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Diffusion of e-health services

A qualitative study on the use of e-health services in Sweden during the pandemic

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Diffusion of e-health services: A qualitative study on the use of e-health services in Sweden during the pandemic

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ABSTRACT (MAX. 200 WORDS):
E-health services are critical for improving the quality of life and accessibility of healthcare. There have been multiple developments within e-health services, but the outbreak of the COVID-19 pandemic caused a significant increase in the use of these services, which led to faster diffusion of e-health services. A qualitative study was conducted to examine how the Swedish public healthcare system worked to diffuse e-health services during the pandemic. This study inquired seven domain experts through semi-structured interviews. The result suggests that the diffusion of e-health services was possible due to enhanced collaboration and communication among the public organizations, improved marketing and promotion, and fast-paced adaptations to fit the circumstances around the COVID-19 pandemic. The study revealed the role of government policies, organizational issues, and financial factors that influence e-health diffusion. While it is suggested that the pandemic has accelerated e-health diffusion, it has also decelerated the developments in e-health innovations. Future reforms in organizational standards and workflow are needed to overcome the barriers of e-health diffusions. Moreover, the market needs to be broadened to cater to the needs of the individuals and developments in e-health must be people-centric and beneficial for the user.

Content

Figures

Tables

1 Introduction

1.1 Background

When COVID-19 was declared a pandemic by the World Health Organization on March 19, 2020 (WHO, 2020), many sectors were unprepared for the emerging challenges that arose due to the pandemic. This was also the case for the healthcare sector (Carroll, Strenger, Eber, Porcaro, Cutrera, Fitzgerald & Balfour-Lynn, 2020). The healthcare sector had to quickly find new ways to reach out with information and develop new healthcare-related services to adapt to the new reality of the pandemic. One way this was achieved was with the help of so-called e-health (electronic healthcare) services (Tebeje & Klein, 2021). In many countries, regulations and laws for e-health were made less strict to help increase the speed of the development of new e-health services (Tebeje & Klein, 2021). These new laws and regulations were often more privacy intrusive than their predecessors. For example, e-health was used for contact tracing, often with the help of location services on users' phones. These tracing apps helped mitigate the spread of the pandemic (Urbaczewski & Lee, 2020). This is not the first time e-health has been used during similar crises. Previous use settings include outbreaks of Ebola (Ohannessian, 2015), Zika (Kostkova, Pinheiro dos Santos & Massoni, 2019), MERS, and SARS (Keshvardoost, Bahaadinbeigy & Fatehi, 2020).

For the past decades, most sectors, including the healthcare sector, are becoming more and more digitalized (Anderson & Agarwal, 2011). E-health is a broad concept that includes several different things but with a focus on the digitalization of healthcare, everything from keeping digital medical records and handling prescriptions digitally to more complex things such as telemedicine and digital monitoring. This is all done to make healthcare more efficient and raise healthcare quality (Jardim, 2013). Telemedicine is a broad term for medical consultations performed remotely (Hwang, Guo, Tan & Dang, 2022) and therefore making healthcare more accessible, especially for those who live in remote areas.

Patients' satisfaction is often more positive among those who get their care through e-health services (Venkatesh, Zhang & Sykes, 2011). This is due to several factors such as technical quality, better communication and interaction with personnel, and less time spent waiting (Venkatesh, Zhang & Sykes, 2011). It is also said that the care becomes more person-centered with the use of e-health, meaning that the patients gain a better understanding when it comes to deciding on treatment options (Tebeje & Klein, 2021). A key factor in e-health is to provide information to patients with the help of ICT capabilities, and in doing so, better healthcare can be provided. For example, in rural India, the infant mortality rate was lowered due to e-health kiosks where mothers could find medical information regarding pregnancies (Venkatesh, Rai, Sykes & Aljafari, 2016). Overall, e-health is considered an excellent way to provide affordable healthcare, especially for those in developing countries and rural areas. However, it is not only developing countries that can benefit from the use of e-health, it is also proven that in developed countries such as the US, e-health can also be used to lower the price and improve the quality of healthcare (Sherer, 2014). It is not only hospitals and doctors that use and can benefit from e-health. It is also used in, for example, social services and eldercare (Lolich, Riccò, Deusdad

& Timonen, 2019). When it comes to elder care, seniors can wear wearable devices to help them monitor their activity and vital signs (Abouzahra & Ghasemaghaei, 2021). Caretakers and medical personnel can then use this data to provide better healthcare.

