change than others. Organizational culture, policies, and past-experience can affect how members of the organization formulate change commitment and change efficacy, either positively or negatively. In this section, we will present our findings from our empirical data that described organizational features that create more or less receptive context for change.

The data suggest that work culture at the DOC is very hierarchical, which is quite common in the health care sector because of the HCP's very defined and specific roles in the care process. The evidence suggests a noticeable hierarchy at the department itself, where the doctors act as one team and other HCPs as another team. The remarks by one of the respondents showed evidence of this hierarchy: *"I feel that we need to define better how often people need to see a doctor and then us [other HCPs]"* (Interview, PT1.R2). This hierarchy is not always visible. For example, like in the earlier quote, interpretation is needed to realize what the respondent is referring to. When the respondent says "*...how often the patients should see a doctor and then us" ,* it is being referred to the 'doctors' as one group and then 'us' as another group containing the rest of the HCPs in the clinic, including nurses, physiotherapist, nursing assistant and nutritionists. Thus, indicating a hierarchy between doctors and other HCPs. Along the same lines, another HCP expressed: "*Sometimes, you get the feeling that this is just for us, and this is for the others. And that is not what I feel is appropriate for teamwork. That is just my opinion"* (Interview, NA1.R5). In this quote, the nursing assistant described how the teamwork in the clinic could be better, and described her individual experience of stratification, and discrimination between professional groups at the DOC.

Another type of culture noticed in the data could be described as an 'Icelandic culture'. In the data, we found some evidence indicating that the operations at LSH are affected by this culture. The members

describe that some things are implemented carelessly, and management strategies that they believe are typical for Iceland. For example, this quote supports these arguments: *"It [Heilsuvera] was just implemented without even thinking about it and just with no controls. Something so typical Icelandic"* (Interview, SP2.R10). Another respondent further supports the existence of the 'Icelandic culture': "*They [the hospital management] somehow are unable to achieve this [successful change management]. There is a lack of time and this Icelandic indiscipline, I think that it is reflected in that"* (Interview, IT1.R7). In this quote, the respondent described the inadequate training and implementation processes at LSH, and mentioned the problems reflecting in "*the Icelandic indiscipline*".

The government recently published a new health policy for Iceland's health service. According to the new policy, telemedicine utilization in healthcare services is encouraged and promises more funds to be allocated to telemedicine implementation. However, LSH does not seem to notice this encouragement or financial support from the government yet, as the head of the IT department mentioned: *"No, we, in fact, do not get much of that money. And that is another discussion, how small amounts of money the hospital receives for projects like these. I think in all this telemedicine, then you can definitely complain about a lack of funding"* (Interview, IT1.R27). The IT department manager describes the lack of funding to the hospital's telemedicine implementation programs and that telemedicine projects do not get enough funding in general.

Positive or negative experience with change has been seen to foster or hinder organizational readiness. The data suggests that the clinic's members have not had a good experience of change in the past. Many of the HCPs describe their experience with past change initiatives negatively. The following quote is a good example:

> *"We have come up with many ideas about this. But we need people. There is a need for nurses, we need psychologists, we need rooms. We have old computers which do not even have video cameras, it is not even possible to get that to work at the hospital. So a lot is missing, and whenever you start to do something like this here, then you give up after some time"*
>
> (Interview, SP2.R2)

The quote described a lack of faith in the organization's capability of changing. The respondent has personally attempted more than once to change the service and initiate change but was constantly running into brick walls. With that it is meant that there is no support from the top managers to take the initiative all the way. Further described by this quote: *"Based on my experience, I have a hard time believing that anything will happen here. This organization is so ancient and unwilling to do anything. Like I said, it took three years to get a telecommunication device, which is nothing more than Skype"* (Interview, SP2.R24). Other respondents further indicate this kind of omission, one of the nurses said: *"Then just as things are here in this hospital, I believe that we will move when we have moved, because that is how it is here"* (Interview, N3.R14). In this quote, the nurse is talking about their anticipated

move to another facility. However, experience from past change initiatives has taught the nurse not to believe the change will happen until it has actually happened, as further described: *"They are always talking about some big changes. Then nothing happens, or constantly delayed, you know. We were supposed to be moving now, and it has been delayed for a year"* (Interview, N3.R14). The change the nurse described is concerning their move to another facility, which should already have happened, however since that has still not become a reality, that further confirms her belief in the organization's inability to manage change successfully. The past change experience shapes the nurse's belief in the organization's capability for change through working in different departments within the organization and participating in many change processes.

5.3 Challenges and Barriers

In this section, we present our data aiming to identify possible challenges and barriers that could hinder the implementation of telemedicine. In the first line of coding, a node was made called *'challenges and barriers'.* In the second line of coding, the node *'challenges and barriers'* were subcategorized into five themes: *'Technology barriers,' 'Change management,' 'Operational management,' 'The Regulatory Environment,'* and *'Governance Barriers.'* These codes will be used to present the data in the following section and answer the third research question: *What are the potential challenges and barriers that could prevent the successful implementation of telemedicine in the case of the DOC?*

5.3.1 Technological barriers

One of the DOC's most significant challenges in the implementation of telemedicine is access to available technology. Iceland is a small market and not very popular among the biggest welfare technology companies, as the chief doctor articulated: "*What has been a problem is first and foremost our access to this technology*" (Interview, CD1.R8). Until now, a company called Medtronic, specializing in diabetes medical technology, has mainly been servicing the Icelandic market. Freestyle Libre (FL) is another company that specializes in diabetes medical technology. They are offering more advanced technology and better service for patients. Therefore, the DOC is hoping to provide the FL technology to their patients, and a part of their future vision is to utilize the services they offer fully. The DOC has been having trouble with buying the devices from FL because the company is not interested in the small Icelandic market. Further described by one of the respondents: "*They just do not have any interest in the little Icelandic market, and we are very disappointed in that*" (Interview, N1.R14). Thus, after a long search for a possible way to buy the devices from FL, they found a pharmacy in the Faroe Islands that was ready to buy the devices from the company and sell it to LSH. The chief doctor confirms this: "*We buy it [FL CGM device] from a pharmacy in the Faroe Islands, who buys it from Denmark and sends it to us*" (Interview, CD1.R8). When the interviews were conducted in March, they had not started using the technology yet, but it was anticipated in the next weeks or months. Based on this example of getting access to the FL technology, suggests that Iceland's small market size can

be a barrier for implementation of telemedicine as Iceland might not have access to global producers of medical technology.

According to the respondents, the current technical infrastructure at LSH is abysmal, and on some levels, it is not good enough to support the technology the DOC desires and expects to implement. The hospital's computer system does not support the data coming from glucose monitors to be loaded into their computers. Therefore, they have to manipulate the system. One of the specialist doctors has this to say about the data loading process: "*That [using data from the CGM] is just a joke in itself. Then I download the data to the hospital computer. We need to have a computer that the hospital 'does not know of,' which is not connected to the internet because the firewall eats everything. We never get any permission to have anything*" (Interview, SP2.R15). The computer system at the hospital does not allow them to load CGM data into their system. Therefore, they have a computer that is not connected to the hospital's servers so that the firewall does not eat the data. The IT department manager at LSH described that finding a system to receive the CGM data has been difficult: *"That has been difficult. The system we had didn't support Apple, you know there are so many things that happen, then we had to go a different way, so we are trying to solve these factors"* (Interview, IT1.R24). In this quote, the IT department manager is describing that they are working on finding the right system that can receive the data. They had a potential system; however, that system had complications, like not supporting Apple devices and more. It is further described by one of the specialist doctors that their computer system is inompetent: *"We have old computers which do not even have video cameras, it is not even possible to get that to work at the hospital"* (Interview, SP2.R2). This quote described their reduced computer availability that does not even have video cameras, which will make telecommunication with patients difficult.

Recently LSH has been in some experimental work with using telemedicine in outpatient services, including the DOC. However, it has been somewhat tricky because the experimental solution does not fulfill their needs. Their service is much based on sharing glucose data, and looking over the glucose history with the patients. One of the specialist doctors described their experience with the solution: "*last year they came out with something completely non-functional, you know. You cannot have shared screens"* (Interview, SP2.R19). The specialist further mentioned: *"You cannot load in any data there, and we are mostly talking with patients about their charts from their monitors, so we have to be able to share screens so we can see it"* (Interview, SP2.R28). In these two quotes, the doctor described that the telemedicine solution that LSH is developing, is not working for them. It is crucial in the treatment they provide to look at the glucose data together with their patients. Therefore HCPs and the patient have to be able to share screens. Furthermore, bad image resolution was described and hiccups in the sound and connection. This was confirmed by one respondent: *"We compared the system with Skype, and the image resolution on Skype is so much better, much clearer what we are watching through the cameras. So the IT department has to do even better with this so this will work for us because people must see*

clearly what they are looking at" (Interview, PT1.R8). Here the physiotherapist at the department described the bad image resolution, comparing the system to Skype. The quality of the sound and picture is a lot worse in the system LSH is developing. One of the specialist doctors goes as far as saying: *"The image resolution is horrible and you can't use Google browsers and it is so limiting and there was no way of using this"* (Interview, SP2.R19). In this quote, it was evident that the doctor is not very fond of the system, describing its non-functionality and limitations.

The HCPs describe their frustration of the hospital constantly trying to make their own systems when there are ready and available systems out there. There exists an Icelandic system called Kara Connect that provides solutions for telecommunication. The staff have made suggestions to use this system, as mentioned by the physiotherapist: "*We tried to get this system here, but then it was all about the system not being secure enough. I know that because the servers have to be here in Iceland and something like that. The developer fixed it, still, they [the IT department] had to try to design their own system for the hospital. You know this is just so frustrating"* (Interview, PT1.R9). In this quote, it is described that a permission to use the Kara Connect system was anticipated by staff. However, it wasn't integrated, and one of the reasons why, given by the administrators was that they do not want to lose their servers out of the country, or have their data stored by some big technology company.

Furthermore, the hospital's systems preferably should operate within each other, as the IT specialist remarked: *"Instead of it being a separate system, because often it is a stand-alone system on the side, It has to be a part of the current system. That it will be booked in the same booking system [...] It will be connected to the EHR system, and it will automatically be registered into the EHR and so on. So this integration is a crucial factor if this is supposed to be successful"* (Interview, IT1.R21). In this quote, it is emphasized on the importance of integration, a system used for telecommunication has to be integrated into the central EHR system (Saga). Otherwise, they risk continuity in their processes. For example, when a patient is booked for an appointment via a video call, it should be booked through the same booking system as a regular appointment. If it was a stand-alone system, the doctor might lose or forget the appointment because it is hard to keep up with different booking systems.

5.3.2 Change management

LSH has been facing slow uptake and adoption of telemedicine, and in this section, the analysis reveals factors that contribute to slow uptake. Inadequate integration initiatives, including training for all users and differences in technical competence, are the main factors contributing to slow uptake. In the following section, these barriers will be described and what possibly explains their reasons.

Speaking generally with the IT department manager at LSH about the integration and adoption of telemedicine, it was described that the rate of acceptance and adoption is slow and can partly be explained by how the initiative is introduced to users, and how the implementation strategy is

established. The IT department manager remarked: *"It is about how you integrate things into the clinical processes, that is what matters. It is here where most people stop. People sometimes think that just buying the technology they have solved the problem, but it is far from reality. What matters the most, and is something that people usually fail to do is that this will be integrated into how they work from day to day"* (Interview, IT1.R1). In the quote, the IT department manager emphasized the importance of pragmatic and practical integration initiatives. Even though the technology exists, whether or not the technology will be successfully implemented is more dependent on how it is introduced and integrated than the technology advancement itself. Inadequate integration initiatives at LSH include lack of training, education, and introduction of the technology being implemented. As the IT department manager remarks: *"Training and education in the hospital is very bad, that is just the way it is. It is worse compared to other places"* (Interview, IT1.R6). The IT department manager described the incompetency in education and training at LSH, which could, in part, be explained by governance problems. Many different managers are working on the same problems, but no one ever takes the responsibility and takes action, in this regard: *"I believe that here it is a governance problem. There are too many people working on it. The executive of doctors and nurses, human resources, and more. And then no one does anything intelligent"* (Interview, IT1.R6).

People's technology competence varies vividly, and it is an important factor to consider if the change is to be widely adopted within the organization. The Chief doctor of the DOC suggested: *"It is technology and then maybe one thing which is health literacy and technology literacy, if there will be someone who uses this [telemedicine], if this will be adopted."* (Interview, CD1.R7). In general, people who are not good with technology have a very low patience threshold for complications with technology. If they need to put in much effort to make the technology work, they tend to give up easily. With telecommunications, many things can interrupt the communication. The It department manager exemplified:

> *"Then there is also a problem on the other end, you have some patients that are not very used to computers and nothing happens. They do not know how to do stuff, and the mute button is on, and nothing happens, or there is a problem with the internet server, and there are some crackles in the mike. There can be a thousand things interrupting this, and the tolerance threshold is rather low with both patients and providers. So if these problems are constantly occurring, people just say no, no this does not work, I do not have time for this."*
>
> (Interview, IT1.R2).

Here the IT department manager gives some examples of common problems in telecommunication. A little disconnectivity in the internet server can create delays in the video call, so the communications can lag or create crackles in the sound. A common problem that occurs is that the mute button is automatically on, or people accidentally press the button, and people do not know how to switch it off.

These factors can create much frustration, and people quickly give up on it. All these factors seem to contribute to the adoption rate of telemedicine.

Furthermore, one of the specialists remarked that the incompleteness of the technology affects the conversation's quality. The technology has to work fast and smoothly in order for it to make sense: *"What I see maybe as a defect with telemedicine technology, is this you know, besides the technology itself [...] There is always some delay in the video call [...] The technology needs to work fast and smoothly, so it will work"* (Interview, SP1.R23). Furthermore, the specialist described the computer acting as a barrier in the conversation with the patient: *"You do not have the body language in front of you. People sit in a chair on a screen far away from you. And you know it is a little bit like talking to patients through an interpreter, the computer works as a barrier, like the third person"* (Interview, SP1.R23). The specialists described the loss of closeness with patients when using telecommunications. The computer is described as a third person in the conversation.

The IT department has realized the importance of integration strategies, training, and education. However, designing and using the right implementation strategy has been difficult. As suggested: *"You often hear like okay let's make some perfect implementation strategy, no matter if we call it telemedicine or messaging system, for example. It is not easy, you need to try it and test it and you do that with the pilot projects. In some cases, this works very well, and in other cases, it does not. You try it in a department that is interested, and you develop this further in collaboration with the department"* (Interview, IT1.R4). The IT department manager emphasizes the importance of implementing in collaboration with staff, ideally finding a smaller unit that is interested in the initiative and starting with a pilot project. The pilot project should emphasize on working in collaboration with the department, learning from the success and failures of the project, and translating it to other units and departments.

In the light of implementing telemedicine into the DOC, the IT department manager was asked how the implementation would be treated in their department. The IT department manager described: "*if we are doing a distinct implementation project, then we are very good at that. For example, let's say we are implementing a new ICU system, that is treated as a project in a specific place [...] It is a bit more complicated with systems that go across the whole organization"* (Interview, IT1.R10). However, the IT department manager further described: *"What we do not want to do is to design a unique solution for only diabetes patients. But preferably a more general solution, and that is what we have in mind for the telemedicine service for these [diabetes] patients, we want to be able to use that for the whole hospital"* (Interview, IT1.R12). This quote is describing that a specific solution for specific departments is something they want to avoid.

5.3.3 Operational management

There are certain barriers in the operating core of the hospital that might affect the implementation process. The business model for telemedicine has not been fully established, and staff, time, and funding

are limited resources. Furthermore, empowerment struggles can make innovative implementations difficult.

Procedures and processes for utilizing telemedicine at the DOC and in the whole hospital, in general, have not been fully established. One of the challenges to overcome regarding the operations around telemedicine is how it should be paid for. One respondent articulated: *"It is a question of how the business model is, is it the patient that should pay for the appointment that happens through the computer? Or is it for free? But how is the operational form in the DOC then? Or the organization for that matter"* (Interview, SP1.R25). It is clear from this quote that there are many questions waiting to be answered. There are complexities present in regards to how telemedicine should be reimbursed. That is further emphasized by the IT department manager: *"It also complicates things like how are you going to pay for this? The business model is not known; if you get a patient into your office, you can easily charge him, but if it is through Skype, it is not assumed that the patient pays. So you are dealing with all these problems that still have not been solved, and while that incentive is not there, do not you think it is more likely that the doctor wants to get you to his office?"* (Interview, IT1.R28). In this quote, concerns are described in regards to the incentives to use telemedicine. If the patient is not paying for online appointments, it is debated that there is no incentive for the doctors to encourage online appointments.

Staff, time, and funding are a limited resource in the Icelandic health care system that might affect the uptake and development of all implemented changes. HCPs at LSH are very pressed and usually have little time to spare. Therefore time to dedicate themselves to changes and participate in change processes is difficult. One respondent remarked: *"I know that with many other hospitals, they have more staff to do this, and it is done in a more structured way. It is often challenging to get the clinicians to come to meetings. But you know they often say: 'I am so busy, I do not have any time to learn how this works,' but then they are supposed to start using it the following day."* (Interview, IT1.R26). The quote is describing how difficult it is to get HCPs to show up to learn how to use something new. They do not have time, or they do not give themselves time to do it. Lack of staff resources is also a critical issue concerning IT implementation. As the IT department manager described: *"The number of people we have is way too low and is not increasing, but at the same time development in IT is going up"* (Interview, IT1.R32). The advancements in technology and the demand for technology is constantly increasing. However, staff resources are not increasing, which is a challenge in the implementation process.

Furthermore, they are facing a lack of funding; in fact, the hospital gets very little fundings for telemedicine projects. There is a lack of money everywhere in the hospital. However, funding is not the only problem when it comes to telemedicine, because the technology is there and is not the most expensive part of the implementation. As mentioned by one respondent: *"I think it is not only the money that is the problem because the technology is there more and less. It just needs to be better tuned in and*

fix some things, and that's not the highest cost " (Interview, IT1.R27). The IT department manager further described that the cost of telemedicine involves costs for more staff and training, as well as cost concerning implementation management.

In recent years, healthcare service has aimed to give patients more responsibility and engage them to take more part in their care; however, for some HCPs, it seems hard to hand over specific roles, and in most cases, it is an unconscious act. One respondent articulated: "*This is a conflict in the technological and electronic revolution. That digitizing processes lead to the empowerment of patients. It is just empowerment in its most transparent picture. You know your input, you have some role in there. But we also have to be aware that some people cannot do it by themselves, do not know how to or are simply too sick to handle this"* (Interview, X1.R8). This quote described the conflict between the professionalism and patient empowerment that has been happening along with the digitization of healthcare services. Along with the technology revolution they have more tools available to acquire knowledge and skills to self-manage but on the other hand HCPs have a hard time letting go of their professional role.

It has been described that in reality, it is a mixture of political and ethical conflicts about who should do what in healthcare provision, as one respondent describes: "*I believe it is the politics around professionalism and some ethical matters. This element of letting go of the role. Giving the users the steering wheel"* (Interview, X1.R9). This quote, emphasized that it can be difficult for HCPs to give more power to the patients in this new model of healthcare that is emerging. It is an entrenched culture among healthcare providers to take care of their patients by doing things for them, telling them what to do, and knowing better, based on their professional knowledge. As one respondent described it: "*Moving from the patient model and the professionalism model. Proceeding from this, "I know better than you," to saying, "you can do this, it is better that you do this yourself, and then I can process it"* (Interview, X1.R9). The respondent suggested that patients can, and should be more active participants in their treatment, and that it would be beneficial both for themselves and the HCPs.

Patients as well tend to take the role of being patients very literally, and some have no interest in being an active participant in their medical care or are unable to. This handover of professionalism is not very obvious, as all of the HCPs remark that they want their patients to become more independent and take part in their treatment. All of them want to have and use more technology in the care of patients. It can be interpreted from the data that this is the culture among HCPs. However, on the patient side, it is quite apparent that they are dependent on the HCPs. One of the patients described: *"I think two [appointments] times a year is rather little, I do not know why I just think so, it is just my opinion and I cannot really say why I have this opinion. I have a serious disease and you want to talk to someone that knows more than you"* (Interview, P2.R11). The quote indicated the patient's dependence on the HCPs. The patients both described a need for more frequent follow-ups and needing more interaction with the HCPs, based on the patients' evaluation of their condition.

5.3.4 The Regulatory Environment

The health director in Iceland has set rules regarding the use of telemedicine in healthcare services, and permission is needed to practice telemedicine. Current regulations about telemedicine in Iceland are the current GDPR, the general health regulations, laws regarding health care services, and medical recording. There are no specific laws for telemedicine per se. In regards to regulations and possible challenges, the example of the FL technology will be used to identify possible challenges and barriers relating to the regulatory environment for telemedicine technology.

First of all, regarding the technology that FL offers, certain things conflict with the GDPR. That has been one of the more significant problems in the implementation process of FL at the DOC, suggesting that this might be the case for other technologies acquired from global medical technology producers. The GDPR was changed last year and became more strict; the lawyers of the hospital have been trying to fit the FL system into the Icelandic health regulations and GDPR. This chapter will describe some of the challenges regarding implementing telemedicine solutions in the Icelandic healthcare system with a special focus on the FL system as a reference for other medical technologies.

There is a policy set by the government that delicate and personal information should be stored within the country borders. The hospital's lawyer confirmed that: *"We cannot forget that we are an island and all these cloud services and all that, there does not have to be anything major so that we will lose connection with the universe. We depend on overseas transport, so there are certain things we do not want to store outside of the country"* (Interview, LAW1.R13). This imposes some challenges for the hospital to adopt innovative technologies that are produced by foreing companies.

Another problem regarding the storage of the data and in regards to regulations about medical health recording. Data generated from the use of technologies like the FL system, where the patient creates data that is stored in a cloud is, in fact, health records. In Iceland, there are specific laws about medical health recording. LSH should record all medical data, and the records should be stored within LSH system. However, the solutions that FL offers, the patients can store their data in a cloud, and the data is stored somewhere outside of Icelandic jurisdiction. Furthermore, it is not entirely clear what exactly is done with the data. Described by the IT department manager: *"You know the company says that it is anonymous and all that, but you never know. You see that they are selling this data to pharma companies and in fact whoever wants to buy it. So this is a kind of privacy problem that has made it hard for us to implement this technology as fast as we wanted"* (Interview, IT1.R29). The IT department manager described concerns about what is being done with the data, relating to the GDPR laws. According to the GDPR, persons have the right to know what is done with their data. The barriers with GDPR have made it difficult for them to implement the solution that FL has to offer as fast as they wanted.