When it comes to Sweden healthcare has benefitted from e-health for many years. In March 2016, the Swedish government agreed on a vision called Vision e-Hälsa2025, which set out the goal for Sweden to become the leading country for the digitalization of healthcare and e-health by 2025 (Regeringen, 2016). This is a joint vision for the different governmental levels of healthcare in Sweden, the national, regional, and municipal level, which all have different responsibilities. Only a few countries within the EU have achieved this (Quaglio, Dario, Stafylas, Tiik, McCormack, Zilgalvis, d'Angelantonio, Karapiperis, Saccavini, Kaili, Bertinato, Bowis, Currie & Hörbst, 2016). It is unclear how this vision affected the Swedish COVID-19 response and preparedness for the pandemic. One way to measure how well prepared an individual is to accept new technologies such as e-health services by measuring technology readiness (Melas, Zampetakis, Dimopoulou & Moustakis, 2014). Research shows that readiness differs among different groups of healthcare workers (Melas et al., 2014).

Sweden also has a specific agency for e-health called e-hälsomyndigheten (The E-Health Agency), which was formed in 2014. This agency has many responsibilities, and for example, they are responsible for the Swedish electronic prescription system and for providing COVID-19 certificates to the citizens of Sweden (eHälsomyndigheten, 2022).

Researchers have argued for the need for more research to be conducted regarding the role of information systems in the COVID-19 pandemic (Ågerfalk, Conboy & Myers, 2020).

1.2 Problem

Many countries across the globe, like the US (Venkatesh et al., 2011), Sweden, and other nations within European Unions (Erlingsdóttir & Lindholm,2013; Hellberg & Johansson, 2017), have focused on the use of information and communication technologies (ICTs) in the healthcare sector (Hellberg & Johansson, 2017; Venkatesh et al., 2011). Despite such investments and promotions of electronic Healthcare (e-healthcare) services, there is little research done on the progress of the healthcare system in response to a nationwide epidemic or pandemic situation. The experience of an outbreak of the COVID-19 pandemic is one such instance that has urged a need for all nations across the globe to look through the diffusion of technology into healthcare. A recent study by Paul et al (2021) on the attitudes of individuals to getting vaccinated against the COVID-19 virus revealed the lack of trust among people towards the public health services in handling the pandemic situation. Despite the aid of ICT-based healthcare services to manage the recent COVID-19 pandemic (Lin et al., 2021), the public's trust in the government agencies and the healthcare system is low (Paul et al., 2021).

The recent technological intervention has been a boom in the healthcare industry (Venkatesh et al., 2011). Technology has played its part effectively in mitigating and controlling the spread of diseases. For example, mobile phones were used to trace contact during the COVID-19 pandemic digitally (Lin et al., 2021), telemedicine was used to provide online assistance and counseling to patients in rural areas within a country (Li et al., 2020), also, there were multiple teleconsultations arranged to aid patients to virtually connect to doctors (Hwang et al., 2020). Apart from using technology in bridging geographic healthcare disparities (Hwang et al., 2020),

the use of ICT within healthcare sectors aids in distributing verifiable medical information among professionals, thereby increasing the quality of medical practices (Venkatesh et al., 2016). Moreover, ICT-enabled electronic health records (EHR) store patients' health-related data digitally and are accessed securely by authorized users or professionals to provide complete information about patients' data (Kohli & Tan, 2016). With technology advancing the healthcare domain in various segments, there still seems to be a lack of trust and increasing concern among the public in the use of ICT-enabled health services (Lin et al., 2021; Paul et al., 2021; Venkatesh et al., 2016). In addition to increasing trust and addressing the concerns like privacy issues, technological barriers, infrastructures, and so on, government agencies must also promote the diffusion of healthcare services among individuals (Melas et al., 2014). One way to improve the diffusion among individuals is to promote the effectiveness and efficiency of the technology-based healthcare systems among the masses and the medical staff and also, improve the quality of the services provided by digitalized healthcare services (Melas et al., 2014). Nevertheless, it is also important to research how innovations are shared and diffused by the individuals within an organization since this process leads to the widespread success of an innovation, according to Ward (2013).