The devices that are used by FL are owned by an American corporation, Abbott Laboratories, a medical devices and health care company with its headquarters in Chicago, Illinois (*Abbot*, n.d.). Then there is a subsidiary that is in charge of the Freestyle Libre cloud and their other applications. However, there is much information that goes between these two corporations, and they permit themselves to share information with a third party member. When the lawyer at LSH tried to find out what is done with the data created by patients, it was difficult to get answers from the company. Therefore the lawyer assessed that it would not be responsible for LSH to make an account with the corporation because they can not be accountable for what happens to the data, nor can they say anything about what happens to it because they do not know. Thus, to be able to use the FL technology, the IHI pays for the devices and hands them over to the patients. Therefore LSH is a bit free of responsibility because they are not providing the technology. When the patients receive an FL device, the patients get a disclaimer to read, saying that the patients themselves own the data, they are responsible, and they choose to share it with their HCPs. As the chief doctor described: *"We have made a disclaimer that describes what is done with the data in the cloud [the patients] they [the patients] get a disclaimer that says, this is your data. Still, you can do this with it and it is your responsibility, and then they choose to share it with a provider, which is us [DOC]"* (Interview, CD.R13). The chief doctor described that when the patients receive an FL device, the patients get a disclaimer to read, saying that the patients themselves own the data, they are responsible, and they choose to share it with their HCPs.

The hospital's access to the patient's data is only if the patients decide to share the data with their HCPs, and for now, the patients can only give the HCPs reading access to their data. That is, physically showing the data to the HCPs by bringing it on paper or showing them on their phone during the appointments. However, when the patients have shown the data to a HCP, the hospital has become responsible for that data, as the hospital's lawyer described: *"All treatment data will be transferred into the EHR system, it is in the regulations about health recording, so we have to put everything into the EHR. Therefore this has become our process, and we become accountable for this processing. We concluded that we cannot be responsible through the FL system. They are, of course, responsible for the data they hold"* (Interview, LAW1.R14). Here The Icelandic health regulations are being emphasized. All health records and all treatment information have to be stored in the hospital's EHR system. Therefore when the patients show the data coming from their FL devices to the HCPs, data must be transferred into the EHR system. The hospital is not fully aware of what FL does with the data and not responsible for the information that FL holds. Therefore, they are only responsible for the data that the patient shares with them.

Another regulatory barrier, mentioned in the data, is the small size of the Icelandic market. Being so small means that the health care system in Iceland has weak bargaining power. LSH is in no position to make reasonable contracts, which can be exemplified by how they got access to the FL technology, which has already been discussed. The hospital's lawyer described: *"They [FL] weren't going to go*

into the Icelandic market, but we found a backdoor way to get it. So we are maybe a little powerless in regards to that [...] We are not a very interesting market, so we have to go our own way with certain things" (Interview, LAW1.R11). Because they had to go this backdoor way in getting the devices, they are powerless in their position to demand information or make any contracts. The company does not have any obligation to do so. The lawyer explained: *"Our bargaining power is much weaker than the NHS, for example. For instance, I reviewed everything [the contract] very well regarding FL, because there was a lot in the contract that didn't really make sense for me. They were not really open to listening to what I had to say"* (Interview, LAW1.R10). In this quote Iceland's weak bargaining power was described and compared to the National Health Institution (NHS) in England, which were able to make their exclusive contract with FL, as described by the lawyer: *"then I saw that NHS made their own contract with them [FL]. That's maybe our biggest problem, how small we are, and therefore we do not get much, we are a small market"* (Interview, LAW1.R10). The above discussion, describes that the size of the Icelandic market can be a barrier in negotiating with global technology companies.

5.3.5 Governance barriers

Throughout the interview process, the attitude towards the top management of LSH revealed itself to be slightly negative. The top management came out as distant, hard to reach, and unwilling to work with their subordinates. There is too much hierarchy in the management structure, which creates uncertainty of roles and responsibilities. When it comes to improvement and development, the staff experiences their needs are not being met, and it takes a long time to get something changed or implemented.

Good communication and easy access to top management were described by an external interviewee, working in the elderly care industry, as factors that characterize successful implementation. The interviewee remarked: *"It has been discussed that what characterizes us in the elderly care business is there is a shorter communication path to management"* (Interview, X1.R4). What is meant in this quote is the difference between the organizational structure in elderly homes and LSH. The organizational structure of LSH is much more extensive and complicated than at elderly care homes. Therefore, the pathway from subordinates to their superior is shorter. As the external interviewee described: *"We are ten managers in the elderly homes, and we are very motivated and willing. We act as one in developing the technology"* (Interview, X1.R4). The elderly homes are smaller units than hospitals. Therefore it has been easier for administrators of elderly care homes to work more closely with their subordinates to achieve their goal.

When it comes to improvements and development at LSH, the process is slow and difficult. In the eyes of the HCPs, it appears as the will from top management to work collaboratively to improve is non-existent. In the case of the DOC, the staff are willing to improve their processes and have been working on making their processes more efficient and encouraging the use of telemedicine. However, they lack

the support they need to accomplish their initiatives fully. One respondent articulated: *"Opportunities for innovation and improvements are very limited here, you are constantly running into brick walls. There is not much will to remove these walls out of the way. There is not much will for improvements. It is more about having very fancy meetings, but then nothing happens"* (Interview, SP2.R21). These *"brick walls"* they talked about came up repeatedly during the interviews, and indicated the staff's experience of how they can only go so far by themselves without top management's support.

Firstly, the staff experiences not being heard, and the top management does not emphasize their needs and ideas. One doctor described: *"They did not understand anything about what I was talking about and did not care to familiarize themselves with the patient group or the operations we do. And that is why they didn't understand anything. And then they did nothing"* (Interview, SP2.R22). In this quote, a doctor described their initiative to incorporate telemedicine in their service, as they see it highly relevant for their patient group. However, the top management did not even try to see their vision, nor did anything about it. Secondly, everything takes a very long time to process. First now, after three years of fighting with the top management, they are finally getting the opportunity to use telemedicine in their service processes. As one respondent said: *"Everything here happens at the speed of a snail"* (Interview, PT1.R10). This lack of reaction from the top management has considerably decreased the staff's driving force, and they have lost the belief of their ability to improve their service.

The information flow from the top to the bottom is insufficient in LSH's management structure. The IT department manager described a need for an additional layer in the management structure: *"We would need another line of people that would have the role of going into the department units, but we just do not have the staff resources for it, and that is a problem"* (Interview, IT1.R30). Here the IT department manager highlights the need for a separate unit, another layer in the organizational structure that would manage the implementation and change processes concerned with new technologies. However they lack the resources to be able to have that layer.

6. Discussions

This section will discuss our findings from the analysis that focused on answering our first three research questions. In this section, we will connect those findings to the literature and discuss how they could translate into a change management strategy at the DOC when implementing telemedicine. We will thereby answer our fourth and final research question. This section will also present some theoretical and practical implications and discuss the limitations of this research.

6.1 The need for telemedicine

As proposed by Kotter (1995), any successful change initiative starts with establishing a clear and compelling vision that emphasizes why there is a need for change, and its criticalness. Furthermore, identified by Whelan-Berry & Somerville, (2010), this is an obvious first step for any change process. Our first research question aimed to explore the identified need for change at the DOC concerning the implementation of telemedicine. Based on the literature, we argue that this need for change translates partly into the organizations change vision and if there is a mutual understanding by the organizational members for the need for change and urgency, that will amplify the acceptance of the change vision and result in lower resistance to change (Whelan-Berry & Sommerville, 2010). Our analysis revealed a considerable amount of issues and problems at the DOC that the HCPs identify as needing to be changed or improved. Our analysis focused on exploring the problems that telemedicine might solve. Five problems were identified: resource deficiency, lack of continuity, insufficient patient support, no shows, and lack of equity in terms of access to service. These issues found in the data were interpreted as a need for change to implement telemedicine into the existing service processes.

As a consequence of increased service demand, resource deficiency is a global trend in healthcare (Frankel et al., 2000). Our empirical data suggests that lack of resources is one of the fundamental problems that lead to other issues, in one way or another. The lack of resources results in the clinic not being able to meet the current service demand, which again results in a lack of continuity of care and insufficient patient support, which might explain the high rate of no shows. These issues were all identified by multiple staff members, suggesting that they are well aware of these problems and see the corresponding need for change. According to the data, there is both a lack of resources in terms of staff and space.

Although telemedicine by itself can not solve the problems of resource deficiency and the resulting lack of continuity of care, we suggest that introducing telemedicine service could increase the efficiency of the service by other means and ensure that resources are used more efficiently. Even though the HCPs describe lack of on-demand support and access to the clinic, the data also suggest that there are several communications platforms for patients to use to seek support. However, the problem is that they are too many and have not been clearly defined how they should be used. The work processes regarding these platforms need to be established and integrated to the existing service process in a better way. For

example, increasing patient support by offering on-demand service with telemedicine solutions would most likely translate into better self-management practices and earlier interventions that would, in the long run, result in better management of the condition and better clinical outcomes (Po, 2000). We argue that by making the patients more independent would decrease the demand for care and require less control visits. Studies have confirmed this; a systematic review on telehealth for diabetes self-management in primary healthcare showed that telemedicine interventions had positive effects on improving self-management practices by diabetes patients. Studies have shown that telemedicine interventions can significantly reduce HbA1c, reflecting the positive effects of telemedicine in the long-term care of diabetes patients (So & Chung, 2018). However, based on our findings there needs to be a balance between on-demand support from the healthcare provider and the independence of the patients, so that the service is not overused. That further emphasizes the need for defining and standardizing work processes around the on-demand service. Without that, the risk is that the demand for service will increase further, instead of decreasing.

We identify non-attendance by patients as another issue that offers opportunities for improvement with the implementation of telemedicine. Non-attendance can be split into two categories; short notice cancellations and no shows, where the patients do not report their absence. Our findings suggest that there are high rates of non-attendance by patients at the DOC, which causes frustration among the staff, who feel that their time is wasted when patients do not show up. At the same time, other patients are on waiting lists for appointments. Non-attendance by patients is a widely recognized problem in healthcare organizations. It has been linked to increased medical costs, as short notice cancellations cannot easily be replaced, leading to lost revenue, with no reduction in costs for labor and facilities. Studies have shown that when a patient with diabetes does not show up for an appointment, it does not decrease the overall number of appointments attended by that patient, meaning that the patient will reschedule the appointment at another time. Therefore, no shows will not only waste the time of the HCPs but also decrease the number of appointments available to other patients. Furthermore, studies have shown that patients that cancel their appointments usually attend more appointments than non-cancellers (Weinger et al., 2005). All this suggests that a high rate of no shows can directly result in higher demand. Therefore, as demand is already higher than the DOC's capacity, we argue that minimizing no shows as much as possible should be a top priority at the clinic.

One solution proposed to minimize the impact of no shows is offering same-day appointments in case there is a cancellation or a no show. However, schedules of healthcare organizations are often too packed to offer this possibility, and patients are hardly willing to wait around in case of an opening. By using telemedicine solutions, offering same-day appointments becomes a more realistic possibility and lets patients connect to their provider wherever they are in case of a cancellation (Murray & Berwick, 2003). This possibility was mentioned in the data by one of the informants as "flex-appointments". The DOC could increase the support to patients and use time and resources more efficiently by offering on-

demand support through flexible appointments. On-demand telemedicine is increasingly adopted by health organizations to meet patient demand for convenient, accessible, and affordable services (Sterling & LeRouge, 2019). Telemedicine can also be the solution to decrease no show rates. A common reason for missed appointments are problems such as lack of transportation and time or work conflicts (Sharp & Hamilton, 2001). Furthermore, it has been shown that patients who utilize telemedicine appointments save both travelling costs and time per visit and therefore, might be more convenient for some patients groups (Charpentier et al., 2011).

Finally, our data shows that service access to some patient groups needs to be improved. Patients living in rural areas do not have the same access to the service and will need to drive or fly long distances regularly for a control visit. That is a critical issue, as studies have shown that lack of access to specialty care for diabetes patients demonstrates more inadequate glycemic control for patients (Siminerio et al., 2014). One of the key drivers behind the growth and development of telemedicine programs has been the need to increase access to medical services in rural areas. Telemedicine has shown to increase the quality of local care and patient satisfaction by enabling patients to receive specialty care in their home communities and save money and time from traveling to seek specialist services (Nesbitt et al., 2000). The DOC has attempted to accommodate the lack of equity in service access by flying specialists a couple of times a month to the North of the island to attend to patients living in that area. Obviously, that is not an optimal use of limited resources.

From the above discussions, it is clear that the HCPs see the need for change and the benefits telemedicine could bring. Therefore, we argue that change leaders can quickly establish a clear and compelling change vision that is likely to be accepted by the organization's members. By focusing on the need and urgency to address the problems of increased demand and envisioning how telemedicine can increase efficiency, members of the organization are less likely to resist the change. Finally, the management and change leaders must be aware of the organization's capability to implement the envisioned change. The gap between the current state of the organization and the desired state in which they want to move cannot be too large and unrealistic, as that is likely to lead to change failure (Hitt et al., 1994). The organization needs to be ready for the change, and the change initiative aligned with their level of readiness for change, which should be incorporated into the change vision.

6.2 The current Organizational Readiness for Change for telemedicine

High organizational readiness for change has been associated with successful implementation initiatives. We argue that the level of readiness needs to be assessed before the change is initiated and re-evaluated throughout the change process. When formulating the change management strategy, the level of readiness needs to be taken into account, in order to realize what course of actions are necessary and how activities should be sequenced (Weiner, 2009). Our second research question aimed at describing how the current state corresponds to the ORC based on Weiner’s theory. That is, how the

current state at the DOC is described concerning the concepts of change commitment and change efficacy and how the function of these two concepts determines their readiness status. Although there are multiple tools and measurement scales available for determining ORC, we decided not to use them since they have not been tested enough for validity and reliability. Furthermore, as ORC is a context-specific concept, it is challenging to generalize specific tools to assess ORC in specific situations and cases. As our objective was to specifically investigate ORC for the case of DOC in a specific context, we analyzed the case based on Weiner's theory to evaluate rather than measure ORC. The goal was to identify low readiness factors that need to be considered when designing the change management strategy.

The first concept we analyzed concerning ORC was unity, referring to how the staff members of the clinic work together as a team. Our findings suggest that the team is divided and they are not working together as a team. They lack more formal establishments of objectives and defined roles. Concerning ORC, lack of teamwork is mentioned in the data in relation to the team's change capabilities, as a barrier for successful change. Although teamwork is not specifically mentioned in Weiner's theory, we argue that this is an important element, as collective behavior and beliefs are essential to establish ORC. The literature on group studies suggest that collective or interdependent behavior is a critical component of team interaction (Driskell & Salas, 1992). Furthermore, studies on healthcare innovations have shown that team dynamics such as motivation and teamwork are factors that contribute to successful change (Greenhalgh et al., 2010). Based on this, we argue that team dynamics and performance will give some indicators of the organization's members' ability to behave collectively. In the case of the DOC, lack of teamwork is likely to contribute to a lower level of readiness.

Based on our findings, we argue that the level of organizational change commitment at the DOC is relatively high. All of the HCPs saw the potential for the adoption of telemedicine and valued the change, although there were different individual reasons for the change valance. Some saw that implementing telemedicine could potentially solve some of their problems resulting from the lack of capability to respond to increased demand, while others saw it was beneficial for the patients themselves. Weiner (2009) argues that it is not so much about why they value the change but more that the members of the organization collectively value the impending change, and that will result in corresponding commitment. The member's motivation for change is reflected in either how telemedicine can solve their problems and make their work easier or how it would benefit their patients. We argue that these motives for change can be seen as an affective commitment, as described by Herscovitch & Meyer (2002). The employees want to support the change and value the intended benefits, which can be reflected as 'want to' motives. Weiner (2009) argues that want to motives reflect the highest level of commitment. However, we sensed during interviews that two respondents leaned more towards 'ought to' motives than the rest. Even though they saw the value and need for the change, it was reflected in their attitude and willingness to commit to changes in general that they felt obligated

to support the change. That might suggest that not all members have the same level of commitment to the change, which, according to Weiner (2009), can be problematic. In this case, the change leaders need to assess these differences in levels of commitment and focus on those who might feel less committed. That is important as differences in how employees commit to change can reflect on their work performance and how they will carry out the change (Herscovitch and Meyer,2002). That will subsequently result in a more successful change process.

The members of the DOC all valued the adoption of telemedicine in one way or another. However, their belief in their collective capabilities to successfully implement telemedicine was less noticeable. Therefore we argue that the change efficacy at the DOC is relatively low. There is a prevalent awareness among the HCPs in knowing what needs to be in place before implementing telemedicine. The members share a belief that if they can establish better work processes, teamwork, and share the same vision, they will be ready for using telemedicine. Based on these assumptions, these factors contribute to higher efficacy, as Weiner (2009) describes: *"implementation capability depends in part on knowing what courses of action are necessary, what kinds of resources are needed, how much time is needed, and how activities should be sequenced"*. However, there are differences in how much they value their ability to solve their problems together. Some members are optimistic and have faith in their collective capabilities to change. In contrast, other members have lost faith in the organization's capability of changing based on their past change-effort experience. Therefore we suggest this to contribute to low efficacy as proposed by Weiner (2009). ORC is higher when members of the organizations do not only want to implement the change, but they feel confident in their capabilities to do so.

Furthermore, it has been proposed by Weiner (2009) that if the members experience a lack of resources necessary for the change, the change efficacy becomes low. All the members consider that they lack resources to implement telemedicine successfully, and for that reason, they do not consider the organization ready at this point for the implementation. They need more staff, better technology, and better facilities. For example, one crucial factor is that they lack rooms to be able to operate telemedicine services. Different from other sectors, telecommunication can not be conducted just anywhere as special equipment is needed, and private and delicate matters are being discussed that need privacy. The patient room capacity is always fully utilized. Therefore a room is never free to add telemedicine appointments additionally to their current service capacity. That is a common barrier for clinics that want to implement telemedicine. As healthcare organizations usually cannot afford to allow telemedicine to take away the space needed to manage the existing in-person patient load. However, it has been suggested that space can be used flexibly to allow dual use of space, both for distance and in-person appointments. HCPs can be more willing to accept the use of telemedicine if it can be implemented into their existing space infrastructure (Makena & Hayes, 2011). Therefore we argue that the dual use of space could be beneficial in the initial phases of telemedicine utilization.

Furthermore, the members consider situational factors such as the time needed for the change and the political environment when they formulate their change efficacy measures (Weiner, 2009). The data suggests that they lack the time needed to be able to participate in the change process. Based on their current situation where they are continually racing time meeting the demand of patients, the members anticipate that they will not have the time and scope needed to dive into participation in the change process fully. Furthermore, the members experience little political will from the top management to support them in the implementation process.

Moreover, organizational culture can affect the members' change valance. It can either amplify or dampen the change valence based on whether or not the change fits or conflicts with the organization's cultural value (Weiner, 2009). The organizational culture at LSH is quite hierarchical, which is common in the healthcare sector because of the HCPs very defined and specific roles in the care process. Therefore, the DOC's staff do not always feel like they are working together in the same team towards the same goal. We suggest that this hierarchical culture might negatively affect the member's efficacy.

Another type of culture noticed in the data is a so-called 'Icelandic culture' which revolves around an Icelandic expression that says: "*It will be fine*". The expression describes the nation's "optimistic"-ness and overtrusting their intuitions. Even though some things are uncertain, they still move along with it and just trust that everything will be fine. However, that does not always turn out to be the case. Some initiatives can be put recklessly on foot without thinking the idea through. Even though the 'do' mindset can be positive in many professional sectors, the healthcare sector isn't one of them. Still, this culture is very rich in Icelandic people and reflects in the way they work, including the managers of LSH. With this mindset, projects are likely to be a failure. That can also be seen in the data by the member's experience of change at LSH, where they describe their lack of belief in successful change based on their past experience with change at LSH. Therefore we suggest that this culture is likely to affect the member's change efficacy negatively; as proposed by Weiner (2009), lack of belief in the organization's ability to change is in part based on the member's past experience (Weiner, 2009).

Finally, concerning how the HCPs formulate the change- commitment and efficacy, it is essential to take into account the patient care values of HCPs. It was evident that the value of the adoption of telemedicine is not as a substitution for the service that they provide now, but rather as an addition or a different kind of service that they can offer. Like one of the respondents described, the value of the service must not decrease with the change. That is important to keep in mind when implementing telemedicine at the DOC because if HCPs feel that the change goes against their long-standing patients care values; they are less likely to commit to the change and adopt new behaviors and practices. Therefore, change leaders need to focus on aligning the change with existing organizational cultural values and emphasizing how the change allows the HCPs to enact their values better and deliver high-quality care (Brett & Luciano, 2018).

Based on the above discussion of the current readiness at the DOC, we argue that the level of readiness is low because of low change efficacy and hindering contextual factors, even though the finding suggests that change commitment is high. Therefore, the change management strategy should focus on how to increase change efficacy and identify what other issues need to be resolved before fully implementing telemedicine to increase readiness and likelihood of success. We argue that by implementing small scale changes incrementally, the level of readiness for telemedicine will be amplified along the change process, constantly preparing the organization for more complex and radical changes.

6.3 Potential challenges and barriers preventing successful implementation

Organizational, technical, financial, and human factors are broadly reported to contribute to the failure or success of telemedicine implementation (Acheampong & Vimarlund, 2015; Doarn, 2008; Jennett et al., 2003)). The European Commission (2018) reported that telemedicine has had a slow start, mainly because of the challenging regulatory environment, insurance rules, disparities in healthcare systems, and user's social behavior. In the analysis, five different themes of challenges and barriers emerged: Technology, change management, operations, regulatory, and governmentality. The adoption of telemedicine at LSH has been slow, and can be related to inadequate implementation strategies and poor technical infrastructure. In the third research question, the aim was to identify possible challenges and barriers in the way of implementing telemedicine successfully. According to Jennett et al. (2003), the concept of organizational readiness for telemedicine is a multifaceted concept related to 'planning' and the 'workplace environment' readiness. We suggest that the challenges and barriers found in the empirical data are determined factors that contribute to organizational readiness for telemedicine. Thus, the challenges and barriers will be addressed in relation to either the 'planning' of the change or factors related to the 'workplace environment' (See Figure 4), and how they could be a challenge or a barrier in the change management strategy.

6.3.1 Planning readiness

When it comes to planning a telemedicine strategy, LSH has not been very successful in that matter. In our findings, the data indicated that implementation strategies are insufficient, as well as education and training when introducing telemedicine at LSH. The IT department manager repeatedly mentioned that the implementation strategy needs to be in place so technology can successfully be implemented, indicating that the strategic plan for telemedicine at LSH is non-existent. However, Jennett et al. (2003) suggest that the formulation of a strategic plan is one of the first and fundamental steps to go through when telemedicine is implemented. The strategic plan should include needs assessment and analysis, and plans about communication, implementation, and evaluation.

According to the data, implementation strategies at LSH do not seem to include needs assessment. Like already mentioned in the data, there is a clear need for change, and telemedicine holds promising

opportunities to solve DOC's problems. However, the DOC often experiences not being heard, and their needs are not being met by top management. One respondent said that they experienced that new technology is often dumped on them in total thoughtlessness and is nothing in line with what they needed, indicating the lack of needs assessment in the strategy development. The goal of the implementation has to be clear when creating the implementation strategy. The desired outcome should be clear from the beginning, and the strategic plan designed to get there, setting specific goals and frequent evaluation (Jennett et al., 2003). Based on this, we argue that planning a change management strategy is a vital first step, and needs assessment where the members are included in the decision-making process is essential in the change management strategy.

A business plan should be a part of the strategic plan, and is considered an important factor creating readiness for telemedicine (Jennett et al., 2003). A business model should define who their intended customers are, what value they expect to create, and how to generate revenue delivering this value (Acheampong & Vimarlund, 2015). LSH has not yet figured out their business model; in particular, there is a dispute in how to pay for the telemedicine service. That is, if and how the patients should pay for telemedicine appointments, and if not, the patients then who should pay. Patients pay in part out-of-pocket for in-person appointments shared with the IHI, and some argue why there should be any difference with telemedicine appointments. In the USA, most state Medicaid programs provide coverage and reimbursement for telehealth the same as in-person services (The Maryland Health Care Commission, n.d.) however, with some limitations (Faget, 2020). In Europe, governments have been careful in supporting the practice of telemedicine, in regards to how they are willing to reimburse and what is covered by health insurance (Fouquet, 2020). In Denmark, they have specific Diagnosis Related Groups (DRG) for some of the telehealth services (Danmark & Ministeriet for Sundhed og Forebyggelse, 2012). Others debate whether or not patients who pay out-of-pocket are willing to pay for telemedicine appointments, and at what price (Bradford et al., 2005). It has been proposed in the literature that without a sustainable business model, it is unlikely that telemedicine service will proceed past the development stage. The reason for that is that often telemedicine services are initiated with a pilot project and external fundings. Then further profitable revenue streams are not developed, which causes the service to become a commercial failure (Acheampong & Vimarlund, 2015).

When starting a telemedicine project, funding is needed to establish the technology. For example, to create the strategy and handle the strategy planning; to recruit a telemedicine coordinator that handles training and support; and a technical support coordinator (Jennett et al., 2003). However, the IT department manager of the hospital described that despite the newest health policies statement of allocating more funds to telemedicine implementation, there is still a lack of funding at LSH to be able to include sufficient training, technical- and general support. The data described that funding goes into forming committees to formulate strategies for telemedicine, and then fail to take it to the next step. The hospital's management seems to lack the accelerator to fully establish the initiatives and make it

sustainable. Therefore we suggest that LSH has to account for what value the telemedicine initiative is creating, both at an individual and organizational level, so it will continue to receive funding. Furthermore, they need to develop a profitable revenue stream so that the telemedicine initiative will become sustainable.

Suggested by Jennett et al. (2003), leadership readiness is about having someone who is leading the change initiative, and sometimes it is talked about leaders in the form of program champions. In healthcare, two types of program champions have been identified as crucial for organizational readiness: clinical/provider champion and senior-level champion. That is, individuals within the organization that are selected to facilitate the change, both at the provider- and senior management level. We argue that in the case of the DOC, the chief doctor acts as the provider champion. The chief doctor is very encouraging and optimistic about the clinic's ability to implement telemedicine. The staff at the DOC describe good communication with the chief doctor, and they trust his management abilities. However, they lack their senior-level champion, as collaboration and support from the top management in implementing telemedicine are exceedingly insufficient. For a successful change implementation, both top leadership's support and support from other leaders throughout the organization are essential (Whelan-Berry & Summerville, 2010).

There is too much hierarchy in the management structure at LSH. The information flow from the top to the bottom has to travel a long way. Every request for something to change at LSH takes a long time, and implementation processes are slow, and success is difficult to achieve. In the case of the DOC, the HCPs are the ones who see the need for change and are initiating the change, but they are not working collaboratively with the top managers. According to Mintzberg's (1983) theory of organizational structure, this kind of organizational structure makes it challenging to implement changes. Furthermore, due to the power of expertise of the clinical professionals, the managers have limited control. This power dynamic can make it even more challenging to implement change as managers and professionals have to be a part of the decision making (Andreasson et al., 2018). In the case of LSH, where there is a considerable distance from the top to the bottom in the organizational structure, it leads to a lengthy decision-making process. We argue that there is a need for an additional middle layer in the hierarchy that links the top management structure to the front line workers. For instance, when implementing technology, this middle layer would take part in the implementation process. They would get feedback from the staff in the front line and report it back to the top managers to speed up the decision making process.

6.3.2 Workplace Readiness

As suggested by Jennett et al., (2003), the workplace environment must be ready to implement the telemedicine and cope with the changes present in their workflows. The workplace readiness divides into two components. Firstly human resources need to be ready for the change, which includes preparing

the staff, having a telemedicine coordinator, and change management readiness. Secondly, structural factors need to be ready and in place. That is, the workplace has an appropriate environment for the technology and equipment needed for telemedicine. Furthermore, themes related to access and policy are essential for the implementation strategy planning.

Preparing staff for the implementation, with appropriate introduction, training, and continuing support, is vital to increase readiness for telemedicine (Jennett et al., 2003). Further suggested by Scott Kruse et al. (2016), barriers to implementation could be overcome through training and change-management techniques. However, our data described that, in general, education and training are insufficient when it comes to implementation at LSH. Further, our findings suggest that slow adoption contributes to variation in technical competence among HCPs. Studies have shown that variation in technology competence further enhances the need for training (Pettersson, 2018). The skills and requirements needed for the change should be identified early in the change process so that appropriate training programs will be included in the change (Eisenstat et al., 1990). Ideally, recruiting a telemedicine coordinator has shown to increase readiness in organizations. A telemedicine coordinator is a person that knows the equipment, works temporally with the clinic in the implementation process, and transfers knowledge to the staff (Jennett et al., 2003). However, as our data suggest that there is a lack of staff resources in every department at LSH, it is unlikely that staff will be available to take on the responsibility for the training and the role of a telemedicine coordinator. Lack of staff resources remains a significant barrier at LSH, and whether that is because of lack of funding, or a governance problem is up for debate. We argue that with the status quo at LSH, inadequate introduction and training will remain a barrier to a successful telemedicine implementation.

Studies have suggested that one of the top barriers to telemedicine implementation is specific to technology (Scott Kruse et al., 2016). That said, the technical infrastructure at the DOC is not making the implementation of telemedicine easy. Firstly the computers in use are old and do not include video cameras, which means that they would need to update their computers for telemedicine to be possible. Secondly, the computer system does not include a forum that can receive data from patients' monitors. For example, the patients have to bring the data physically to the appointments, on paper or digitally, or bring their monitor to the appointment, and the doctor loads the data into an unofficial hospital computer. This process can genuinely slow down the clinical process as the loading of data can sometimes be problematic and take a considerable amount of precious time from the HCP. Studies suggest that having the right equipment has been identified to be a significant barrier to implement telemedicine (Scott Kruse et al., 2016). Therefore we argue that the current technical environment at LSH is not ready for telemedicine. For the DOC to be ready for implementing telemedicine, the technical infrastructure has to be updated to a more appropriate level.

Another challenge is their market access to the technology due to Iceland's small market size. Jennett et al. (2003), suggests that access to technology is another crucial factor contributing to workplace

readiness. In the analysis, the example of getting access to the FL system is an excellent example describing LSH's lack of market access. Because of the small market size, they were in an inconvenient contracting position, where they could not make a contract with the FL company. Therefore they could not get full access to all functionalities the FL system had to offer for health care providers. We suggest that market access could be a challenge in other change initiatives in the Icelandic health care system when acquiring new technology from global technology companies.

One aspect that is not covered in Jennett's (2003) model is the conflict between the professionalism and the empowerment of the patients. This is a very interesting discussion and therefore we argue that it is worth including and accounting for when implementing new technology with the aim of increasing the patient's independence. Some have introduced this concept as 'co-care' that emphasizes the role of the HCPs as complementary to the patient's own resources to self-manage. It is argued that to put co-care into practice includes moving from profession-centeredness to patient-centeredness. Changing the view of how care is approached, from care being transformed as an input of product to viewing care as linking needs and knowledge together. This requires behavioural and attitude change among HCPs. Information and communication technology act as enablers to allow knowledge to be created, shaped, shared and applied between HCPs and patients, with the result of achieving better clinical outcomes (von Thiele Schwarz, 2016).

Based on the discussion above, the lack of needs assessment, undeveloped business plan, and hierarchy in the management structure is likely to propose challenges and barriers in the strategic plan-making. Further, the workplace environment proposes several challenges and barriers likely to hinder successful implementation that should be considered in the change strategy. We suggest that funding is needed to establish sufficient training programs, and the technical infrastructure needs to be updated in order for the workplace to be ready for telemedicine. Finally, we argue that challenges and barriers will exist in all implementation attempts, however, identifying anticipated challenges and barriers, in the beginning, can help to accelerate the change process by structuring the change strategy to overcome them. However, there are likely to be some unforeseen challenges and barriers along the change process. We propose that they should not be seen and framed as a brick wall hindering the process, but rather a bump in the road necessary to overcome to continue the journey to a successful change.

6.4 The acceleration of telemedicine adoption due to COVID-19

At the time of data collection, the novel coronavirus had started to spread in Iceland. A few days after we had finished the data collection process, the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) outbreak as a pandemic. Since ORC is a context-specific construct, the COVID-19 pandemic might have altered the state of readiness in the case of the DOC. In fact, that possibility is quite likely as in response to COVID-19. To reduce the risk of transmission, telemedicine, particularly video consultations, has been promoted and scaled up in many countries

(Ohannessian et al., 2020). Similar to our findings in this study, the telemedicine business has had a slow start in other places in Europe because of an unfriendly regulatory environment, patient's unwillingness, disparities in healthcare systems, and insurance regulations. However, because of the COVID-19 pandemic, governments set aside some problems with regulation to speed up the utilization of telemedicine. Furthermore, the pandemic forces the people to change their social behaviors and accelerate their change in habits (Fouquet, 2020). On that notion, others worry that due to the Covid-19 virus, the telemedicine technology becomes too much of a business trend. Telemedicine must be used with judgment and the spread of the coronavirus should not be an excuse to market telemedicine (Fouquet, 2020).

Many private clinics and health care organizations in Iceland have implemented digital solutions to communicate and monitor their patients as a response to the COVID-19 pandemic ("Aukin Fjarheilbrigðisþónusta", 2020) (Sjúkratryggingar Íslands, 2020). The LSH has also been accelerating their adoption of digital solutions. For example, a COVID-19 outpatient department was founded to support patients diagnosed with the coronavirus, to monitor and treat them at home remotely. The hospital signed a service contract with the health technology company, Sidekick health, which has developed a mobile app to allow healthcare providers to monitor patients remotely (Landspítali, 2020). Sidekick is a digital therapeutics platform, created to remotely support people with a variety of chronic illnesses, including cardiovascular and inflammatory diseases. However, in response to COVID-19, Sidekick adopted its platform to take the pressure off overburdened hospitals and healthcare clinics and is working now with LSH to provide a nationwide COVID-19 support program to triage remotely, support and manage infected individuals in home isolation ("Sidekick," n.d.).

The current situation with COVID-19 has also put pressure on the regulatory environment and the reimbursement system in Iceland. On the 20. March 2020, IHI announced that they were working on improving the service access of patients during the COVID-19 situation by making additional service options available such as telemedicine. The IHI announced that they would reimburse healthcare providers for providing telemedicine services such as phone calls and video consultations, with specific conditions set by the Director of Health (Sjúkratryggingar Íslands, 2020).

Considering the above discussion, it is likely that ORC's context has changed since the data was collected. We argue that in regards to COVID-19, organizations should be more ready to implement telemedicine. The COVID-19 pandemic has created a momentum for the adoption of telemedicine, and organizations should use that as a point-of-departure for the telemedicine's journey. Furthermore, it will be interesting to see how the business around telemedicine will evolve and if they will manage to keep up the acceleration and sustain the change in social behavior and habits.

6.5 Theoretical Implications

Based on our findings from this project, we identified that there are a variety of existing measurement tools that measure the level of ORC and theories that address this concept. However, there is a gap in the literature that provides information on how organizations can use the results of measuring the ORC to increase the readiness and how the level of readiness should be translated into the change management strategy. We suggest that organizations should start their change process by evaluating the ORC. The ORC should be translated into the organization's change vision, the beginning of the change process, to manage change expectations. The gap between the current state of the organization and the desired state in which they want to move cannot be too large and unrealistic, as that is likely to lead to change failure. The organization needs to be ready for the change, and the change initiative aligned with their level of readiness for change, which should be incorporated into the change vision.

Based on their change vision and ORC, the organizations should choose the appropriate level of change activities to start with. That is, organizations should start with implementing small scale changes incrementally, which will amplify the level of readiness for telemedicine along the change process, constantly preparing the organization for more complex and radical changes. Therefore the change management strategy should be designed based on the member's level of readiness at each point in time. By breaking down the change's objective to a more small scale change, the organization becomes incrementally ready for more complex implementation. Therefore the ORC should be evaluated frequently after each small change initiative and fitted to the change management strategy. As the ORC will, therefore, change over time, we furthermore argue that change management strategy is not static but should be constantly re-evaluated and adjusted to the level of readiness at each time.

Based on these suggestions, future research could investigate how translating ORC to change management would affect the success or failure of change initiatives.

6.6 Practical implications

From the above analysis and discussions, it is evident that many areas need improvement in the DOC's daily operations; therefore, many practical implications can be drawn from our findings. In the below discussion, we will identify the main practical implications that the DOC should consider on the journey to telemedicine.

6.6.1 Change management guidelines

First of all, as clearly indicated in our research findings, lack of resources is the most significant problem that the DOC is facing. They envision that telemedicine is the key to their problems, and will result in more manageable service demand. However, our findings suggest their capabilities for change are insufficient, mainly due to lack of resources. Therefore, we argue that without adding more resources, that is human resource and facilities, they will not be able to successfully implement telemedicine. We

suggest that they will either need to hire additional workforce or free up some time for the current resources by outsourcing some of their operational activities. One possible activity that could be outsourced is the T2D care. T2D care is already managed in primary care organizations in Iceland, but for some reason the DOC is still seeing a bulk of this patient group. We suggest that the DOC should fully outsource the care of T2D patients to the primary care organization, but provide them with speciality consultation and support with difficult cases through telemedicine. By doing so the DOC would free up more resources to commit to the change process of telemedicine.

Second, it is very clear that they need to establish clear objectives with the implementation of telemedicine. The objective of every organization is always to increase efficiency. However, the saying of "increasing efficiency" has become a buzzword of management that does not have any real meaning to HCPs, who care more about the value of the service to the patient. Of course, they want to increase their work efficiency, but at the end of the day, their main goal is to provide better quality of care for their patients, which means the efficiency needs to increase. However, it should not be presented in that way to HCP. We argue that it is crucial to frame the change objective in a way that is appealing to the HCPs and has real meaning for them. That should further be incorporated in the change vision, along with the reason for why the change is needed.

Third, we argue the importance of including the HCPs in the change process from the beginning. In order for a successful change implementation, the participation of the HCPs at the DOC in the change process is vital. Since LSH is a hierarchical organization with high autonomy and power of clinical staff (Mintzberg, 1983), having the staff involved in the change process will be crucial for the successful implementation of telemedicine (Erlingsdóttir, 2017). As suggested in the data, the HCPs have been the receivers of change rather than active participants in the process. Their past change experience has lowered their confidence, and they have little belief in the organization's ability to change. The solution could be to put the staff at the wheel to increase the confidence and believe in their capabilities to a successful change. As proposed by Erlingsdóttir (2017), change is more likely to be successful and sustained if management coaches the process and initiates the change by recognizing the problem and then letting the staff define the problems, develop solutions and drive the change process to solve the problems. Therefore we emphasize on using participative change management style, where the HCPs are active participants in the change process.

Fourth, there is a significant communication barrier between the organization's structural layers, and front line workers do not feel that they are being heard or their problems recognized by top management. We argue that this is an organizational problem for the whole hospital that needs to be addressed, as this will be a barrier for any improvements that are initiated by front line workers, because these two layers are not communicating well enough. Furthermore, there are also the problems of training and education when it comes to implementing new technology. As recognized by the IT department manager, technology is usually not the problem when it comes to implementation. Instead, it is about

the human and behavioral factors and the need for integrating the new technology into the existing work processes. This is currently not being done in an effective manner and is not the responsibility of the IT department, and therefore no one takes accountability for it. We suggest that there should be an additional unit in the organization that connects IT, management, and front line workers, that is responsible for driving the change process through training and implementation activities.

Finally, we argue the importance of prioritizing change activities based on value and complexity. It is evident that the DOC faces problems that are likely to be a barrier to the successful use of telemedicine. Therefore we argue that it is important to prioritize the problems based on their complexity and value in order to solve more complex problems in the future. Weiner's theory also supports this suggestion, as he described: *"implementation capability depends in part on knowing what courses of action are necessary, what kinds of resources are needed, how much time is needed, and how activities should be sequenced"* (Weiner, 2009). The organization might be ready for a more simple solution at this point in time. However, with incremental implementations of smaller change activities, the organization becomes increasingly ready for more complex problems. This process shall be looked at as a constant iterative process, with the change objective broken down to a series of smaller activities that continuously produce higher ORC levels. Even though there should always be a defined objective with every change process, the process of improvement does not have any designated endpoint as the objectives will evolve with time, and the process of improvement should never end. With this in mind, we present a value vs. complexity matrix that could be of use for the DOC when deciding how to prioritize their change activities to reach their objectives.

Figure 10 explains how the problems at the DOC should be paired with a possible solution. Then it has become an *'activity'* that is evaluated based on its value and complexity. Activities are then fitted within the matrix (Fig 10) to find the activity of the lowest complexity and highest value (the upper right corner of the matrix) and is most relevant to start implementing. Thereby, starting with activities that are high value and easy to implement it will clear the way for more complex high-value activities to be implemented with less complexity. Therefore activities of high value that started as highly complex activities become less complicated.

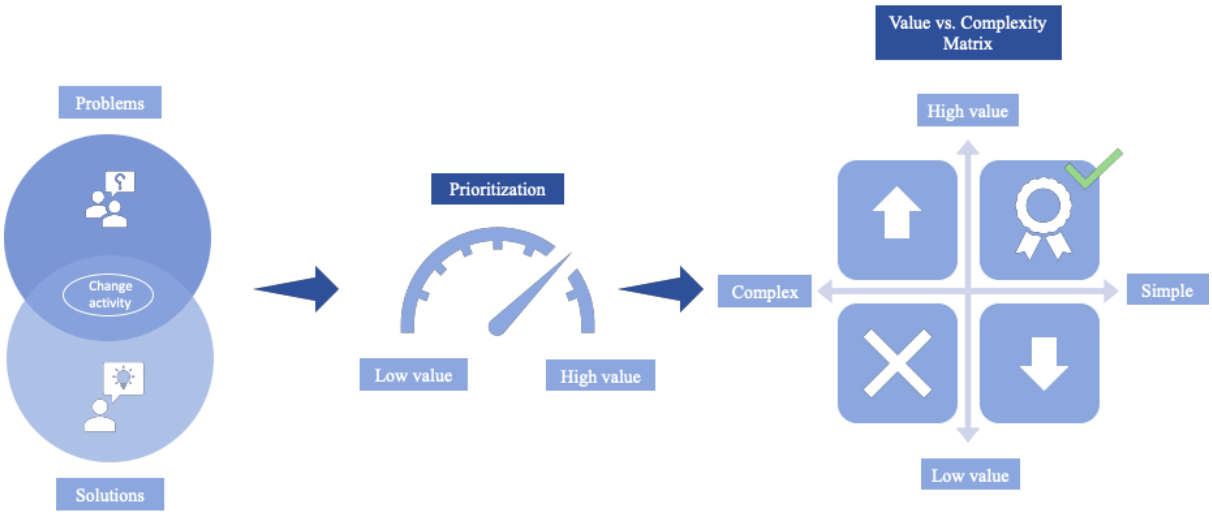

Figure 10: Value vs. complexity matrix

Source: Own creation based on model from H2I (Health Innovation Institute)

6.6.2 The journey of telemedicine

Based on the future vision presented by the chief doctor and at the current state of ORC, the DOC is far from being ready for AI-based prioritization of patients. We suggest that the road to that desired state should be split into several phases to align better the current level of readiness to their objectives. We suggest that the journey of telemedicine could be divided into four phases, presented in figure 11. However, it should be noted that this is only a visual simplification of a more complicated change process and the timeline is only an estimation and would need further investigation to predict its feasibility.

Figure 11: The roadmap to the future

Source: Own creation

We suggest that the first phase of the change process would be to implement telemedicine services to the rural areas. First of all, there is a high pressure for improving equity in terms of healthcare service in Iceland, and therefore we argue that a political will exists for this activity. Second, the value of telemedicine is higher than for other patient groups, as this would mean that patients would save time and money in terms of traveling long distances and receiving specialized services in their home communities. Furthermore, this would mean that the DOC's specialists would not need to travel to the north a couple of times a month and could save valuable time. We suggest that this should be implemented as a pilot project for patients who show a high willingness to adopt new technology. From the pilot project, the telemedicine service to rural areas could be standardized

In the second phase of the change process, we propose implementing telemedicine as an on-demand service for patients. We speculate that there is a proportion of the patient group that telemedicine appointments might be more suitable for, such as younger patients with smaller kids and patients who are still active members of the workforce. By using telemedicine appointments, this would save them time not having to physically go to the DOC, as they would not have to take time off work, and more. This service could also be used for urgent appointments to attend to acute problems that the patients might have as well as flex-appointments in case of late cancellations and no shows. The pilot project in the first phase could serve as a trial and run for the implementation of this second phase. With that, the DOC could learn from its failures and successes.