1.3 Research question

While there is research regarding how e-health was utilized during the pandemic, we believe there is a lack of research on strategies that can be used to diffuse e-health services during a crisis situation like the COVID-19 pandemic. Therefore, this study will focus on the diffusion strategies used by the Swedish public healthcare system and the effect a crisis situation like the COVID-19 pandemic has on e-health diffusion. With this, we intend to answer the following question:

How did the Swedish public healthcare system work to diffuse e-health services during the pandemic?

1.4 Purpose

The purpose of this paper is to understand the strategies used by the Swedish public health system to diffuse e-health innovations and their role during the COVID-19 pandemic. This will enable IS researchers to further analyze the e-health diffusion strategies that worked for the Swedish public healthcare system during the COVID-19 pandemic and provide room for further developments within the healthcare sector to better prepare for emergency crisis situations. In doing so, we will use a conceptual model that will help us carry forward our research. Additionally, it will shed light on the present-day developments in the field of the healthcare system and the impacts of the pandemic on the diffusion of e-health innovations. In doing so we will also identify a few key challenges and strategies needed to overcome those challenges. We believe this will give us a holistic view of the diffusion of e-health within the public healthcare of Sweden.

1.5 Delimitation

The purpose of this thesis is to understand the strategies the Swedish public healthcare system takes to diffuse e-health services among the masses. In doing so, we will also understand the current state of e-health services and the role played by the COVID-19 pandemic in the diffusion of e-health services. Hence, we will be interviewing people from Swedish municipalities, regions, and e-health agencies. We have chosen to study e-health services in Sweden, as it is proactively involved in the promotion and development of e-health services (Hellberg & Johansson, 2017; Erlingsdóttir & Lindholm, 2013; Lindquist et al., 2008), which will allow us to understand the latest progress in e-health services and will provide us with more insightful experiences of e-health implementation.

In our thesis, we will be limiting ourselves to the development leaders and specialists involved in strategizing e-healthcare facilities across Sweden. We do not intend to interview the users of e-health services. We understand that it might affect our study to some extent. But, owing to the time constraints and the complexity of healthcare systems, we believe that the experiences of the professionals involved in the Swedish e-healthcare system will provide us with valuable insights into the role of IT in healthcare service and will also provide a comprehensive understanding of the strategies they use to overcome the challenges.

2 Theoretical background

This section of the paper will provide an overview of the key concepts and theories used in this thesis in the context of e-health. We will further discuss the challenges and strategies to overcome e-health diffusion. Further sections will discuss a theoretical framework to create a conceptual model which will guide the research.

2.1 Key terms

The healthcare industry has transformed rapidly, transitioning from traditional paper-based approaches to ICT-based modern practices. Technological diffusion into the medical field is widely referred to as e-health (Weber-Jahnke et al., 2012). E-health, as defined by WHO, is the secure and cost-effective use of ICT to support health and health-related services. These services include telemedicine, mobile health (m-health), electronic medical or health records (EMP or EHR), big data, wearable devices, or the use of artificial intelligence (AI) in the healthcare sector (World Health Organization, n.d.). Collectively, Health Information Systems (HIS), which was coined in the early 1990s, involves using health service appliances having an electronic background to enhance the process of health affairs (Sezgin & Yıldırım, 2014). Apart from improving the quality of health, health information technology (HIT) has also helped reduce mortality rates (Agarwal et al., 2010). Today, Information Technology (IT) is strategically positioned in the clinical and diagnostics centers to store, record, access, and communicate health-related data, thereby enhancing timely decision-making for coordinating effective health services at individual and population levels (Fichman et al, 2011).