In the third phase, we propose that telemedicine services could be integrated and standardized to the existing service process. Patients would then have yearly control appointments with a specialist, but in between, they would get a physical or telemedical appointment with a nurse. If they would require further assistance, they could utilize the on-demand or flex-appointments.

In the fourth and final phase, we suggest that AI could become a part of the service. By utilizing AI technology, the DOC would be able to sort patients based on clinical outcomes and health risk assessment to capture those individuals that need further guidance and support to meet the treatment goals. Those individuals that are in more risk or have poor health status could be monitored more closely by the HCPs than those who are doing good and can contact the service system based on their needs. That would allow the DOC to prioritize resources they need to attend to those who most need it and therefore decrease the service demand.

6.7 Limitations

There are several limitations of this research. First, our sample included a limited number of patients and there for patients readiness for change could not be fully evaluated. An attempt was made to establish a focus group of diabetes patients, but because of COVID-19 that did not become a reality. Furthermore, COVID-19 made it difficult to get in contact with more patients. We recognise that it is important to include more patient perspectives before implementing telemedicine at the DOC to further

understand their need and readiness levels. The patients are end-users of the technology and become co-creators of the service along with HCP. Therefore we suggest that DOC should investigate patient readiness before initiating the change process.

Second, we wanted to include more senior management perspectives in our research. We attempted to get in contact with them several times, but as executive leaders of a large healthcare organization this stakeholder group at this time was busy dealing with the COVID-10 outbreak.

Third, this study did not include the investigation of the financial aspect of telemedicine, which nonetheless is a crucial factor to the implementation of telemedicine as discussed earlier. Further investigation into funding, business plan, costs and reimbursement is needed to fully design the change management strategy.

Finally, we did not utilize the full strengths of a case study and could have incorporated more sources of data, for example quantitative process data, that could have further supported our arguments. Our case study used two sources of data; primary data gathered with interviews, and the secondary data from DOC's internal documents as well as public documents.

7. Conclusions

This research aimed at investigating the need for change, the ORC, and identifying possible challenges and barriers when implementing telemedicine at the DOC. The findings from these investigations were then translated into how the change management strategy could be designed.

Five main problems were identified in the empirical evidence that can be translated into change vision as need for change when it comes to the implementation of telemedicine at the DOC. First, there is a lack of resources that is affecting the DOC's capability to meet the service demand. This affects further the quality of the service through lack of continuity of care and patient's access to support, which is seen to be partly solved by the implementation of telemedicine. Furthermore, telemedicine offers possibilities to minimize the impact and rate of no shows by offering flex-appointments and on-demand service access. Finally, telemedicine is also an opportunity to respond to the need to provide better equity in service access to patients living in rural areas by offering them the possibility to connect to their health care provider and receive specialty service in their home communities. We argue that these factors contribute to the need for change that should be included in the change vision for future telemedicine change programs, as presenting a strong need for change will increase likelihood of change acceptance.

Based on Weiner's theory the current state at the DOC was evaluated considering factors that contribute to the change commitment, change efficacy, and contextual factors. The lack of unity among the members at the DOC was considered to negatively affect the clinic's capability to change and lower the readiness of the organization to implement telemedicine. The change commitment at the DOC was considered high, as all the HCPs saw the potential value for implementing telemedicine. The change efficacy at the DOC was considered low. Even though the members of the organization seemed to realize what it takes to implement telemedicine and the sequence of activities, they lack resources in every possible aspect to be able to implement telemedicine. Furthermore the contextual factors contribute to lower readiness of the organization. There are no resources available for the members to participate in the change process, and participating in the change process means that it has to be a trade-off for meeting their service demand. Finally, organizational culture, policies and past-experience affects how members of the DOC formulated their change- commitment and efficacy, both negatively and positively.

A number of challenges were identified in the case of DOC when it comes to implementing telemedicine in the Icelandic health care context. These challenges and barriers are related to technology, change management, operational management, regulatory environment and governance. We argue that it is essential to account for these challenges and barriers when it comes to designing the change management strategy and make a plan to overcome them before initiating change.

We argue that the assessment of the need for change, ORC and the potential challenges and barriers should be incorporated in the design of the change management strategy in order to ensure successful change implementation. In the case of the DOC, change leaders should use the obvious identified need for change to establish a clear and compelling change vision. The data suggest the level of readiness for telemedicine to be low at the DOC. Therefore, the change management strategy should put focus on increasing the readiness before telemedicine's implementation to increase the likelihood of success. We suggest that the gap between the current state and the desired state cannot be too significant. Starting with small scale implementations, that are high value and low in complexity will incrementally minimize the gap between the current state and desired state, and increase the likelihood of successful change. Finally the identified challenges and barriers should be encountered in the change management strategy and precautions made to overcome them.

To conclude, by including a clear vision based on the need for change, the level ORC and a plan to overcome challenges and barriers in the design of a change management strategy, the organization could increase their likelihood of successful telemedicine implementation.

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9. Appendices

9.1 Examples of available ORC measurement tools

TOOL/INSTRUMENT	AUTHORS	DESCRIPTION	VALIDITY & RELIABILITY TESTING	OTHER LIMITATION
OR4KT	Gagnon et al., 2014	Measures organization's readiness for change according to six dimensions: contextual factors; change content; organizational climate for change; leadership/participation; organizational support; and motivation.		
TCU - ORC	Lehman et al., 2002	Measures ORC with an 118-item instrument that covers four dimensions: motivation for change, adequacy of resources, staff attributes, and organizational climate. These four dimensions further consist of 18 sub-scales.	Its validity is promising, reported the highest instrument validity out of 26 in a systematic review from Gagnon et al. (20014) and the only instrument that reported a reliability score.	The instrument was developed for the substance abuse and health services field, however alternative versions have been made for other fields.

ORIC	Shea et al., 2014.	Based on Weiner's theory of organizational readiness for change. Their studies provide psychometric evidence for a brief yet robust measurement tool. Their aim was to enable testing of theories about determinants and consequences of organizational readiness.	The tool is promising, however further assessment is needed regarding the convergent, discriminant, and predictive validity .	
ORCA, BASED ON THE PARIHS FRAMEWORK	Helfrich et al., 2009	The promoting Action on Research Implementation in Health Services, or PARIHS is a theoretical framework used as a guide to implement evidence-based clinical practices. They introduced an Organizational Readiness to Change Assessment instrument (ORCA) based on the core- and sub elements of the PARIHS framework. The ORCA surveys consist of three major scales based on the three core elements of the PARIHS framework: Evidence, Context, and Facilitation, and the surveys consist of 77 items in total.	Poor reliability in use, and additional validation is needed.	The scales fail to measure some important factors and the scales are rather extensive.

NOVEL QUESTIONNAIRE TO ASSESS THE STAGES OF ORGANIZATIONAL READINESS	(Stamatakis et al., 2012)	Their aim was to describe the development and potential use of a novel survey instrument to measure the level of organizational readiness for evidence-based interventions, and design it to be brief and easy to use. The survey instrument was developed based on the frameworks from the Diffusion of Innovation and public health interventions. A group of experts formed for the study developed a set of 26 questions with four domains, and they focused on user-friendliness of the questionnaire using as few items as possible. This instrument is brief, takes on average six minutes to complete.	It is validity needs to be further tested.	It is designed to help practitioners to assess readiness for evidence-based practice specifically in chronic disease prevention programs.

9.2 Interviews

Interview guide HCPs

We are master students from Copenhagen Business School, and we are currently working on our thesis project in the program Business Administration and Innovation in Healthcare. We are looking at how telemedicine can be brought into the outpatient service for diabetes type 1 patients using data that the patient collects himself at home using glucose monitors.

We will record the interview, and then the interview will be transcribed for analysis in our project. When that is complete, the record is destroyed. Your name will never appear in the data, and the information used in the thesis will not be able to trace back to you.

Furthermore, we ask the interviewees to sign an informed consent, agree to participate in the interview, and give consent for the data to be used in the project.

Topic/theme	**Objective**	**Questions**
Warm up	Get to know the respondent, demographics	**Can you tell us about yourself and about your work here?** . Age . How long have you worked here? . What is your role? **Can you describe what you like most about your job.**
Current state/process mapping	Understanding the process as it is today.	**Can you tell us about your role in the treatment of patients with DM1** · When do you meet them and for what purpose · For how long, do you on average spend with each patient? What happens during that time · Is there anything that you wish you had more time for when you meet the patient?
Value	Value stream mapping. Identifying value adding activities and non-value adding activities. Where can telemedicine add value to the patient care?	**Can you describe how you feel that you create value for the patient?** · What is the most important aspect of your job in your opinion ? · What is less important **?** · What do you think that the patients feels adds the most value to their care **What in your opinion defines quality for the patient?** **How important do you feel that it is to meet the patient in person?** · How important is it to you? · How important do you think it is for the patient ? · Is it always important? **Do you feel that your time is well spent when you meet the patient? Why/why not ? Can you describe that for us** · Do you have an example? **Can you describe the kind of questions patients ask?** · Is it often the same questions? · Do you feel that you repeat yourself a lot to the same patient or b/w patients.

Need for change	Does the respondent see the need to change the service? Why and how Do staff members have the same vision on what needs to be changed and why?	**Can you describe the service as it is today** . What is successful ? . What is less successful ? **Do you see any need to change the service as it is today? Why/Why not ?** · If yes – how should it change ? · Can you describe how you think it could improve.
Future state/vision	How does the respondent see the future at the department? Do staff members have the same/similar vision for the future? What is their opinion on telemedicine?	**How do you see the service change in the future?** · What will change – how ? **Have you heard of the concept telemedicine?** **Can you describe the concept and what your opinion is?** · Do you think that telemedicine could be beneficial to the service of this patient group? How ? · Have you thought about how telemedicine could help your role? Can you describe it? · How do you think that your job will change if more telemedical solutions would be adopted in the service?
Individuals **Readiness to change**	**Intrinsic factors affecting the readiness:** motivation, beliefs and values, characteristics **External factors:** management support, empowering leadership, social support?	*Individual characteristics, beliefs, values* **What is your thought on changes in general ?** · Do you fear change? · Do you propose change? · Do you encourage your coworkers to commit to change ? **How much do you value innovation?** *Trust in management:* **Can you describe the relationship that you have with the management ?** · Do you trust them? · How Is the cooperation · Can you describe the information flow between you and management ? · Do you feel like the objectives of changes have been well communicated and are clear? · Do you get information without asking for them? · How easy is it to get information from management? Are they accessible ? *Job satisfactions:* **Can you describe how happy you are in your job?** · How do you feel at the end of the day when you go home? Are you satisfied with what you have accomplished ? · What do you like most about your job? · What do you like least?

Organizational readiness to change	Past change experience of change Change commitment Change efficacy Organizations readiness to change	*Past changes* **If you think back to some recent change here at the department , can you describe the change process?** ● What kind of changes? ● Radical vs. Incremental? ● How did your role change? Did your job change in any way ? ● How did you feel the implementation went ?Was it successful/not successful? ● Are the changes still sustained? ● In your opinion, what does it take for you to commit to change? What needs to be in place at the department/hospital? ***Proposed change*** (give example of implementation of telemedicine – the vision of management) **What would it take to implement this kind of change ? Is something missing before the department can commit to this change in your opinion?** ● Do you have the resources to change? ● Do you feel like you have the time to adopt new technology? ● Are you confident that you will be able to implement a change like this? Describe why. ● Are you ready to commit to the change that implementing telemedicine would take?

Interview guide - Patients

We are master students from Copenhagen Business School, and we are currently working on our thesis project in the program Business Administration and Innovation in Healthcare. We are looking at how telemedicine can be brought into the outpatient service for diabetes type 1 patients using data that the patient collects himself at home using glucose monitors.

We will record the interview, and then the interview will be transcribed for analysis in our project. When that is complete, the record is destroyed. Your name will never appear in the data, and the information used in the thesis will not be able to trace back to you.

Furthermore, we ask the interviewees to sign an informed consent, agree to participate in the interview, and give consent for the data to be used in the project.

Topic	**Goal**	**Questions**
Getting to know the interviewee.	Getting to know the patient and his diabetes medical history. Demographics	**Can you tell me a little bit about yourself and when/how you got diagnosed with Diabetes?** ● Age/sex ● When were you diagnosed with diabetes? For how long have you had diabetes? **Can you describe for me how it is to have diabetes** ● Daily routine ● What do you need to check upon everyday? ● What is difficult ● What is easy/ less difficult **How is your diabetes treatment plan? Monitors/Medicine/Follow up appointments** ● Do you use a Constant Glucose Monitor? ● How do you like using the monitor? ○ Pros?

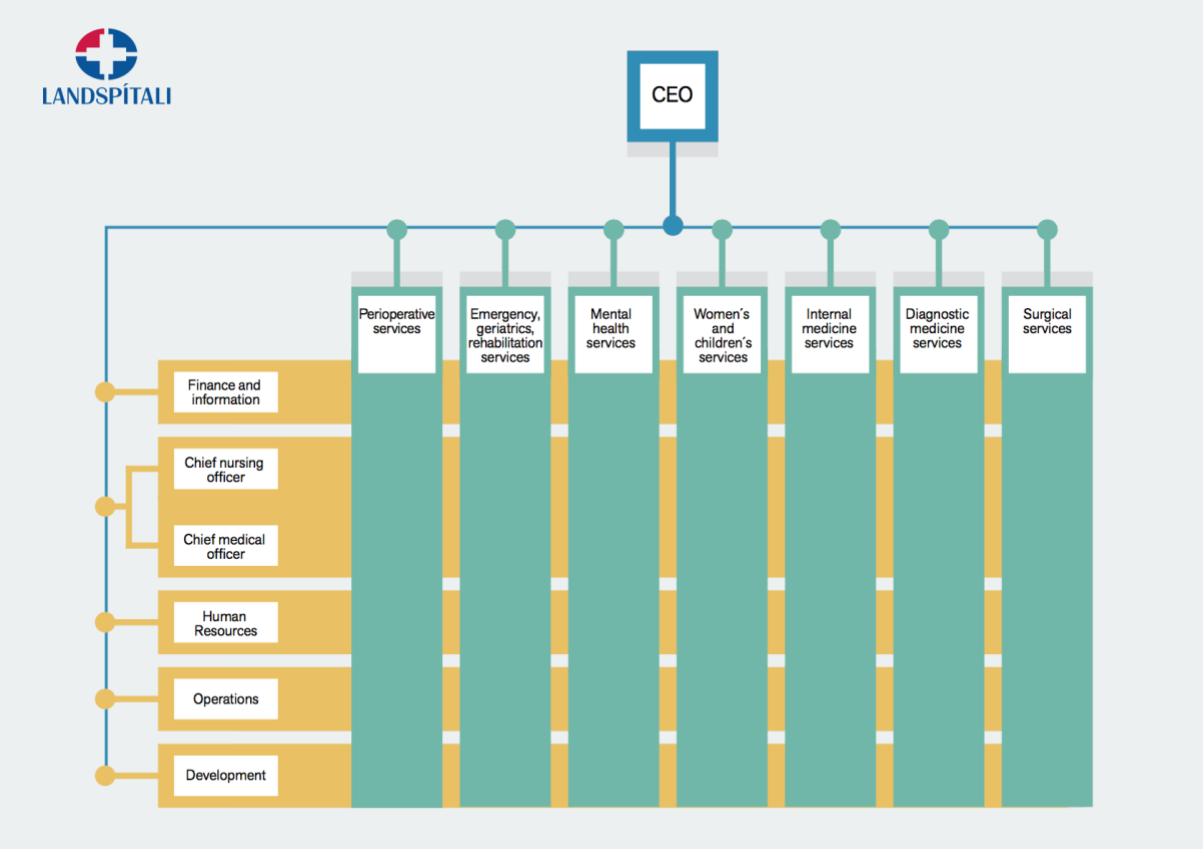
		○ Cons ? ● How did you feel about starting to use the CGM, did it work well? ● How is it to use them now? ○ Easier now than in the beginning?
Current state/process mapping	Understanding how the service process is now. What is the interviewees role in the service	**Can you tell me about the outpatient appointments at the diabetes department, how do they go by ?** ● How often do you go? ● What for?/ What is being done in the appointments, is it different every time? Or pretty much the same routine? ● Who do you meet? ● How do you make an appointment? ● How long does the appointment take each time? ● Is there something during the appointment you would want to spend more/or less time on? ● How long is the time period from when you leave your home/work to go to the appointment until you are back at home/work? **Have you experienced having to wait for a long time to see the doctor when you get to his office, or to see some other specialist during the appointment?** ● Does that happen often?
Value	Analyse value adding activities and non-value adding activities	**Can you describe what you perceive as value in the outpatient service?** ● What is most important to you during these appointments? **Can you describe for me how you feel about the appointments in the outpatient service - how important are they for you and your diabetes?** ● Do you always find it important to attend to the appointments? ● Do you always experience that your time is well spent during the appointments? ● Do you always find it important to meet the doctors and the nurses in person? ● Do you ever feel like some appointments could have been skipped?(nothing new or important came from the appointment, no changes were done - no value added.) ● Do you feel like you are in great need of being in touch with your doctors? (what about now, compared to when you were recently diagnosed?)
Need for change	Finding out if the interviewee sees the need for change. Where does he see the need for change?	**How would you evaluate the service as it is today? Does it fulfill your needs completely? Why? Why not?** ● Do you think there is space for improvements in the service? ● How could the service be improved? How can it be made more efficient?
Future vision	How the interviewees see the future. Do patients have the same vision as healthcare providers or the authorities? Do they see what needs to change and why? What is their opinion on telemedicine?	**How do you see the diabetes outpatient service in the future?(5-10 years) What do you think will change?** ● Have you heard about the concept “telemedicine”? ● How would you see yourself use such technology in the diabetes outpatients service?
Readiness to change	How does the interviewee commit to changes? How has he dealt with changes in the past? **Intrinsic factors affecting the readiness:** motivation, beliefs and values, characteristics **External factors affecting the readiness:** management	**If you think about any changes that have occured in the outpatients service in the past, how have you been able to adapt to those changes?** **(if new in the service, how he adapts to changes in general)** ● How do you adapt to new technology/processes? ● How did it go for you to adapt to the CGM monitors? ○ What was difficult? ○ What was easy? ● How well do you trust technology?

	support, empowering leadership, social support?	● What are your thoughts on data protection? ● Would you give the doctors in the outpatient service permission to access your data collected from the CGM monitor, to analyze and act on the data for adjustments on your treatment plan? ○ Would you trust it? ● How would you feel about being in more contact with HCP's through technology like secure messaging or video chats(telemedicine)?

9.3 Code Description

Code	*Description*	*Files*	*# Ref.*
Need for change			
Resources	Describes the problem of lack of resources; human resources, facilities, equipment etc.	12	27
Continuity	Describes the problem of high variability in the care that the patient receives or, more specifically, the issue of not being able to see the same care provider in follow-up appointments throughout the whole care pathway.	8	22
Support	Describes the problem of insufficient patient support, that is the support that patients receive additionally from their healthcare providers, apart from the regular control appointments; education, training, emotional support etc.	11	76
No Show	Describes the problem of patients either not showing up for appointments or canceling on short notice.	9	17
Access	Describes the problem of lack of equity in terms of access, that is that not all patients have the same access to the care system, for example, patients living in rural areas.	7	8
Organizational readiness for change			
Unity	describe how the staff works together as a team and assesses their capabilities to collaborate, or behave collectively	7	24
Change commitment	Describes the organizational members' shared resolve to pursue the course of action associated with change implementation, that his how much the organizational members value the change.	8	13
Change efficacy	Describes the shared beliefs of the organizational members in their collective capabilities to arrange and execute the actions needed to complete the change implementation.	9	42
Contextual factors	Describes how contextual factors affect organizational member's change commitment and – efficacy; for example, culture, policy, past experience etc.	5	7
Challenges and Barriers			
Technological barriers	Describes possible challenges and barriers to the implementation of telemedicine related to technology.	10	29
Change management	Describes possible challenges and barriers to the implementation of telemedicine related change management	9	34
Operational management	Describes possible challenges and barriers to the implementation of telemedicine related to operational management.	5	10
Regulatory environment	Describes possible challenges and barriers to the implementation of telemedicine related to the regulatory environment.	6	31
Governance barriers	Describes possible challenges and barriers to the implementation of telemedicine related to governance.	4	10

9.4 Organizational structure



9.5 Empirical evidence - coding tables

Table 1 – Empirical evidence from informant 'Chief Doctor'

Chief Doctor 1 (CD1)		
Ref. #	**Quote**	**Codes**
CD1.R1	*"We are always in trouble with staff."*	Resources Change efficacy
CD2.R2	*"There is an idea that each week there will be a consultant team that will be responsible for servicing 100 patients, for example. Then there would be an automated system that would tell us who is in bad condition and who are in good condition, who do we need to consult. The others we can just leave, and they can contact us if they need it. And there are some other solutions to send us data. That is apparently something that is in the making, o that you can securely send in PDF files. Then it would be sort of on-demand, you know questions from people, helping people that need help. So you can see that something is happening. It could help us to be able to sort out those who we should spend time on. That would be one thing […] or that the computer suggests that " yes, this one has too many deviations, you need to support him with this."*	Support
CD1.R3	*"One of the things that we are seeing is that patients are often trying to change their appointments. Our booking system like it now is that we decide what staff members are available that day with a certain advance. Then we just have a pool of patients that we take from the groups and fill up the holes in the schedule. So we are not negotiating with the patients what appointment he gets, but instead, we tell him that he gets an appointment on this date. But we are seeing that people are just deciding the day before that they want to change the appointments, and then they are calling in and things like that, endlessly. And even are just not showing up, which means of course inefficiency. I was responsible for the follow-up appointments Thursday last week and I think that there were 2 out of 8 that showed up or something. But you know this is one of the things we have been trying to do, to create a system that is around the service for specific tasks or patient groups, but not the doctors. So the outpatient clinics are not organized after the doctors. It is not that this doctor has the outpatient clinic today or always on Thursdays or something. We always have an outpatient clinic for T1D on Thursdays. And that means that, because we need certain persons to screen their feet and eyes and stuff, then those persons need to be there, but maybe they do not need to be there on Wednesday, then they can just be doing something else. We have tried to do something like this to increase the efficiency of the processes. But opposed to that, then the patients themselves do not have much to say about exactly what doctor they meet every time, which we think that in some ways is just a form of quality control. Double-checking or second opinion. Better see eyes than eye. But it is a bit hard to get Icelanders to understand that. They always want to see the same doctor. And like it is now, the patients get an appointment time with six weeks' notice, and maybe it does not fit their schedule. One way would be to send the patient a selection of dates to choose from or offer him to go into some gateway where he can choose an appointment himself from a chosen period. Or something like that is what we could do."*	Continuity Support No show
CD1.R4	*We operate an outpatient clinic in 'Akureyri,' and we go there twice a month. But that is something that would be optimal to manage remotely"*	Access
CD1.R5	*We are trying to map out the journey of the patient's process, how he travels through the department. We are moving to a new place where we will have much more space, and we have been sketching and thinking like what does the patient need, who does he need to see when he arrives, who needs to be where, etc."*	Support
CD1.R6	*"It maybe takes us a certain time with each patient, in one-to-one counseling, so it would be possible to pick out ten people, so there is a certain problem, for example 'postprandial spikes' [spikes in blood sugar after meals]. Then it would be possible to send these people very clear instructions. You know, to pick out those who have some of these classic errors and not waste time speaking to each individual patient, but rather send them all direct mail with guidance."*	Support
CD1.R7	*"It is technology and then maybe one thing which is health literacy and technology literacy, if there will be someone who uses this [telemedicine], if this[telemedicine] will be adopted."*	Technological barriers Change management

CD1.R8	*"What has been a problem is first and foremost our access to this technology. Medtronic has been on the market here in Iceland, but no one else. Freestyle Libre has not been here, even though they reached the market overseas a long time ago. Because the market in Iceland is so small, the company is not interested in this market because of how small it is. So what we do is that we have to go in through the backdoors. After a long time, we found a pharmacy in the Faroe Islands that was ready to buy this for us and sell it to LSH, and that is how we can make this happen here in Iceland. But therefore, we haven't been able to utilize everything that it offers because we haven't had access."*	Technological barriers
CD1.R9	*"We buy it [FL CGM device] from a pharmacy in the Faroe Islands, who buys it from Denmark and sends it to us"*	Technological barriers
CD1.R10	*"There are some technical problems that are about that this needs to be within a secure system so that no one can hack into it. A conversation like this one (on skype) wouldn't work because it is possible to hack it. But now they are developing a solution within the Saga system in what is called 'Heilsuvera'. Then it is within a secure area, but the problem is that we can't share the screen. Like on Skype you can choose to 'Share screen', and then when I move the mouse you can see that I am moving and you can see my screen and so on. But that still is not possible in these systems we have, so there again we have a bit of a technical problem, and they are talking about solving it within weeks or months."*	Technological barriers Change efficacy
CD1.R11	*"We still do not have any technology that can receive data from apple or android wearables, but it is probably not long until that will happen. Because these services can also share with others applications."*	Technological barriers
CD1.R12	*"Then there is another big problem we have been dealing with, which is the GDPR. Because the privacy laws changed last spring or something like that, so it all became more strict. The lawyers of the hospital have not been able to create a sufficient solution so that we can use the patient's web access. Because health records and certain laws say that LSH should hold medical health records, it should be stored within the hospital servers. But this data that the sensors create, if people choose to store the data in the cloud, then it is stored somewhere in Europe, and the individuals have lost their control of their data. You know the company [FL/Medtronic] says that it is anonymous and all that, but you never know. You see that they are selling this data to pharma companies and whoever wants to buy it. So this is a kind of privacy problem that has made it hard for us to implement this technology as fast as we wanted."*	Regulatory environment
CD1.R13	*"We have made a disclaimer that describes what happens with the data in the cloud. It is Icelandic Health Insurance that is buying the device and giving it to patients, so LSH is free from the responsibility there. So this is a law thing that has been in our way, but I think that now we can start using the data. So then it is that way that they get a disclaimer that says, this is your data, and you can do this with it. It is your responsibility, and then the patient chooses to share it with a provider, which is us. Then we have made this cloud access for Medtronic and another one for FL."*	Regulatory environment

Table 2 – Empirical evidence from informant 'Nurse 1'

Nurse 1 (N1)		
Ref. #	**Quote**	**Codes**
N1.R1	*"It is the same thing that goes for all of us nurses, that people are coming in to see the doctors 1-2 a year and they are referring patients to us that need more comprehensive management, education and support. So that is the main thing that we do"*	Support Continuity
N1.R2	*"We were doing a lot of those phone-follow ups, but we have discontinued that service. We were spending too much time chasing people but now we have shifted gears and instead the doctors can book time with us. They send people home with the information that if they run into some trouble and are not meeting the treatment goals then the can get a phone call from a nurse, but you have to call yourself and ask for it. So people are ready with their data. We call the same day if people call in before 10 a.m. and then people can also call and ask for an appointment with a nurse. So people are ready with their data. We call the same day if people call in before 10 a.m. and then people can also call and ask for an appointment with a nurse."*	Support Continuity
N1.R3	*"I want to see much more teamwork here, or I would like to see teamwork which frankly I think is just not happening here. And I want more collaboration. I agree that nurses should also see patients for follow-ups in companionship with the doctors, and even call people in more often for a follow-up. See them more often than every six months in-between the follow-ups by the doctor. Catch those individuals that need help. The number of doctors is decreasing. There are only two doctors in 100%, and one of them is the department chief. He also has management duties, and therefore there is a bit much that falls on this one doctor. So there is a huge burden on this one doctor, which is unbearable. I want to see better organization of things, much more collaboration, and more teamwork, so that we work together and have more space. We can work together in sorting out the patient group, and decide together who in the patient group it is that we will offer this program and some other program. I want to be there. I am looking in that direction, but I do not know how fast or how long it will take us to get there."*	Resources Change efficacy Unity Future vision
N1.R4	*"This environment that we need. I have just realized that, like with the break room, how crucial it is. Even though it was not very compelling where we moved from, but it was just for us. We sat down at 8 o'clock in the mornings. We got a cup of coffee and pulled the day up on the screen to see what tasks were that day. This is what should be happening in the status meeting we have each morning, those 5 minutes where we stand in the hallway. It was much nicer, and you could discuss this and that, "This one is coming in and this one is coming in, we are going to handle this in this way, we need you nurses to help out with this. It was much better than it is today. I think that by getting our own private space and facilities, we will be able to create just that and improve our teamwork subsequently if we do it in an organized manner. But teamwork is not something that people just think "Yes, I am going to participate in teamwork. I will start tomorrow." People think that teamwork is just when two people are working together in the same space, that then they are participating in teamwork. But like we know, it does not work like that."*	Unity Resources
N1.R5	*"It is in the plans that we move to better facilities, Although I have not seen when that will happen. We were supposed to move now in February, but they have not even started the remodeling. And then we are working on streamlining a bit our processes through that facility. I see that if that works out, then there is nothing in the way. If we can establish teamwork, we could provide excellent service and have good processes and just help the ones who need help. The ones who do not need to come more than once a year will just come once a year. Others will come more often, and so on."*	Change efficacy Change commitment Unity
N1.R6	*"Patients are put into a group booking. If you are supposed to come back to the doctor in six months, then you are put into the August/September group or September/October group. However, when the time comes to book the appointments, it is impossible to get everyone in. so the patient might not get an appointment until December, or January and that is just not good."*	Resources Support
N1.R7	*"I am sure that the work of us nurses, we need to review our work. It can be more efficient, and there are all kinds of barriers in the way. Maybe first and foremost, we need to redefine what is most important, and then everyone works according to that. We have now, for example, discontinued the phone calls in the follow up like it used to be. Then we were chasing the patients and asking them for their numbers, but maybe they had not started the treatment. So now people should call in themselves, which makes*	Support

	things way more efficient. This service that we have now started that if you call before 10 a.m., then we call the same day, this is way more efficient."	
N1.R8	*"We are doing all kinds of things. For example, one of us is the shift manager, and is then responsible for calling the patients. Patients are sending e-mails with all sorts of requests and questions. We are trying to limit that and have more information available on our website."*	Support Continuity
N1.R9	*"One of the things that limit us is that we need more space, and we need more patient rooms to accept patients. So if someone comes in that we need to take in acutely, we will not have any room. Then we are running down the hallway and checking where we can add in, so it is a bit like that. Three nurses can access a computer each day; one can take in patients, and the other two are in a working space. So if the fourth nurse comes in, then there is no room. Even if there is a need for it, there is no space. The nurse is available, but has no workspace. Then I feel that our time is not well spent. Then you are trying to figure out: you come in at this time, wait I am going to check if this room is available at this time."*	Resources Change efficacy
N1.R10	*"We need to make sure that the HCP involved has the space and privacy needed"*	Change efficacy
N1.R11	*"I like the job, but what I do not like is the environment. I do not like that we cannot work together as a team. The group is divided, and I wouldn't say I like it. You can hear that I have particular opinions about this, and I think that the clinic can become good. There are many good people here, but we need to make the people work together."*	Unity Change efficacy
N1.R12	*"I am sure that it would work out fine with some patients. However, with certain groups, you need to meet them in person, just having them eye to eye, especially the older generation. Patients are often sending in their charts with some specific problem, and then I think it is easy to service that through something like this. I can see that happening, some who are constantly having hypoglycemia and are asking what to do, one specific problem. But if people are coming with the whole package and do not have any idea what to do, then you need to sit down with people and find out what is the problem"*	Support Change commitment
N1.R13	*"We need more space, so people are not coming for follow-up as often as we would like. We are talking about patients coming twice a year, and the doctors have an interest in having that way that patients would come in once a year to see a doctor and once a year to the nurse. But that does not work, partly because of a lack of space."*	Resources Change efficacy
N1.R14	*"We have Guardian Connect sensors here, but we do not have the Freestyle Libre sensors yet. They just do not have any interest in the little Icelandic market, and we are very disappointed with that."*	Technological barriers
N1.R15	*"Then there is always someone trying to get the Dexcom and Tandem pumps, but I am not very optimistic, I hope so, but I am not optimistic. I think that people should have more choices. So many people are not satisfied with this technological problem with Medtronic."*	Technological barriers
N1.R16	*"Just for an example the sensor often loses its connection, we often have troubles with loading in charts and data, and so on."*	Technological barriers
N1.R17	*"We have these two insulin pump seminars, which both are around two hours. We are trying to cut the time as much as we can to get people to show up. Before, there were 2-3 whole days. We experience that it is challenging to get people to come to these seminars. We are always experiencing trouble with that. That is why we have now that people end their workday here and get then time off work in the afternoon. That has been working better."*	Support No-Shows
N1.R18	*"For example, then a lot of my time goes into the insulin pumps. Keeping an overview of the registration, calling people, and preparing the seminars and those who have not shown up for the carbohydrate counting seminar, calling them and finding time"*	Support
N1.R19	*"I think that we need to analyze our group of patients more, which patients have high long-term blood sugar, who are not showing up to the appointments, who are the ones who really need the help from us, nurses. I think that we, nurses, should make a massive program for these patients, and we should all create it together."*	Support

Table 3 – Empirical evidence from informant 'Nurse 2'

Nurse 2 (N2)		
Ref. #	**Quote**	**Codes**
N2.R1	*"Initially, our job is to teach insulin, like the insulin pen education, about insulin and sort of the basics about diabetes. It also gives a sort of brief advice about dietary changes that should happen in the very beginning. And in the beginning appointments, we do not want to give too much and overload people because sometimes it can be very overwhelming to get a diagnosis of diabetes. After all, it is life-changing, and sometimes people are quite nervous about having to have injectable medication. So it is just sort of like a supportive and educational role at the beginning and explaining what they should, need to do."*	Support
N2.R2	*"That varies, I think our appointment times are booked 45 minutes or an hour, but depending on the person. Some people need a lot more support than others. Some can be quick, under half an hour, and others can take over an hour. Especially if there are some complications where I need to have a doctor involved, the consulting doctor, if we need to contact them, then it may like, go over the time. But it is typically less than an hour. Especially if it is something like reading the CareLink reports which come from the sensor, if all goes well with downloading the information and everything, we can run into hiccups with that, we just take a look, look at the patterns, make suggestions, and it is finished. So those tend to be a bit shorter, but yes, 30 minutes to an hour, I think."*	Support Technological barriers
N2.R3	*"There's worry and concern right now about some doctors who have left or going on to different roles. One of them was a specialty physician with tons of experience that we trusted and relied on and is now leaving to go to a different position. And then another doctor is also I think either reduced or is completely leaving. I am not quite sure what the final decision on that will be. But then we're a bit worried like this is all going to fall on one person like one doctor. We have our chief of the department, and then the doctor who's always there, always on call. And a lot of things get put on that doctor. So we like, worry about that, that there is going to be too much."*	Resources Change efficacy
N2.R4	*"It is better for people to see the same physician or care worker throughout, especially being newly diagnosed. If there are issues [with the treatment], then they know what we tried to change last time and can follow up [with the patient]in a better way than someone who's just coming into it. And it is just not possible when there's so few and like this one's 40% This one's 20% this 60%, this one's you know 100% but she can't see everybody right. So, yeah, it is inconsistent."*	Resources Continuity
N2.R5	*"So that would be the secretary who books appointments. The doctors put the patients in a group of when their next follow up should be. And it'll be like in a three months sort of timeframe. And then she looks at those groups and tries to book people into the slots. But sometimes there's not enough available, and people who should have come between January-March are being seen in May or June or something. And so sometimes then these people will land into an issue, nurses will pick it up and then try to get them an appointment sooner. So we do a lot of, I guess it is sort of like a triage but when things are more urgent than others, and we can make that decision and get them."*	Resources Support Continuity
N2.R6	*"Are they calling or with just a question about a side effect or refilling a prescription or something like that versus somebody who has been hypoglycemic over five days and are in a dangerous zone, you know, elderly people who are experiencing hypoglycemia on a regular basis, extremely dangerous."*	Support
N2.R7	*"Well, I think there's a huge difference in care between nurses and doctors. So there is the medical side, and we are the nursing side. It is more of a supportive role, an educational role. We take more time, and we answer more questions. We are like the person in the middle, the advocate that can go to the physician when say they do not have an appointment or an appointment time for six months from now, but there's something that needs to be dealt with now. We are sort of that key that gets them in to be able to get the service that they need. And in the initial visit with a physician. They get the information, but it does not really sink in. And then it is our job to explain, answer questions and, yeah, support them, right. So it is a lot more of that type of role, and I think that they appreciate it a lot."*	Support
N2.R8	*"When you have like the physician appointments, maybe 15 minutes or so. It is very short, and it has to be because they have a lot on their roster right so, we can spend a*	Support

	little bit more time and, you know, take a deep breath, what do you need to know today. What would you like, what, what, what questions do you have."	
N2.R9	*"That would be very beneficial for people like I was saying before, living outside of the city and in faraway places. Because sometimes they'll only come to the city once a year, and they have that whole 12 months where they might not be getting the support they need. Or they live in a small community and do not have specialists that can give them like the up to date evidence-based information. Somebody living out in the countryside does not have that. So, yeah, I think that would be beneficial, and especially if we could have like, see a report, and then talk to the person on some sort of video conference that would be beneficial."*	Support Access Change commitment
N2.R10	*"It is getting much better. So that's what we're working on correcting. So I would say last year was horrible. It was horrible last year. There was no like defined roles of what people should be doing. And some people had so much to do while other people weren't doing anything. You wouldn't see those other people join in and be like, how can I help you, and I think that was just some personality and the way some people work. We didn't work together, and now we're trying to change that."*	Unity
N2.R11	*"And then making sure that they have their appointment with the nutritionist, follow up with us after a couple of weeks, and if there is that plan of how the follow up should go. But if we feel like there should be sooner follow up or if it can be extended. That never happens, but if we need to be in contact with them sooner than we just make sure they are booked, it usually falls on nursing to make sure that their follow up with the doctors are booked. We're trying to figure out whose responsibility it should be. Usually, it is nursing who would be like: okay, let's make sure that those booked in the future."*	Support
N2.R12	*"I think what is successful is that when there is somebody with T1D, they're prioritized and managed. Like we make an absolute effort to make sure that they get the care that they need and that it is scheduled in the care plan, and also in the follow up like they should be every six months to a year. I think that part is good, but it could use improvement. I was thinking about some suggestions. That we could do like having some sort of system that when there is a diagnosis or there is somebody who's type one, having some computer system that flags them, like in case someone missed. They get put into groups of when the next follow up should be. And so that system has been sort of working, but sometimes it does not. So, yeah, I do not know if that really answers the question but, I mean, when we should have something better to follow people along and see where they are, like, you know, some people like a triage type of system where someone's in a red zone or green zone or yellow zone, you know."*	Support
N2.R13	*"I think the first thing would be to make sure nobody is missed and in their follow up like you always tell someone: come back in six to eight months. But do they realize if they do not get a call, they should phone and make sure? Some people are just so polite; they'll just be sitting just "I will just wait for A3 [the outpatient department] to phone me", and sometimes that does not happen—a lot of the times that might not happen. And then the other thing is, if we were to triage them to see where they are, like if they're with good control, medium control, then we would have to be following them to know that. So, I think that would be helpful."*	Support
N2.R14	*"Yeah, psychiatrist services and social care. We need much more, much more. And I am not trying to criticize people who are doing it for us, but I think there's not enough. There's not enough time, or they have too much to do in other places where we do not get what we need, I think, because there have been times I needed to refer people and they. It is not the expectation of care that I would have wanted them to have, or even in the timeframe that I would want them to have."*	Resources Change efficacy
N2.R15	*"When we move to the new place, I think we'll sort of be more in our own space, like designated area, I guess, because now we share a place with four or five different clinics, people are sort of everywhere. So I think when it is separated, people will be more like okay I am in the Diabetes clinic. And I think they are talking about having a specialized machine where you can come in and get your HbA1c just on the spot, do a urine test with this specialized machine. The nurses could do it like no problem. But it will be nice to sort of have that patient come here and then here and then there, you know, like in an organized manner."*	Change efficacy
N2.R16	*"Well, I think it is well spent. There are times where it hasn't been about diabetes management, and I'll give you an example. Recently two different patients and I obviously won't say names or anything. But after their diagnosis they were quite overwhelmed. They were upset about a lot of things. Maybe being told that they were*	Support

	different type and then it came to light that there were another type of diabetic. And some issues running into getting their insulin and their medial aids from the pharmacy and Icelandic Health Insurance, issues with that. So I was listening probably for half an hour. Just letting them, you know, not rant, but. And so that's not really my job in my job description. But I felt like I had to do that for them because maybe it is not directly related to what I should do, but I felt like they sort of needed to have someone to sit and listen. And maybe it was just a part of this whole, you know, new diagnosis and being overwhelmed. So, sometimes that happens and recently that has happened a couple times and it is complaining about services, Icelandic healthcare, and nurses sometimes have to listen to that and then explain. And then maybe put in some explanations about why things happen the way they do, because sometimes it may look like it is a mistake or an error when it is really not the case."	
N2.R17	*"Another thing that's not our job is finding appointments and yeah like the administrative like secretarial type stuff. We have a lot of that on our plate, and that's what we're trying to change now. We're in a transition with the director and the nursing manager. Trying to make changes to how nurses get the work that they need to do or the information or, you know, tasks, what tasks are ours, and what can be put to other people, you know. Yeah so that's a big one too, I should mention that."*	Change efficacy

Table 4 – Empirical evidence from informant 'Nurse 3'

Nurse 3 (N3)		
Ref. #	**Quote**	**Codes**
N3.R1	*"We are moving to 'Eiríksgata' in a year. There is a lot of work happening there to organize everything so that there will be a better flow for the patients. And it is very exciting to see how that will all work out. However, I think that it will be difficult. I do not believe that there will be much change while the staffing is so inadequate, and both with doctors and nurses. We need more staff. So it is hard to be planning to do big things, in my opinion. We need staff resources, and also workers that are here full time. Few are in a 100% position. So it is a bit difficult to improve something. And many doctors also are in other projects at the hospital, so it is a big project that we have ahead of us."*	Resources Change efficacy
N3.R2	*"Well, I was just ready with everything that is not going so well. I am going to start with things that are not going well. I feel that patients are not coming often enough for control visits. It is recommended that they come twice a year, every six months. But that is just not possible with the resources that we have, especially with the doctors. It is regularly discussed to solve that problem by booking appointments with us [nurses]. Where we call the patient in for a follow up in-between yearly appointments with the doctor, where there is a blood test, and long term glucose is measured, and then they come to us. But we do not either have nursing resources for that, to meet all T1D patients. But maybe we could do that for some patients. If the doctor decides that this person needs more follow-up, we will book that. But that has not been standardized or clearly defined. It is shameful that people are only coming once a year, and sometimes it is even longer than that between appointments. I think that is really not okay, and this does not just happen for patients who are doing well, but also patients who are not doing so well. That needs to improve, but we just do not have the resources for that."*	Resources Support Change efficacy
N3.R3	*"It is going well after we started to keep a formal overview. Anyway, twice a year, I go over the list of everyone that is 25 years and younger and has been here. But this is not a perfect system, you cannot extract from the system: "everyone with T1D, 25 years and younger". So this is just an excel sheet, so it is a bit outdated. And then I just see who has been for a follow-up in the last year, if they do have an appointment booked in the future, or in these groups that we have, this group booking system that we have. If someone has fallen out, that is not under observation or is not in a group. Then I put him in a group and book him, call people up and check how things are going. It is all done manually. It can be quite time-consuming."*	Support
N3.R4	*"I think that we have a lot to offer, the clinic. But we need staff and more structure around everything and define everyone's role in a better way. However, I think it is positive how many professionals we have, even if we are missing a psychiatrist and so on. We can solve many things together. But there is a lot of work ahead. It is in progress, so it is exciting to see how it will turn out to be. It is a bit like the team is not good enough, even if we call ourselves a team and are trying to work as a team. It could function better."*	Resources Change efficacy Unity
N3.R5	*"What is missing is maybe that just some specific people are responsible for specific patients or groups. After we changed the booking system for patients, it is no longer possible for the doctor to book the patient back to see him after six months, and another doctor books his patients. Rather, the patients are put into a group and are just booked for T1D appointments but not to that specific doctor per se. And then the patients are seeing many different doctors, even though we try to limit it to 2 doctors, but we rarely see that happen. Every patient has met every doctor. And we are left a bit confused as to whom we should turn to for assistance with a specific patient if he has maybe met all the doctors. We want and should turn to the doctor that has an advisory role that day. Still, then he may have never met the patient and does not want to take responsibility for that patient. So it is maybe a bit…. We need just this team to handle these patients, and this team these patients. Like with our teenagers, for example, if there would just be two nurses and two doctors that would only handle the treatment and care for that group."*	Unity Continuity
N3.R6	*"What creates the most value is the support that we give, both during interviews and in continuous follow-ups, even if it is over the phone. We are in the process of limiting a bit or changing this access to us. Before we had phone calls booked in advance and we called. But now we are asking people to call us and ask for a phone call back. It was all becoming a bit too much, and we have some people that we cannot discharge or you know discharge in quotation marks. People think it is nice to get a phone call, and we*	Support