In the Nordic countries, "welfare technology" is an umbrella term that encloses the digitalization of healthcare and social services (Cozza, 2018). Welfare technology is the service that enhances the quality of living by helping people or patients to perform daily chores that might need assistance (Cozza, 2018). In short, welfare technologies in Sweden are mainly used for the elderly, people with disabilities and chronically ill people to provide supportive, responsive, or preventive aid (Cozza et al, 2019). The use of welfare technology helps reduce the workload of the caregivers and aids in improving the life expectancy of the elder population (Cozza, 2018). Welfare technology is included within the Vision e-hälsa 2025, which is Sweden's vision for future advancements in e-healthcare (E-Hälsomyndigheten, 2022), and Regeringen (2006) argues that e-health and welfare technologies are often overlapping. Hence, welfare technologies are an integral part of healthcare technology and are critical for fulfilling the goals for e-health within healthcare and social care (Cuesta et al, 2020).

This thesis is intended to study the strategies used by the Swedish public healthcare sector to diffuse e-health innovations and to understand the role of e-health diffusion in combating emergency crisis situations like the COVID-19 pandemic. Innovation is a broad term often used within organizations to refer to the changes occurring within the system to add value to the customers (O'Sullivan & Dooley, 2008, p 1). This change can be a small change in the processes within the system or a groundbreaking change involving the design and development of a novel system (O'Sullivan & Dooley, 2008, p 1). While speaking about e-health innovations in this thesis, we will refer to the changes done within the healthcare systems. This can be innovation or re-innovation of e-health services. Furthermore, we will investigate the various diffusion

strategies used by the Swedish public health services. Technology diffusion refers to the collective adoption of technology by the group of individuals working with it over time (Liu & Miguel-Cruz, 2022). This is slightly different from technology adoption, which refers to an individual's choice to use the technology (Liu & Miguel-Cruz, 2022). Therefore, diffusion looks into the macro perspective of technology usage, whereas adoption deals with the micro perspective of an individual's use of technology (Liu & Miguel-Cruz, 2022). With e-health diffusion strategies, we intend to examine how the use of e-health technology has spread among the population and its role in handling emergency crisis situations like the COVID-19 pandemic.

2.2 IS in Healthcare

The healthcare sector is a very distinct field comprising a vast diversity of patients, professional representatives, treatment options, healthcare delivery process, and stakeholders (Fichman et al., 2011). This diversity within the healthcare sector makes it an excellent fit to be researched under the information system domain (Fichman et al., 2011) and to understand the socio-technological interaction among multiple stakeholder groups and the people within the healthcare sector (Fitzgerald et al, 2008). This thesis section will provide an overview of the existing range of services IT offers in the healthcare domain. With multiple countries investing in IT services for combatting multiple health hazards (Nishantha et al., 2009; Weber-Jahnke et al., 2012), it is vital to understand the services offered by IT within the e-health sector.

2.2.1 Transforming healthcare with electronic devices

Driven by compliance and regulatory requirements, record keeping, and patient care, the healthcare industry has generated quite a lot of data (Raghupathi & Raghupathi, 2014). Yet, there have been numerous instances of fragmented information systems sharing patients' care and high health care spending like misuse of diagnostics testing, avoidable hospitalization, and rehospitalization of patients (Demirezen et al, 2016). One reason for this is because HIS work in "silo". They lack the ability to interact with each other (Weber-Jahnke et al., 2012). Weber-Jahnke et al (2012) suggest that attaining e-health interoperability is not an easy task as there is an added complexity from inherent medical data. The fragmentation of patients' health data also occurs because patients switch from one healthcare practitioner to another (Demirezen et al., 2016). Demirezen et al (2016) suggest a possible way to tackle this problem by using Health Information Exchange (HIE). HIEs are the information-sharing technologies or mechanisms that automate the storage and sharing of health-related data. Besides providing authorized and secure access to information retrieval, HIEs enable safe and effective decision-making. HIEs enable multidirectional flow between laboratories, clinics, and hospitals to enable coherent information across all systems for timely decisions (Demirezen et al., 2016). Furthermore, Adjerid et al (2018) examine the efficiency of services provided by HIEs and use HIEs to reduce the healthcare spending of the patients.