	are trying to frame the structure more around this, so that they are not totally, you know."	
N3.R7	*"Also just putting the responsibility back to the patients themselves. They will call when they want to discuss something. Not that we are calling and saying, "well, have you done this?". There are advantages and disadvantages, and this will suit some people better than others. So now we are doing less of this phone communication, because people need to seek it themselves. They need to call before 10 a.m."*	Support Continuity
N3.R8	*"If someone is at his doctor's appointment and gets instructions to call us, we naturally do not know if he does it. But before it was booked in our calendars to call this person in two weeks. Now we are putting more responsibility on the patients, except people who are newly diagnosed with T1D, then we call. We are not expecting them to contact us. And then there are also always some exceptional circumstances, maybe immigrants and they may speak limited English or Icelandic. We are not expecting them to call us. So that this is still under development."*	Support Continuity
N3.R9	*"I think that it is essential that there are nurses who are a part of this kind of service. I believe that a service like that is much better than just some doctor in a private clinic that does not have this multidisciplinary team. So I feel that the patients must have access to us. Not all patients come to see us, but we can give a different input than the doctor does, and often then the patient will get a better understanding."*	Support
N3.R10	*"Well, there are advantages and disadvantages to the scheduling system. I can well see the advantages as the chief talked about that it was his vision that "better see eyes than eye", so that would lower the chances that something is missed and that kind of stuff. That is certainly true. However, in the current system, patients are seeing way too many doctors. If you have some problematic cases, it complicates them further to have too many healthcare providers involved. Like with my group of teenagers. They have started to see the associate doctors, which I do not want for them. I want them to meet a maximum of two specialists the first 5-7 years. And it is hard to keep track of that because I am not involved in booking the appointments. The secretary handles that. So we need more like we see in clinics abroad, that there is a team that handles this group and another team takes care of another group. Meet up and discuss as a team about the patients. We are missing that."*	Continuity Unity
N3.R11	*"How well time is used during the appointments depends on how well the patient is prepared when he shows up. Maybe he does not have any information with him, does not have his measurements, and not even his blood sugar monitor. So we cannot even go back in time and check. And just people come really unprepared, and then it is a waste of time for everyone. And then sometimes, maybe that is not a waste of time, but sometimes other matters than diabetes are discussed. You often feel like you are a shrink, or you know. But it is maybe beneficial for the patients and what he needs at that moment, but this is maybe not my specialty. I always think it is better when the discussion stays within my specialty."*	Support
N3.R12	*There are good people here. But there could be more collaboration and so on. Work more as a team, like how teamwork is defined.*	Unity Change efficacy
N3.R13	*"It would be great to have a psychiatrist in the clinic and regularly book appointments for the patients with him. We have a social worker, bug not located here in the clinic."*	Support
N3.R14	*"There have been meetings with the whole department. And then the other nurses and I have been meeting every 2 weeks with a project manager, trying to organize better and frame the service better. And then just as things are here in this hospital, I believe that we will move when we have moved, because that is how it is here. They are always talking about some big changes. Then nothing happens, or constantly delayed, you know. We were supposed to be moving now, and it has been delayed for a year. I will contribute to the work, but I believe that we will move when I clock into work at 'Eiríksgata' [the new facility]"*	Change efficacy Change commitment Contextual factors Change management
N3.R15	*"I think that everyone is a little bit in their own bubble. Like we were organized in groups, doctors, nurses, and nurse assistants and just everyone in the clinic. We were supposed to organize some things regarding the move and the service to certain groups. The group who was supposed to represent other endocrine diseases, other than diabetes, was missing their nurse. She could not be there, so it was only doctors in that group. When we presented how we imagined the service for each group, the doctors had imagined that we, the nurses, could just take over certain tasks previously done by the*	Change management

	doctors. They had major plans about how we could take all the thyroxine patients and with the calls and all. They said it will be no problem and so on, but we were just like, well, it is maybe no problem doing the doses, but we have no time for it. And we cannot take over endless new tasks when we do not have enough staff, and when it has not been prioritized what it is that they want us to do and what is it that we should focus on, but it is sometimes you know they have all these major plans without talking to us."	
N3.R16	*"We said like easy now. It sounds good and exciting and all. It is not a question of interest from us. It is a question of what we are going to focus on, what is realistic, and where is the best utilization of us. We are currently trying to decrease phone calls, and then they had this vision of us doing loads of phone calls every two weeks, like it is no problem."*	Change management
N3.R17	*"Yes, precisely. That [Video conferencing] hasn't been tried yet, but they [IT department] were going to try it. I know that one of the specialists here have been working on it and trying it, but there are some technical problems. I haven't tried it, but I think it will be very beneficial, as a different kind of service, in addition to the service we have. […] especially if people are coming from the rural areas, then this kind of service can be of great help."*	Change commitment Technological barriers
N3.R18	*"But then it is a question about do I necessarily need to see them in person, in some situations that are necessary."*	Change commitment
N3.R19	*"Every other week on Mondays there are department meetings at noon, I can almost never attend because I only work 4 hours, and I have patient appointments before noon on Mondays. So I ask myself, is it more important for me to take these appointments, or have one less appointment on Mondays and go to the meeting, and who wants to decide that?"*	Change efficacy

Table 5 – Empirical evidence from informant 'Nutritionist'

Nutritionist 1		
Ref. #	**Quote**	**Codes**
NUT1.R1	*"No, it is 50%, 50-60% in total. There needs to be a nutritionist here always. But it comes back to exactly, facility issues. We are only here on the days when there is space for us, there is no space for us here more than 2 days a week. Just every room is occupied. But there needs to be someone here every day, to be sufficient. To be able to just catch patients that are somewhere... Now it is always booked in advance, and then it is the risk that the time is not well spent."*	Resources No shows Change efficacy
NUT1.R2	*"To keep an overview of those who do not show up, those who are a no show or have dropped out of follow up. We need a system that gives an overview of that. We need to do that manually."*	Support No shows
NUT1.R3	*"We need something that keeps an overview on all of that and controls it. Ensures that the patient goes to this person. Whether it is some person or a system or something. Ensures that he gets an appointment with a nutritionist after 3 weeks and then a doctor after 3 months and so on."*	Support
NUT1.R4	*" It would be nice if the patients themselves could just see "When did I go last, when should I go next, in what group am I in, when can I expect to have an appointment. If they could see this somewhere, compared to the process map that we have. "Did I definitely go?" Because we are always trying to make the patients a little bit, you know...to take more responsibility for their own treatment"*	Support
NUT1.R5	*"It is mainly the doctors and nurses who refer to me and book an appointment. But then the patients can also call and book an appointment."*	Support
NUT1.R6	*"It would be nice if I could follow up more with the patients. But they always have access if they want. There is some waiting time for an appointment, but not months like for the doctors. It is maybe about 2-3 weeks."*	Support
NUT1.R7	*"The carbohydrate counting overall is not extremely complicated in itself, but it needs a lot of practice. It would be good to be able... because when people come here after 2-3 weeks, they forget the questions they had at some point in time. It would, of course, be better to be able to... that they could just ask questions when they think of them. You always tell them to write down questions or something that happens or something that does not work out or something that you were doing. Still, then they just forget to do that, but it would be nice to be able to, you know, that there was easier access."*	Support
NUT1.R8	*I give most patients my email, but very few of them use it. I think that to sit down and write an email is so extensive somehow.*	Support
NUT1.R9	*"I would want that the service would be more fixed. That it would be at diagnosis and then once a year after that, where patients are just offered to get an appointment with a nutritionist, no matter if you accept it or not. That it is just always available once a year. That it is just more standardized."*	Support
NUT1.R10	*"Well, in a service like this, it is [meeting the patients in person]not really important, at least not for me, what I am doing. Because you are talking about telemedicine, it does not matter to me if the patient is sitting in front of me or somewhere else. So it would be, you know, it is a problem that we have a lot of no shows, people are skipping their appointments. So I book my appointments very tight because I just know that 2-3 will not show up, but it is challenging if everyone shows up. So if it would be possible somehow for patients to have access to the clinic in a way that our time will be used in a better way."*	No show Support Access
NUT1.R11	*"I can educate people, but then I do not do much more. For example, with carbohydrate counting, I teach people how to do it, but then it is in the hands of the patients. But that is where most people stop. Everybody understands it, and then when people come to me, he has no reason to be here, except that I am encouraging him to do something. But in the future, if there would be a way to use the time in a better way. No matter if it is through some telecommunication or just more access to us, rather than always booking these appointments that people do not show up to."*	No show Support Change commitment
NUT1.R12	*"The main issue is with no shows. Then you feel like your time is being wasted."*	No show

NUT1.R13	*"There is a lot of waiting and so on, which is really frustrating and difficult. It is difficult to get appointments. Just for the patients themselves."*	Support
NUT1.R14	*"I went on maternity leave, and the clinic moved just at that time here, and they had been here for a year when I came back. Some things changed with the move. I think that everyone felt that. It changed this team spirit. We were by ourselves at the old place, or you know we had our own break room and things like that. And there were short distances between offices. So this teamwork changed a bit. A little bit longer communication paths somehow. You are not talking about the patient in the breakroom now, like we used to do. Because there are many other clinics there. So I think that was not necessarily a good change."*	Unity
NUT1.R15	*"I think that everyone would benefit. Like the hospital would benefit from it, if we could just talk about the patients. That we would use all of our working hours to talk about the patients. Even though you should not talk about the patients during lunch breaks. But it created...there was more… what can I say, we were more united at the old place."*	Unity
NUT1.R16	*"We, of course, always try not to make the patients feel it [the pressure/demand]. We just run faster or longer or something. I hope that at the new place it will be back like it was. That it will bring us closer. The communication path is sometimes a bit long, just if you need someone. For teamwork. If you need a doctor or something, "what doctor is on call? Oh wait, he is on the 7th floor" or something. You know, in the old place we were much closer."*	Unity
NUT1.R17	*"The communication pathway is often very long, and everything needs to be a bit formal when there is this distance between us."*	Unity

Table 6 – Empirical evidence from informant 'Specialist 1'

Specialist 1 (SP1)		
Ref. #	**Quote**	**Codes**
SP1.R1	*"We need these team meetings. People are just working specific percentages, and everyone is not working at the same time. We are in trouble with the staffing of nurses as well. We need more headcounts there. So the follow-up service for patients needs to be strengthened. And then, people have also been decreasing their work percentage."*	Resources Unity Change Efficacy
SP1.R2	*"I would want to see the service change. We need a more powerful unit with more staff and a more efficient booking system. Better working conditions where we can be more separate and maybe have more time to have more relaxed days, so-called paper days. To go over doctor notes, improvement projects, and organize. There should be more time for that. We need more team meetings. For people to become more satisfied in their jobs, we need to strengthen our teamwork on so many levels."*	Resources Unity Change Efficacy
SP1.R3	*"It is doubtful as things are now, we need more staff to be able to run this properly. But telemedicine is possible, and now we have begun to look into that, maybe more with T2D and the rural areas. I am involved in a project now that is, in fact, not related to telemedicine service. Then I go there to the primary care clinics and work with them to implement procedures, education, consultations, and so on. This is about making the primary healthcare clinics sustainable when it comes to managing T2D so that we are not seeing the bulk of those patients. So we are trying to delegate these different projects."*	Resources Change efficacy
SP1.R4	*"Maybe not, technologically no and facility wise no. It could be ready [for change], but it is not now. We need more staff and better facilities."*	Resources Change Efficacy
SP1.R5	*"Well, we do sort patients. We have an associate doctor and nurses and all kinds of other healthcare professionals. What it is that we can do as specialists is maybe that we can perhaps take care of more complicated cases. Some patients are more difficult than others, vary in complexity, both diabetes patients and others. T1D can be complicated, so when there are very complicated patients we can step in more actively as consultants. But in general, how I can specifically help patients as opposed to someone else with the follow-up in T1D care. It can be thought that this basic follow-up could happen with someone else. Maybe someone who has more of a primary education or more general education but still enough experience, definitely. So it could possibly be that way that we as specialists come in every other follow up appointment, we did not need to be in every appointment."*	Support
SP1.R6	*"It is the choice of the patient where he wants to be. In my opinion I think that T1D management is better suited in the hands of multidisciplinary teams […], but then some patients have more simple treatment, are less sick, and can be in private clinics."*	Support
SP1.R7	*"We could focus more on looking at what the numbers look like, looking at the data, and the general health status of that patient. That is maybe what we need more time for and less administration. But it has improved a lot. Before, it was more that we were trying to find appointments for the patients sometime in November next year and booked them ourselves. Now we put the patients in a group and the secretary books. But here are advantages and disadvantages too with that."*	Support
SP1.R8	*"There have been no significant changes. The booking system. We have fixed that a bit. So that you are no longer personally responsible for the patients. You just see random patients, they are randomly put in a random group, and they only meet doctors randomly. So that the service has changed a bit, but mostly it has stayed the same."*	Continuity
SP1.R9	*"What is lacking are the work processes. We are developing them. We are maybe not all working towards the same objective, so the unity of the staff members could be increased. Better defined management and better booking system."*	Unity Change efficacy
SP1.R10	*"I would say that relationships with the patients and communications, and of course that the service is excellent, including the booking system, the access, and information flow. All this needs to be in place, that is a crucial factor."*	Support
SP1.R11	*"We use messages considerably. But we can never cut out the reception of patients. But in some cases, messages can work. There are advantages and disadvantages. You could see more patients or communicate with more patients. You could realistically serve*	Support

	many patients by letting them know: "these are your lab results, this is your long term glucose level, blood pressure, weight," and so on. "Here is your blood sugar level and do this." But then you, of course, lose this personal communication. And that is an essential part of the job."	
SP1.R12	*"What is successful is that attendance has been okay. There have been a lot of no shows in the past, but it has improved. We should have booking done sooner, we should have better access to the office and the clinic. The information flow from us to the patients should be even better. You know what they should do before they come to see us and what they need to take with them. So then we could make it even more efficient than it is today. Without question."*	No show Support
SP1.R13	*"Unfortunately, people are not aware enough, and you could say that people are prepared enough for their appointment. We have been improving a lot and trying to put out brochures and information. Still, people often come without their information and data and then mainly without their blood sugar measurement. And that is data that we really need. So there is a big gap there. So a lot of our time goes into trying to figure out how the measurements have been, what medication they are taking, and so on. And that is a crucial part. What medication are you taking now, and are there any changes from last time? What dosage? Are you in a medication packaging service? Commonly, people do not know the answers to these questions. So a lot of time goes into digging for this information, calling pharmacies, and so on. And often, these are not databases that we have access to, like the medication packaging. So there are a lot of time-consuming factors that could be eliminated."*	Support
SP1.R14	*"The number of consultation requests has been increasing. We have also taken up these 'urgent appointments'. Those return visits where we are also engaging with the patient. Meeting the patients, along with the consultation. It has become substantial work. And a lot of reviewing. The clinic does the preparation work of the consult, and then the doctor associate comes to you. You have familiarized yourself with the case and guide the doctor associate instead of just looking at the case yourself, which you can do very quickly and process it. So it is a lot of double work, so to say. But then again, this is a teaching hospital, and we need to be in that role, which is often a fun and rewarding part of the job."*	Support
SP1.R15	*"There are waiting lists, but they have been decreasing because we have added more doctor associates and who can work down the waiting list. But this has been a huge issue."*	Support
SP1.R16	*"Telemedicine could be an option for patients between these regular follow-ups and maybe for certain groups where the distance is too great. You do not want to make people travel 400 km to meet you and talk to you for 20 minutes."*	Access
SP1.R17	*"I think the service will be more controlled by technology and less controlled by humans, like what you are looking at, and maybe more controlled by nurses. The doctors maybe do not need to participate in everything. More teamwork. More telemedicine where people can just hand in their charts and some data and gets feedback rather than always some personal interview. I think that will be the evolution."*	Support
SP1.R18	*"We are lacking more collaboration, and the team is maybe a bit dysfunctional. There is some dissatisfaction here and there. This is all a bit scattered. Many experience we are not working as a team, and there are stations scattered here and there that do not interconnect. In fact, we moved two years ago. We were above the emergency department before. That is maybe the most significant change. We moved to be a part of A3[The outpatient department], where the facilities are much better, indeed. Still, it is busier, and we are then a part of another outpatient department, and therefore less by ourselves."*	Unity
SP1.R19	*"In some ways, people are unhappy about that. For example, we had our own break room where we could have discussions and maybe review professional matters. Now we do not have that option anymore because the break room is shared with other people, and you do not want to discuss the patients anymore. That decreases the team's intimacy. It becomes impersonal and bigger. The offices are here and there, and people have less contact ground with each other. So that the facilities are better, but there is less intimacy."*	Unity
SP1.R20	*"We do not have team meetings often enough. We are supposed to have meetings about the patients, but we are spending too little time discussing the patients as a team. It is*	Unity

	more like person A comes to person B and asks, "should we do it like this?" or "what do you think about this?" There is not enough of that the whole group meets as a team, discussing the patients and throwing around ideas. It is more like two people talking about one patient, rather than one group talking about a group of patients."	
SP1.R21	*"It is a management problem and maybe sometimes communication problems between some individuals. There have perhaps been some disagreements, and some people have been unhappy. Other people have dedicated themselves to other things, like education or management positions, and so on. Somehow some groups like nurses have not been too happy in their jobs. This and that has happened and led to that the unit is not functioning well enough."*	Unity
SP1.R22	*"It is also just this environmental factor, like traveling, costs, gas, pollution. These are all things that weigh in and support the adoption of telemedicine services. As a patient, you will not need to get dressed, brush your teeth, and pay for the gas and all that. You are just at home in your pajamas and talking to your doctor or a nurse. Then you can also offer 'flex-appointments', where the patients do not need to take time off work, for example. So there are a lot of economic factors that need to be calculated into this."*	No shows Support Access Change commitment
SP1.R23	*"It is crucial. What I see maybe as a defect with telemedicine technology, is this you know, besides the technology itself. For example, Who is talking? There is always some delay in the video call, and you do not have the body language in front of you. People sit in a chair on a screen far away from you. And you know it is a little bit like talking to patients through an interpreter, the computer works as a barrier, like the third person. So, it is also a matter of training maybe, you just need to dedicate yourself to this. The technology needs to work fast and smoothly, so it will work. But I can see this work very well in some cases. Not solely on its own, but as an addition."*	Technological barriers Change management
SP1.R24	*"But then, of course, very accurate recording can be very time consuming to go through. I have had patients that measure themselves maybe 8 times a day and always documents very thoroughly what he eats and goes through that in detail. He maybe ate a sandwich with tuna salad on Tuesday at 12 p.m., and that is why the blood sugar level was like this, but now I ate a sandwich with roast beef, but still, the blood sugar level was like this. And then you have to go into a lot of fine-tuning with the treatment, and that can be really challenging."*	Support
SP1.R25	*"So it fits the business model, but then it is a question of how the business model is, is it the patient that should pay for the appointment that happens through the computer? Or is it for free? But how is the operational form in the DOC then? Or the organization for that matter."*	Operational management
SP1.R26	*"I would be willing to do that it combination with direct healthcare services, if we can combine this on a reasonable, effective and accessible manner, then I would we willing to commit to this. When you are looking to adopt telemedicine services, you need to be sure that if you are going to provide such service, that you are providing at least as good as or even better services than in the current system. So if you are looking at that the service is in lower quality, and this you can measure with quality indicators or other measurements scales, then I think that we are taking a step back. But some combination of telemedicine and direct healthcare services is desirable"*	Change commitment
SP1.R27	*"The work processes, good administration, staff that is ready to work according to the procedures, and staff that is satisfied with their jobs"*	Change efficacy

Table 7 – Empirical evidence from informant 'Specialist 2'

Specialist 2 (SP2)		
Ref. #	**Quote**	**Codes**
SP2.R1	*"There are large waiting lists for appointments. It is difficult to get rooms, and there are a lot of things that are missing. There is a high deficiency for doctors. If there was any sense in this organization, then they would utilize our workforce to see as many patients per time unit as possible. And let someone else take care of the rest. No matter if the patient is in 'Ísafjörður' or here. You can use the technology to treat them at home. Even if they would come here once a year and get the full check-up."*	Resources Change efficacy Change commitment
SP2.R2	*"We have come up with many ideas about this. But we need people. There is a need for nurses, we need psychologists, we need rooms. We have old computers which do not even have video cameras, it is not even possible to get that to work at the hospital. So a lot is missing, and whenever you start to do something like this here, then you give up after some time."*	Resources Change efficacy Contextual factors Change commitment
SP2.R3	*"The [teamwork] is just fine, it is going okay. We just need people."*	Resources Change efficacy Unity
SP2.R4	*"We do not know. We do not have an overview. There is no quality control system in Iceland. So we do not know how it is going. We have a very rough criteria. So, in reality, we cannot say how it is going. We do not know anything about this group. We cannot concentrate our work to those who are in the worst shape, because we cannot sort them out in any way. We cannot sit down every three months and say: "Okay, these have already had a follow-up and are in good shape, they will have an appointment in one year, contact us if they need. These are a disaster, we need to see them every 4 weeks." We do not have any options to do this."*	Support Operational management
SP2.R5	*"We do not have any quality control system. We do not have any overview of the patients. And we are using the "Saga" system, which is a disaster. So you know, it is not possible, it does not exist. Like in both Sweden and Denmark, where you have those diabetes registries. You can download data, try to have some sort of overview of things, and use the resources they need. You cannot do anything similar to that here. […] You need to have some system like this, otherwise you need to call everyone in under the same circumstances, no matter if they have no need to come here."*	Support Operational management
SP2.R6	*"And then no shows are free in Iceland. People do not pay anything if they do not show up. So then it is just wasted time that is lost."*	No shows
SP2.R7	*"We need to have the possibility to sort the service so that we can have more contact with those who we see that when they come here that they need it and people also need to have some access on their own terms."*	Support
SP2.R8	*"In Iceland, we have had it that way that you meet your doctor every 3 months or something no matter if there is something wrong with you or not. In T1D, we know that we need to screen for complications maybe once a year and go thoroughly through that and check if the treatment is right and things like that. But then diabetes is that way that we know that people are dealing with it daily and things can happen. Some things need to be changed and improved and checked and things like that. Then people need to have the ability to book an appointment for themselves when something has happened but not in August when everything is going great, but maybe it was in June that things went south."*	Support
SP2.R9	*"We have to have some kind of a system that sorts the patients. We can be in more contact with patients that we see when they come to the clinic and need more service. And patients have to have some kind of access to us on their own terms. It all revolves around the fact that people need to take responsibility for themselves and know what they need to do. And they have to have the option to contact us if they feel there is a reason for it, but not just when some group booking system tells them that it is their turn. That would be the first thing."*	Support
SP2.R10	*"We have 'Heilsuvera' which only created more problems, yet, than it solves. Because people have free access. And access is, of course... I am not supposed to be treating someone for an infection in the nail or something. It was just implemented without even thinking about it and just with no controls. Something so typical Icelandic. And then just "oh, is this not what to want." So it needs to be polished a lot before it will become useful. And apart from that, then it does not even support sending data and documents."*	Support Contextual factors Technological barriers

SP2.R11	*"We need to have a system where people can book appointments themselves, either with a doctor or a nurse. We need to have these fixed points. Okay, you'll come once a year, just a one-stop-shop, and we'll do everything that needs to be done and check everything that needs to be checked. Do the blood tests, urine tests, and the examinations that need to be done. However, in between that, we should be able to decide with people when to book them next, or they can book appointments themselves."*	Support
SP2.R12	*"We have some telecommunication equipment with a camera. It is nothing special compared to what I have used before, but it might be enough to start with. It is just on the internet. It does not offer the patients opportunities to connect with us or book an appointment or anything like that. But then we have 'Heilsuvera' from the Director of Health, and there you cannot download any files or data, yet. And we are most often talking to the patients because of their insulin pump report or some standard data that we need to have the ability to share the screen. To be able to see it."*	Support
SP2.R13	*"Patients that live in the countryside, they need to come here. Except for those living in 'Akureyri'. We go north 1-2 a month […] We do not service the rural areas well enough. They do not have the same access as those who live in a driving distance."*	Access
SP2.R14	*"There must be some sort of continuity, that patients get the same messages no matter if he is talking to me or someone else."*	Continuity
SP2.R15	*"That [using data from the CGM] is just a joke in itself. Then I download the data to the hospital computer. We need to have a computer that the hospital "does not know of," which is not connected to the internet because the firewall eats everything. We never get any permission to have anything. But we, of course, need to look through the data with the patient. So either the patients themselves download the data if we have tried to teach them how to do that or we do that here and just look at it with them together on the screen when they come. This can be extremely time-consuming. It takes maybe 10 minutes to set it up. Move it to USB memory into the patient journal, which is, of course, a 30-page report. So, if you are going to review it thoroughly, that will take some time."*	Technological barriers
SP2.R16	*"So we were supposed to have it just like we wanted, but then some project management group formed which none of us were a part of, to begin with. The first drafts took no remarks on what we had been working on. So, all that had to be put in afterward. So it was all very awkward and stupid. And the working environment, we have had a lot of influence on how the patients will flow through the clinic. I think it will be okay, but it is too small. It will be hard to develop that any further in this house. And then the working area, it does not take any considerations of anything that we wanted. They do not listen to anything we say. These people have never worked with us, and do not have any idea of what we are doing. And they are going to decide that we are just going to sit in some open space and yell out personal information for everyone to hear."*	Change management
SP2.R17	*"I have no idea who the project manager is that is responsible for this"*	Change management
SP2.R18	*Yes, like they just came to us, sitting somewhere else and being some "know-it-all" about how this should be for us. There are some project managers, I do not know how many project managers there are in this hospital. I do not see any use for them. I never see them. I have no idea what they do; at least I haven't seen anything in my three years here that project managers have done to makes my day to day work more manageable.*	Change management
SP2.R19	*"We have tried to offer the hospital to buy the solution. We have suggested that they buy another Icelandic system called Kara, which has all the papers ready and ticks in all the boxes, but nothing happens. They wanted to make their own version, and last year they came out with something completely non-functional, you know. You cannot have shared screens, and the image resolution is horrible, and you can't use Google browsers, which is so limiting. There was no way of using this. It is no until now that they have some kind of a solution to it."*	Technological barriers
SP2.R20	*"There are not even video cameras in the computer screens"*	Resources Change efficacy Technological barriers
SP2.R21	*"Opportunities for innovation and improvements are very limited here, you are constantly running into brick walls. There is not much will to remove these walls out of the way. There is not much will for improvements. It is more about having very fancy meetings, but then nothing happens. And finally, there are now some possibilities of*	Governance barriers

	having telecommunications with patients. After three years of arguing with the hospital's administrators, where they ignored almost everything we asked for in the beginning."	
SP2.R22	*"When I came here and started talking about these telemedicine solutions, they looked at me like I was crazy. They didn't understand anything about what I was talking about and did not care to familiarize themselves with the patient group or the operations we do. And that is why they didn't understand anything. And then they did nothing. Then they designated some project manager that was completely incapable of doing what we needed, both in terms of the technical and the medical care part of it."*	Change efficacy Governance barriers
SP2.R23	*"They [the hospital management] just say that it is good to have telehealth services, talk about it in meetings, but I never see these people."*	Governance barriers
SP2.R24	*"Based on my experience, I have a hard time believing that anything will happen here. This organization is so ancient and unwilling to do anything. Like I said, it took three years to get a telecommunication device, which is nothing more than Skype. So if we are to improve something here, the management needs to remove those brick walls out of the way. It is only so far we can go ourselves. There are always these walls in the way. And if that does not happen, I can see myself going into my own practice where I can have this as I want."*	Change efficacy Governance barriers
SP2.R25	*"There is no will for change. There is no will to execute all these fancy statements they talk about in their meetings. I mean, we do not even get patient rooms."*	Change efficacy Governance barriers
SP2.R26	*"Especially not after three years, digging my own grave the whole time, because you never go forward"*	Change efficacy Governance barriers
SP2.R27	*"When am I supposed to answer this? […] we have just been answering these messages in our free time or in between appointments."*	Support Change management
SP2.R28	*"You cannot load in any data there, and we are mostly talking with patients about their charts from their monitors, so we have to be able to share screens so we can see it"*	Technological barriers

Table 8 – Empirical evidence from informant 'Nursing Assistant 1'

Nursing Assistant 1		
Ref. #	**Quote**	**Codes**
NA1.R1	*"We changed the booking system, but you know that it is never just one thing, it is always a combination of things. It has not been so successful, but it may not be the system per se, but because the numbers of doctors have decreased. So we have not been able to have things the way we want them to. And people you know, our patient group is diverse. People have not necessarily been happy with the change. People want things to stay the same. I have been sitting down with people and talking when they come in and wonder about this."*	Resources Change efficacy Change management
NA1.R2	*"But there is a lot in this that is positive. I think that this telecommunication service will be very beneficial for many people. It is a tremendous stress for people to come here from 'Þórshöfn' in the middle of the winter. It is exciting to offer this technology where you just plug it in so that the doctors can see it on their screen and see the numbers and the lab results. I think that things are moving in this direction."*	Support Access Change commitment
NA1.R3	*"Maybe this access, we need to change a bit this access. We get these questions loaded on us, the secretary and me. We are sometimes having difficulties with finding the right pathway for these questions. And then people will get frustrated and are calling again and again and want to know the results of something. This process could be improved extensively. And the doctors are also complaining that there are too many gateways, too many. Some patients call too many times, and we have nothing to say to them except that we will try to get this message to the right person. And I think that that is one factor that needs to really improve. This access to the clinic. It is quite good, but there are too many access entries. Maybe it is that our patients just do not know, but it is sometimes a bit frustrating to get the same calls repeatedly: "hey, I was promised this and that," but it does not happen."*	Support
NA1.R4	*"It happens that people are not showing up. We are trying to call in advance and remind them of the blood test and checking if people are really planning to show up."*	No show
NA1.R5	*"Sometimes teamwork is not as efficient as it could be. Sometimes not everyone is included, and that could improve. Sometimes, you get the feeling that this is just for us, and this is for the others. And that is not what I feel is appropriate for teamwork. That is just my opinion."*	Unity Contextual factors
NA1.R6	*"Teamwork is essential for this patient group."*	Unity
NA1.R7	*"We are trying to discontinue using e-mail communications […] strictly speaking we are not allowed to forward e-mails. Then I have to find some other way, for example, send the message to the 'Heilsugátt' or to the message list. And you know, doctor's preferences differ between individuals. But in 'Heilsuvera', I just connect the message directly to the doctor the patient is asking for. But this opens a channel to the doctors, which can be overwhelming. So there are both advantages and disadvantages."*	Technological barrier Support

Table 9 – Empirical evidence from informant 'Physiotherapist 1'

Physiotherapist 1 (PT1)		
Ref. #	**Quote**	**Codes**
PT1.R1	*"What stands in our way of improving is that we do not have enough resources to see patients as needed. I do not think that the grass is greener in our neighboring countries. But the fact still remains that we do not have an overflow of doctors and nurses who are ready to work here. I know that the salary, working from 8 a.m. to 4 p.m., the salary is nothing special. So that maybe tempts a lot of nurses to work shifts to raise their wages up. But in general, I think that the service is going okay."*	Resources Change efficacy
PT1.R2	*"I do not think that we are missing anything to move more to service through some sort of web-solution. But I feel that we need to define better how often people need to see a doctor and then us [other HCPs]. Some are used to coming every three months and are a bit frustrated that they do not get to meet their doctor after three months. People also complain that they do not get to meet the same doctor always. But that is just the way it is. There are just some specific doctors on duty, and then it is only possible to meet them. But yes, I do not know, I do not have any right solution to fix the show ups. I think no matter what you do. I mean, we had an insulin pump seminar yesterday, where we are offering people to come and get a new insulin pump. And then there was still one individual that did not show up. And when we called the person, they had just woken up and was like "No, I am just so scared of this Corona virus," and he did not let us know. So this is complicated, and I do not see the solution. I am maybe just so used to this system, I just do not know."*	Resources No show Change efficacy
PT1.R3	*"We have been designing a procedure for those who are at risk for foot ulcers, then you meet our podiatrist. They are, in fact, two. But then it would be an agreement between the podiatrist and the patient how regularly it would be. People are discharged from the 'Wound Care Center' after having a foot ulcer that is now healed, then we are seeing people very regularly. Maybe just at 4-6 week intervals, and then we lengthen the ranges as needed."*	Support
PT1.R4	*"I think that we are doing okay. But I also know that if we look at quality indicators like Hb1Ac, that is overly high. But this is not a proper system. Our computer system does not support that we can just analyze that kind of information month by month and see who is over 60 mmol/mol. We would need to try to focus more on the people that are between 60 and 80 mmol/mol, who are really trying, but it is not working out. We may spend less time on patients that are 48 mmol/mol, where everything is going good. They come in once a year and are just happy with how things are going. Do not need anything else than a regular check-up and screening, renewal of prescriptions. If any problems, then we would just solve them."*	Operational management
PT1.R5	*"Of course, it matters to young people with T1D and just all people that have diabetes to have the best blood sugar control possible. That naturally demands that people get the time that they need. But it also cannot be about what people are calling every other day, and there are 1000 words written about the people that meet the HCPs because no one reads that kind of text."*	Support
PT1.R6	*"It would be nice if people would not need to fly from 'Kópasker' and 'Ísafjörður' for a 20-minute conversation."*	Access
PT1.R7	***"****The main issue, what is not going so well for us, is that there are a lot of no shows. We have a long list of people waiting for an appointment while 3 or 4 people out of 8 do not show up that day, then others are waiting at home. We cannot call every single one of them the day before and say: "Hey, are you going to show up tomorrow?". That is not possible. But it would be best if you could know with some certainty and have some opportunities to book someone else."*	No show
PT1.R8	*"We are testing it, and we are building such a system here, but the image resolution sucks. We compared the system with Skype, and the image resolution on Skype is so much better, much clearer what we are watching through the cameras. So the IT department has to do even better with this so this will work for us because people must see clearly what they are looking at."*	Change efficacy Technological barriers
PT1.R9	*"We tried to get this system here, but then it was all about the system not being secure enough. I know that because the servers have to be here in Iceland and something like*	Technological barriers

	that. The developer fixed it, still, they [the IT department] *had to try to design their own system for the hospital. You know this is just so frustrating."*	Change commitment Regulatory environment
PT1.R10	*"Everything here happens at the speed of a snail."*	Change efficacy Governance barriers
PT1.R11	*"We do not have a proper computer system"*	Change efficacy

Table 10 – Empirical evidence from informant 'Patient 1'

Patient 1 (P1)		
Ref. #	**Quote**	**Codes**
P1.R1	*I had not gotten an appointment in a really long time […], and I had to call to actually call and ask for an appointment and got an appointment soon after that. I was always getting some infections because of the sensors. But it got better. And then I just met some guy that I had never seen before, because they had started some rotations so that you never meet the same doctor. And I went, and all good. These are not bad people. But then I was supposed to come back in six months, so somewhere over the summertime. In August I had not heard anything from the clinic and not gotten an appointment for a follow up […], So I just called a private clinic where my doctor is. I have been seeing her for 15 years […] I got an appointment 3 weeks later and yes, I had to pay 50% more, but then I at least met the same doctor.*	Continuity
P1.R2	*"For me, quality in service is a follow-up and that you meet the same doctor. […] I need to have the same doctor. Having three kids and having to go between different doctors, and then just with myself. I have been seeing doctors since I was three years old. And when I was a kid, I was in and out of the hospital. To have to give the same speech over and over again between doctors instead of just… I am a bit "addicted" to seeing my doctor. It is just so comfortable. She also handles the diabetes cases at the maternity ward and has followed through that. You know, just not having to have to go over all of my history over and over again."*	Continuity
P1.R3	*"I trust her, and she also understands her own doctor notes. Instead of reading notes from doctor to doctor, they say the same things in different ways. But to read between doctors. I just think that the quality goes in hand with having the same doctor."*	Continuity
P1.R4	*"I feel that the rotation at the clinic has become too much. They are not meeting the demand for the number of patients that come to see them."*	Continuity
P1.R5	*"I have not showed up for the last two appointments […]I just find it absurd that I do not even get some flexibility to tell them when I can show up. I think that I do not even have the opportunity to change the appointment time if it does not suit me. I called them in August and asked, and they just said that I would get an appointment when it is my turn. I just think that 10 months between appointments is way too long."*	No show Support
P1.R6	*"I then got a text message from the clinic on the 7th of November: You have an appointment booked on the 14th of November. Period. And I, of course, just called and canceled it. You know, it was 10 months later."*	No shows Support
P1.R7	*"I feel like I have to wait a lot. You always go to the blood test and then to the clinic. Then once a year, he [the physiotherapist] will check the eyes and feets every two years. Unless you have some complications that you need to get checked more often […] But it depends a bit on what specialist I am seeing. If I am just seeing an endocrine specialist, which is most often the case for me, It won't take that long. You sometimes have to wait over an hour if you are not booked in the first appointment at 8 am. There is substantial waiting time if you are not in the first appointment in the morning. I always try to get the appointments in the morning because that suits me best."*	Support
P1.R8	*"She [The doctor] always plugs in my monitor to her computer and loads the numbers in. I have never done it myself at home. I have never been able to access the website, and my computer is dying."*	Technological barriers Change management
P1.R9	*"No, I am not afraid of data security. I am just awful with computers, I never open my laptop. I have an iPad at home, and if I could do this on him, I probably would."*	Technological barriers Regulatory environment
P1.R10	*"I do not think that this is a quality service. They [The DOC] are just not meeting the demand"*	Resources Change efficacy Support

Table 11 – Empirical evidence from informant 'Patient 2'

Patient 2 (P2)		
Ref. #	**Quote**	**Codes**
P2.R1	*"I do not get the next appointment when I leave. I get a letter with a new date. And even though I always say "I want to see this doctor", then it usually does not work out. And I find that to be really frustrating. You have found a doctor that you like and are happy with and knows your history and all that. Then sometimes you just meet a doctor associate, more often than not. Because the specialists are busy."*	Continuity
P2.R2	*"And especially when I have maybe decided in my head: I am going to see this doctor, fantastic! I need to tell her this and that and some other things. And then you show up and meet some doctor associate, and you just look at him and: "you can forget this, I am not going to talk to you. There is no trust here between us. I am never going to see you again"*	Continuity
P2.R3	*"If there is one thing that I can complain about then it is not meeting the same doctor. For me, that is number one, two, and three. Absolutely top three. There is maybe nothing else that I can complain about that clinic. But I feel like because you do not come there so often, perhaps every six months, that you should just talk to a specialist, you know. I am not saying that the doctor associates are not good or something, but you want to talk to your specialist. It has been two that I have seen the most. I originally started with this just one specialist that I then wanted to keep seeing always. But then that just kind of stopped."*	Continuity
P2.R4	*"For me to say that this is a quality service, I would need to always meet the same doctor. That there would be better follow up."*	Continuity
P2.R5	*"I think that the service is… When you come there, and you are just randomly assigned like I already told you. Last time the doctor associate that I had was actually excellent. But I said to him: I asked for an appointment with X, and I am not complaining about you, but why can I not get an appointment with my doctor? And then he said that they are in over their head, that the specialists are in over their heads. So should they not outsource this or something, or what should they do. They cannot have some service that is not a service."*	Continuity
P2.R6	*"I have no future vision in regards to this clinic. I am just going to keep feeling good. I mean, like I said and like I have probably said hundreds of times, I want to see the same doctor. I cannot see this working out for them."*	Continuity
P2.R7	*"When I arrive, I just go straight up to the clinic. And then there is often some waiting time."*	No show
P2.R8	*"Usually, you go straight into seeing the nursing assistant as soon as you have let them know that you have arrived. But then you have to wait for the specialist."*	No show
P2.R9	*"I think they [the DOC] are trying, and I do no doubt that. Nevertheless, this has exploded. They are just not able to handle this anymore. It has exploded with a big bang."*	Resources Support
P2.R10	*"According to my experience, this is a terrible service. I am sorry to say so, but it is just terrible. Absolutely horrible service […] I just cannot say that there is quality in this service."*	Support
P2.R11	*I think two[appointments]times a year is rather little, I do not know why I just think so, it is just my opinion and I can't really say why I have this opinion. I have a serious disease and you want to talk to someone that knows more than you"*	Support

Table 11– Empirical evidence from informant 'IT Department Manager 1'

IT Department Manager 1 (IT1)		
Ref. #	**Quote**	**Codes**
IT1.R1	*"It is about how you integrate things into the clinical processes, that is what matters. It is here where most people stop. People sometimes think that just buying the technology they have solved the problem, but it is far from reality. What matters the most, and is something that people usually fail to do is that this will be integrated into how they work from day to day"*	Change management
IT1.R2	*"It has been slower than we thought, because even though we have developed some technological solutions, we are faced with some technical problems. Often it is a matter of getting people to start using the technology. Then there is also a problem on the other end, you have some patients that are not very used to computers and nothing happens. They do not know how to do stuff, and the mute button is on, and nothing happens, or there is a problem with the internet server, and there are some crackles in the mike. There can be a thousand things interrupting this, and the tolerance threshold is rather low with both patients and providers. So if these problems are constantly occurring, people just say no, no this does not work, I do not have time for this. So the adoption goes much slower than was thought to begin with, but it will come slowly."*	Change management
IT1.R3	*"It is all about pilot projects. It is tough to plan like okay in six years things will look like this, and then start with this, and then this and this. You have to bump into a lot of brick walls, regarding both technology and processes. I mean, there are a lot of complications in this. For example, a random patient at home just likes to take up the computer whenever he feels like it, and get in contact with his doctor. But you know the doctors are busy. They do not have time whenever. They have many other things to do. But the patient maybe has enough time. And this is well known, doctors started to give their e-mails and gave patients opportunities to send in questions. In the best-case scenario, the doctor might answer in a few hours. Then just 10 minutes later, another question came from the patient. So this is not always easy to handle"*	Change management
IT1.R4	*"This is precisely our experience with new technology. And you often hear like okay let's make some perfect implementation strategy, no matter if we call it telemedicine or messaging system, for example. It is not easy, you need to try it and test it and you do that with the pilot projects. In some cases, this works very well, and in other cases, it does not. You try it in a department that is interested, and you develop this further in collaboration with the department. Some things work; others do not, and then you fix it. And that, for example, is what has worked out best in 'Heilsugátt'. That is, to do it in small steps. Do not start with it fully ready but get people to participate in the development, to develop it in the right direction."*	Change management
IT1.R5	*"It is a cycle that we would call an agile ideology. This old way of doing it where someone sits down for two years and programs everything, and launches it and then people are like no, this is not what I wanted. That does not work very well. And I think the 'Saga' is an excellent example of that. When they tried to add some new form to the system, it took 2 years to program, and then it was not working when it was finally released."*	Change management
IT1.R6	*"There we would probably be rated very low and the whole hospital as well. Training and education in the hospital is very bad, that is just the way it is. It is worse compared to other places. For example, when a doctor comes from another country and starts working on Monday, no one has taught him anything, and he is just supposed to start working. This is some kind of culture here. You cannot do this in many other countries, you would have to take some tests and so on. I believe that here it is a governance problem. There are too many people working on it. The executive of doctors and nurses, human resources, and more. And then no one does anything intelligent. So implementation and education is not very good at LSH, that is just the way it is."*	Change management
IT1.R7	*"I think it is mostly administrative problems. They [the hospital management] somehow are unable to achieve this [successful change management]. There is a lack of time and this Icelandic indiscipline, I think that it is reflected in that. And then, on the contrary, it is maybe not that easy, this agile ideology. It is not easy to teach that correctly because many new things are coming in every month. So it would be rather obstructing if we would always teach the whole hospital every time there is something new."*	Contextual factors Change management

IT1.R8	*"You become aware that some people are like: 'oh you just can't keep up, there are always some new buttons here and there.' And yes that is true. And you mentioned the messaging system: 'There was no one who taught me how to use it'. And surely, that could have been done in a better way, but I am not sure that we would have gone in the right direction if we had introduced how to use it right away. We spent two years introducing it when we started implementing it when we did not really know where we were going with it. So it is quite tricky to find the right balance. What we instead try to highlight is that the change in the computer systems is similar to when you change the website for an airline company, for example. That is changing all the time, and you do not get any training or education on that. What matters is that as a software engineer, you design it intuitively, that the regular user can figure out how to do things. So when there is a new button that does new things, you should be able to figure it out by yourself."*	Change management
IT1.R9	*"We are often very late with that [the new work processes related to the new technology; how it should be integrated], and sometimes I think that is okay. Like with the messaging system, I do not know if it would have done any good if we had tried to make the processes beforehand, because we didn't know where we were going with this. But now there is more need for it when it has been established. Now someone could say why is it not clear, in general, how the messaging system should be used?"*	Change management
IT1.R10	*"In general, education and implementation are not at its best. But if we are doing a distinct implementation project, then we are very good at that. For example, let's say we are implementing a new ICU system that is treated as a project in a specific place. Same with a new X-ray system like we are starting now, then it is a particular group, and we make sure that it is done right. It is a bit more complicated with systems that go across the whole organization."*	Change management
IT1.R11	*"I think biggest challenges and barriers when it comes to implementing the so-called change management. How are you going to get people to change the way they work. Usually, these implementations require people to do things differently, especially if there are significant changes. For example, with the ICU system, moving from writing everything from the monitors, vitals, and stuff like that on paper to it all being automatic and new processes around drug administration and more. That is a significant factor in this, and to ensure that factor is there can be very complicated."*	Change management
IT1.R12	*"What we do not want to do is to design a unique solution for only diabetes patients. But preferably a more general solution, and that is what we have in mind for the telemedicine service for these patients, we want to be able to use that for the whole hospital."*	Change management
IT1.R13	*"There was a bit of pickle in the clinical factor in the telemedicine service, so I suggested to the Chief doctor to use this [the Cisco System], and I think he is doing that with some patients. But it is only temporary until we have fixed the other solution, so it will become a part of 'Heilsugátt'. So we are taking steps towards it, but our problem is also that we have so many projects. This is only one of the things we are working on, and it actually surprised me when we started this that there was not more demand for it. When we had some solution ready, and at first, we were going to do a project with the psychiatric ward. They are a good group of patients to work with because their treatment is mostly conversations, not much transport of data or something like that. However, there turned out to be not that much interest from the ward."*	Change management
IT1.R14	*"Well, I would say that it never really went so far that the patients got to say what they thought about it. Because the staff just somehow... this was not in their culture, but this will come with time, maybe just a little slower."*	Change management
IT1.R15	*"Maybe it is because the idea is not presented well enough, explaining the benefits and how this can make them work better. It is a part of it, it probably is a part of this. When people try it, and it does not work 100%, people are like: "okay, I am a bit busy, come back later". People back out really quickly, and I do not blame them. There is a lot that comes up. People maybe have some old computers at home, and the internet is not working properly. It lags a bit, and people do not hear what you say, and then people are just like "this does not work" regardless of how much you have prepared on your end. So there are so many things you need to think about in this."*	Change management
IT1.R16	*"Like when they first introduced the computer tablets 6-8 years ago, I somehow thought that would just be a revolution. And we have made many attempts to give them to the clinicians. Still, we found out that it is not enough only to provide them with the tablets, they need to be integrated into their workflows, and many complications come up. It is*	Change management

	often just so much more complicated than you think. There is something human about it, and it does not fit".	
IT1.R17	*"I was convinced that everyone would have tablets in the clinical service. Like you see in the movies. Then everybody has these tablets, and it looks terrific. We made a lot of attempts with the nurses and in the cardiology department and more places. But it wasn't working very well for a variety of reasons."*	Change management
IT1.R18	*"Every month a new version of 'Heilsugátt' is released, and in that version, there are many updates. Maybe something has been fixed, and then there is a new feature. At that time, perhaps only 4-5 people are using it. Then it develops in one direction. In each version, there are maybe 30-50 new updates in different phases in the development process."*	Change management
IT1.R19	*"They say that a doctor spends up to 60% of his time in front of computers. So it is imperative that we decrease this time somehow. Of course, it matters that the doctors spend as much time as possible with the patients. That he is not spending too much time downloading and retrieving data, registering data, getting an overview of the information that concerns the patients, and so forth."*	Technological barriers
IT1.R20	*"To begin with, people saw that it was the technology that was the problem. Telemedicine was challenging, and it was hard to move it forward, and so on. But there are like 10 years since the technology stopped being the problem. There is nothing that is stopping them from having... I mean, because we have Skype, and we are communicating through e-mails and in other ways, including all these small and simple devices that can send in data and that all."*	Technological barriers
IT1.R21	*"For example, we have been trying to do that in the solution we are developing now. Then, for example, when you are booking a patient, you are booking him in the system; still, it is in the form of telecommunication. Instead of it being a separate system, because often it is a stand-alone system on the side, It has to be a part of the current system. That it will be booked in the same booking system, and the doctor will be reminded that he has this appointment. It will be connected to the EHR system, and it will automatically be registered into the EHR and so on. So this integration is a crucial factor if this is supposed to be successful."*	Technological barriers
IT1.R22	*"We are a very complex organization. The Saga system is just one of 30-50 systems that we are managing, and it was not living up to our expectations. That's why we started to develop 'Heilsugátt', which is like a foundation for all of the other ones, and we are putting more power into that."*	Technological barriers
IT1.R23	*"Yes, but then there are plenty of technical problems that can come up in implementations like this. No matter how well you prepare, there is always something that happens, and you have to expect that something will happen. You have to put up the machine in that way that it will be quick to react to technical problems that occur."*	Technological barriers
IT1.R24	*"No, we do not have that yet [solution to receive data from the patients], we put that into phase 2. In phase 1 we were going to be able to have good connections with the patients. But that has been difficult. The system we had didn't support Apple, you know there are so many things that happen, then we had to go a different way, so we are trying to solve these factors. And even if the youngsters are fast to find out how to connect and all, then it is not that simple with a middle-aged man from the West fjords, who's getting psychiatric service."*	Technological barriers
IT1.R25	*"There was one problem. You can, in fact, have the 'Heilsugátt' on mobile devices, because it is an internet browser. But then there were some technical problems. And as soon as the connection was poor, the people got irritated. People found it uncomfortable to write things, and there were a lot of factors like these."*	Technological barriers
IT1.R26	*"In other hospitals, I know that with many other hospitals, they have more staff to do this, and it is done in a more structured way. It is often challenging to get the clinicians to come to meetings. But you know they often say: "I am so busy, I do not have any time to learn how this works," but then they are supposed to start using it the following day."*	Operational management
IT1.R27	*"No, we, in fact, do not get much of that money [from additional funds to telemedicine]. And that is another discussion, how small amounts of money the hospital receives for projects like these. I think in all this telemedicine, then you can definitely complain about a lack of funding. But you know it is a lack of money everywhere. But when it comes to telemedicine, I think it is not only the money that is the problem because the technology*	Contextual factors Operational management

	is there more and less. It just needs to be better tuned in and fix some things, and that's not the highest cost."	
IT1.R28	*"The cost is more associated with administration, training, and education and just getting the project to start. How are you going to use this in the hospital wards? People are just not really there yet. It also complicates things like how are you going to pay for this? The business model is not you known; if you get a patient into your office, you can easily charge him, but if it is through Skype, it is not assumed that the patient pays. So you are dealing with all these problems that still haven't been solved, and while that incentive is not there, do not you think it is more likely that the doctor wants to get you to his office?"*	Operational management
IT1.R29	*"Then there is another big problem we have been dealing with, which is the GDPR. The privacy regulation changed last spring or something like that, so it all became more strict. And the lawyers of the hospital have not been able to create a satisfactory solution so that we can use the patient's web access. Because it is, in fact, health records, and certain laws say that LSH should hold medical health records, it should be stored within the hospital servers. But this data that the sensors create, if people choose to store the data in the cloud, then it is stored somewhere in Europe, and the individuals have lost their control of their data. You know the company says that it is anonymous and all that, but you never know. You see that they are selling this data to pharma companies and in fact whoever wants to buy it. So this is a kind of privacy problem that has made it hard for us to implement this technology as fast as we wanted."*	Regulatory environment
IT1.R30	*"Yes it is a question of who should do it, is it HUT [the IT department] that should do it, because we are more in producing the tools for people. We would need another line of people that would have the role of going into the department units, but we just do not have the staff resources for it, and that is a problem. I would say that this is a management issue, and everyone points at each other."*	Governance barriers
IT1.R31	*"Like the chief doctor at DOC, we haven't been able to serve him with his ideas, that's just the way it is, because we kind of have to focus more on what is general."*	Governance barriers
IT1.R32	*"The number of people we have is way too low and is not increasing, but at the same time development in IT is going up"*	Resource Change efficacy Operational management

Table 12– Empirical evidence from informant 'Lawyer'

Lawyer 1 (LAW1)		
Ref. #	**Quote**	**Codes**
LAW1.R1	*"In fact, the Director of Health has been introducing these rules, it is being used a bit right now. Rules about telemedicine service. You have to get permission from the Directorate of Health to be able to offer telemedicine services. The current GDPR, these general health regulations, laws about health care service, laws about health registry. These regulations concern the use of telemedicine. There are not any specific laws about telemedicine service."*	Regulatory environment
LAW1.R2	*"However,[with GDPR] some things were sharpened, like the safety of information, that is being reinforced. What has been mostly sharpened is the regulations around children. They have special protection, and that can affect how we work with FL."*	Regulatory environment
LAW1.R3	*"Children should have a little more protection than adults regarding personal information that are health information, we need to especially consider them. Then when it comes to telemedicine, we are only working with sensitive data."*	Regulatory environment
LAW1.R4	*"On the other hand, the implementation turned out to be different because if you know FL, there are two ways we can use it. On the one hand, the hospital makes an account. On the other hand, the individuals make their own account, buy the device, and then show the information in there to the healthcare provider."*	Regulatory environment
LAW1.R5	*"The patient could print it out on paper. We do not want people to be sending this information via e-mail. But according to the chief doctor at DOC, the data could just be looked at from the individual's account. The individual can give the provider access to their information."*	Regulatory environment
LAW1.R6	*"I do not see why we should not be able to do this; there is nothing in the way. We are rather technology-minded, and now we are working fast at implementing healthcare service through video calls, so I think we are ready for this. I think the doctor's mindset towards it is very positive, at least the once I've talked to"*	Change efficacy Regulatory environment
LAW1.R7	*"Because it is a huge American corporation with its headquarters in the USA. Abbott or something like that, I am not sure what the name is. They, in fact, own the devices, that is to say, the monitors themselves. Then there is a subsidiary that is in charge of the Freestyle Libre cloud and all that. However, there is a lot of information that goes between these two corporations, and they authorize themselves to share this information with a third party. So we do not know, and we could not get any answers about what they do with the information. That is, who they, in reality, are sharing this data with and in what purpose. For these reasons, we assessed that it wouldn't be responsible for the hospital to sign a contract with this corporation. We cannot say anything to our patients about what would happen to their data [...]. Then it was decided that Icelandic Health Insurance would pay for the devices. And we [the hospital] have to be able to service our patients. So we thought it would be the best way for us, that the patients make their own account and give us a reading access to their account. Therefore we are not directly guaranteeing anything but would be able to service our patients."*	Regulatory environment
LAW1.R8	*"No LSH does not have an FL account as a provider, not that I know of. Like I said, we only viewed this from one side. Still, technically speaking, we should only be able to see the information, not through a provider account. Nevertheless, this is a gray area. In general, we do not really know where we stand. Still, we are not the only health care organization dealing with this, especially now, when Icelandic Health Insurance pays for the devices. Then there will be more the will take advantage of this. For now, we consider it to be our duty to inform the patients about the processing that happens with us, that is, we take the information that we look at and transfer it into the EHR system."*	Regulatory environment
LAW1.R9	*"What are the biggest challenges with moving the information into the EHR? We have regulations about health records, which in fact are more strict than the privacy regulations. According to regulations about health records, we must record all treatment information into the EHR system. Maybe the biggest challenge would be, just like always putting data into the EHR system, that is that you record the right information about the right individual. But that is the biggest challenge in all*	Regulatory environment

	treatment recording, and there is no difference here. But we are of course, in a new territory and this is the first project of this kind we are working on."	
LAW1.R10	*"But the biggest problem is that we are a small country. And when there is a third-party provider like Freestyle Libre, our negotiation power is much weaker than the NHS, for example. For instance, I reviewed everything very well regarding FL, because there was a lot in the contract that didn't really make sense for me. They were not really open to listening to what I had to say, but then I saw that NHS made their own contract with them. That's maybe our biggest problem, how small we are, and therefore we do not get much, we are a small market."*	Regulatory environment
LAW1.R11	*"They do not really see like, I know, like with FL that they weren't going to go into the Icelandic market, but we found a backdoor way to get it. So we are maybe a little powerless in regards to that. And in fact this happening in more industries than healthcare. We are not a very interesting market, so we have to go our own way with certain things. How do we actually incorporate this all, and the IT department has been very good with that. They, for example, have these telemedicine services that are being put up now. Like I said, we are going to have to start doing much more of telemedicine."*	Regulatory environment
LAW1.R12	*"No, we do not' use Kara Connect. It is, in fact, a Sisco system, which is completely hosted through the LSH server. It is a little bit hard to adapt everything so that we can host everything through the LSH server instead of using Sisco.is or Sisco.com and go through that."*	Regulatory environment
LAW1.R13	*"We have very sensitive personal information, and we do not want to have them just anywhere. We, in fact, are not allowed to use just anything because the DPR requires increased security. Then we cannot forget that we are an island and all these cloud services and all that, there does not have to be anything major so that we will lose connection with the universe. We depend on overseas transport, so there are certain things we do not want to store outside of the country, not that telemedicine solutions are an example of that precisely. For example, if we would use more of the service that FL offers, then we want to have that within our system, if worse comes to worst. All of the ministries do this as well, certain things do not leave the country."*	Change management Regulatory environment
LAW1.R14	*"All treatment data will be transferred into the EHR system, it is in the regulations about health recording, so we have to put everything into the EHR. Therefore this has become our process, and we become accountable for this processing. We concluded that we cannot be responsible through the FL system. They are, of course, responsible for the data they hold. We have a disclaimer that we give to patients where we inform them that there is uncertainty regarding the cloud service and this FL device. They are encouraged to read the terms very well, but they must have in mind that all of their information is also put into the EHR system."*	Regulatory environment
LAW1.R15	*"Consent works differently. They [The patients] can as well just not give us access. We really cannot, or we assume that we cannot build on consent when it comes to information that has to be put into the EHR system. Because that is a legal obligation, so we build on that. I do not know how much you know the GDPR, but consent is not really meant for public institutions. It cannot be forced, and you can always question if the patient really is unforced when he agrees that his doctor will use his information. What if you say no, you do not get service? So we do not build our processing of data from consent."*	Regulatory environment
LAW1.R16	*"Well, automatic decision making is something that the GDPR is not very fond of. It appears in the introduction of the regulations that it is technically forbidden. So all automatic decision making needs to have some human interventions. That is probably the biggest challenge that there needs to be done a DPA(data protection assessment) of the processes. Just like there needs to be done a DPA assessment to all telemedicine technology. And we would have been required to do a DPA for FL if we would have gone a different way with it. If the risk is high, then it will be hard to implement. That is the risk for the individual and his data. So it will be hard to implement AI. However, it is the future. We know that we will not get away with not using it. So it will be done in the end, and the risk will be so high that we will not be controlling it entirely, then we need to take this through the Data Protection. That is, the Icelandic Data Protection Authority and get assistance from them. But as I say, there just are specific requirements when it comes to automatic decision making. We do not really have anything that has automated decision making, no project. Still, there are some projects under consideration. But there always needs to be this human factor."*	Regulatory environment
LAW1.R17	*"We are in that kind of a position that if something goes wrong, then very much goes wrong. It would not be good if there was an error in the system or some incorrect information goes in, and the person is just completely misdiagnosed. Then that would*	Regulatory environment

	be very bad. All of this needs to be taken into the decision-making when looking at new technology and if it should be implemented. What is the risk, what is the worst that can happen?"	
LAW1.R18	*"For what it is worth, it is making everybody's life easier. It is not the intention of privacy laws to stand in the way of technology development and better living conditions. It is more about if we are doing this the right way. Are we being safe about who has access? You know how this is arranged. So that is maybe the next challenge that we are providing integrated and default person right protection beforehand."*	Regulatory environment
LAW1.R19	*"It is maybe better to be a bit strict in the beginning instead of losing control. That's just human nature that you get a super good idea, and you just want to run ahead. Here you are forced to tone down a little bit and go through these tedious steps, then we can keep on going with our idea. So the human factor will always be the challenge with person right protection, that is to get people to listen and do what needs to be done."*	Regulatory environment
LAW1.R20	*"In fact, this is something in the beginning when this legislation was introduced: "oh this goddam GDPR," you know. It is not an issue as soon as you get into a conversation with people: "oh, you are not going to stop me, but you're going to help me to do this right." We are first and foremost secure that the patients have their privacy, as well as get the best service possible."*	Regulatory environment
LAW1.R21	*"And that is what we discussed, the chief doctor at DOC and me. That, of course, everyone needs to be doing this the same way. Firstly, it shouldn't be done just the way people feel like, and as well maybe, you know there are more of these devices. Medtronic, for example. And people do not agree on what sensor is the best. Some do not want to use this one and so on… And here we come back to this human factor. It is going to be hard to tell someone, "you cannot use this, you should use this!". This is a challenge, as well."*	Regulatory environment
LAW1.R22	*"Patients have a choice of what sensor they want to use, but the problem is that you do not get anything else subsidized than the FL devices. The Icelandic Health Insurance is not subsidizing, for example, Medtronic devices. So Icelandic people do not have many options unless they are willing to pay for it themselves. There has been a complication, regarding those who have been using Medtronic and want to share their data. That has caused some trouble. But for now, we are only supporting FL because that is the device that has been decided to subsidize."*	Regulatory environment
LAW1.R23	*"When implementing new technology, we should think: how are we going to minimize the damage if something goes wrong? We want to work by the same line, that people use the same things. But then I am told that some sensors like Medtronic are better for the insulin pumps, what FL does not offer. But of course, this needs to be looked at every time."*	Regulatory environment
LAW1.R24	*"To conclude, then it is an absolute key to go through the GDPR before we implement this. That is that we are securing safety and minimize the risk of damage as much as possible. This is, in the end, all something that needs to work, and at the same time, you need to have the lowest risk for the individual. So we must go the right way through this process and begin performing the DPA assessment, have you heard of it? Evaluation of the impact on privacy?"*	Regulatory environment
LAW1.R25	*"It is a critical factor that we do the DPA. In most cases, we need to perform the DPA because we are accountable for the technology being implemented. However, we do not consider ourselves to be responsible for what FL does with the data. But the GDPR steps are crucial, and these will be the most significant projects in the future, with AI and telemedicine."*	Regulatory environment

Table 13– Empirical evidence from informant 'External Informant'

External Informant 1 (X1)		
Ref. #	**Quote**	**Codes**
X1.R1	*"I was a part of the Nordic project 'Connect'. I do not know if you have heard of it. There we were trying to get an insight into the establishment of work processes or this implementation process. This implementation process around sustaining innovations is not just an inspiring project for 12 months, or you know I have a job for 24 months because I am the project manager of implementing this new technology. And then I just quit when the project is over, and nobody continues with it. That is a bit what is happening worldwide, and in the Nordics as well, with projects like these."*	Change management
X1.R2	*"We have been working with a consultant to establish the service where we are not only talking about using it. We pick out 2-3 individuals and set the system up for them and learn from the process. First is to pick, then it is to choose, then it is to go for a visit. Buy the device or rent it, set up the profile, establish the user, establish the relatives, consider the GDPR and keep on going. You know, not just stopping somewhere in the process, stopping at the first barrier. "Oh privacy laws", then we'll just make some form that people have to sign. The project we are working on has been around structuring the implementation process or the idea of how we want this to be. Not on a large scale, but only with 2-3 individuals."*	Change management
X1.R10	*"Government's policies matter when implementation strategies are developed.."*	Governance Contextual factors
X1.R4	*"This is interesting to consider, what is it that drives implementation? What is the driver for a project like this to start? It has been discussed that what characterizes us in the elderly care business is there is a shorter communication path to management. You know between the staff and me. We are ten managers in the elderly homes, and we are very motivated and willing. We act as one in developing the technology."*	Change management Governance barriers
X1.R5	*"For example, to take a form and making it electronic. An application process will make that electronic. Then the next step is that you process the information. You change some of the information collection process because you are doing it electronically, and it might have an impact on the service's ideology, empowerment, and things like that"*	Change management
X1.R6	*"And then there is this next step you might struggle with. How are you going to work with all this data? Then you're on to the next step which is the artificial intelligence, or some macro computing - things that can receive information from your watch and your blood measurements that you do by yourself. It takes it and orders it in an organized way, so that the nurse, specialist or doctor can with just one display see what is happening. It does not work like that now when you get a patient. Like one doctor I know that had this patient that had troubles with blood pressure and was collecting some data with a watch. The patient was always wearing a trainer on the wrist, and could record the heart rate and blood pressure, and then the patient came to the doctor with 30 pages of data."*	Technological barriers'
X1.R7	*"Like now, when there are announcements that all elderly homes are closed, and nobody can visit their relatives. But no one has suggested that they should call them on skype. No one added that sentence to the announcement. But that's probably because there is no equipment in the elderly homes that can receive the Skype calls. There isn't even wireless internet on some elderly homes."*	Technological barriers'
X1.R8	*"There are also technical and ideological problems. That is to say with doctors, the emphasis on the social science model versus someone who is very old school. If you can call it that, you know this model of admitting patients to the hospital and have them under constant surveillance and control every situation around them. This renounce of the professional interview to patients filling out a form by themselves. You were talking about collecting information with diabetes patients, and they do it themselves. Instead of saying like: We are nurses, and we are so important, nobody can do this right but us. This is a conflict in the technological and electronic revolution. That digitizing processes lead to the empowerment of patients. It is just empowerment in its most transparent picture. You know your input, you have some role in there. But we also have to be aware that some people cannot do it by themselves, do not know how to or are simply too sick to handle this. But it is interesting to hear that when we have set this up, there is in use now a certain psychiatric system, which is used to write down people's life history. This system is, in fact, a semi-structured interview that a psychiatrist and a nurse usually*	Operational management Regulatory environment

	take, and It is supposed to be transformed into digital form. And then there come up a lot of speculations regarding when people may start talking about domestic violence, then do we have a third person in there? And what roles does GDPR play there? So there are some interesting ethical considerations. Because this information is, in fact, currently being collected electronically. But when the individuals start to write the information themselves, and it will be documented electronically, then it is suddenly something completely different."	
X1.R9	*"I think that this big thing...I believe it is the politics around professionalism and some ethical matters. This element of letting go of the role. Giving the users have the steering wheel. You know this model, the medical model vs. the social science model. You know to encourage disabled people to be independent and self-manage instead of looking at them as patients. Moving from the patient model and the professionalism model. Proceeding from this, "I know better than you," to saying, "you can do this, it i s better that you do this yourself, and then I can process it."*	Operational management