Countries like Sweden have developed nationwide cooperation to create ICT-based user-friendly health services for efficient usability (Lindquist et al., 2008). Municipalities in many Nordic countries use multiple monitoring devices, telecare and alarms, assistive robots and exercise apps, and other mobile health applications to improve the safety of the patients or people at care homes (Kuoppamäki, 2021). Apart from IT benefitting the health care workers, it

benefits the patients by diffusion to multiple other services like EHR (Kohli & Tan, 2016). EHR also referred to as electronic medical records (EMR), is a repository of patients' data stored, accessed, and exchanged among healthcare professionals and patients in a digital format (Kohli & Tan, 2016). Here the data is stored in a consolidated format containing the dated diagnosis and the treatment activities of the patients across multiple institutes, hospitals, labs, and physicians. Besides this, it also contains family medical and dietary history to promote coordinated high quality, high velocity, and high reliability among medical organizations (Kohli & Tan, 2016). EHR use has been further promoted by several other countries like the US (Kohli & Tan, 2016) and countries under the European Union (Eysenbach, 2000). The European Union's data protection directive has made it compulsory for all patients to have access to their data. There have been several ways to access data by the diffusion of IT, through smart cards or services over the internet, or a combination of both (Eysenbach, 2000).

2.2.2   Delivering services through tele-health

As mentioned earlier, IT diffusion in healthcare helps bridge geographic healthcare disparity (Hwang et al., 2020). Despite governments' continuous effort to excel in healthcare services equally across all regions of the globe, it has faced limitations in doing so. This is worsened because urban areas provide healthcare professionals with more attractive social, cultural, and professional incentives than their rural counterparts (Hwang et al., 2020). However, with the developments within tele-health, this uneven distribution of services is being mediated (Hwang et al., 2020). According to WHO, tele-health refers to the long-distance delivery of healthcare services by professionals using ICT to diagnose, treat, and prevent diseases, thereby continuing the advancement in medical healthcare facilities across all regions of the globe (Hwang et al., 2020). Apart from enabling services across the globe, tele-health facilitates epidemiological research for future health care developments. Studies have shown the effectiveness of tele-health in reducing the propagation of disease by enabling physical distancing (Blandford et al., 2020). Additionally, governments and non-governmental organizations (NGOs) provide free telemedicine camps or telecamps to people living in less developed areas to provide healthcare facilities. Thus unleashing the facilities and benefits of telemedicine services (Li et al, 2020).
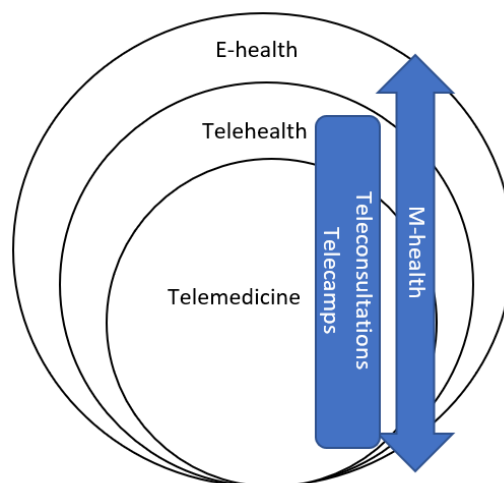

Figure 1: Overview of tele-health within e-health (adapted from Totten et al., 2020, p 2)

Figure 1 above summarizes a few of the IT-enabled services provided within the tele-health domain. Several government initiatives support this field of virtual care through telemedicine

(Hwang et al., 2020). Telemedicine uses audio, video, other telecommunications, and electronic information processing technologies to transfer appropriate medical diagnoses or data, provide help to healthcare professionals, or provide healthcare services to people remotely (Koch, 2006). However, recent advancements in video conferencing technologies have given rise to new opportunities (Bhatia & Taneja, 2018; Koch, 2006). The technology that enables patients and doctors to interact from their residential places over audio-video conferencing is called telehomecare (Koch, 2006). In either scenario, the use of telemedicine or telehomecare facilities enables patients to transfer images, videos, and medical records to an experienced medical practitioner (Bhatia & Taneja, 2018; Koch, 2006). This virtual visit by a medical practitioner is termed "teleconsultation" (Koch, 2006). Apart from enabling the monitoring of vital health hazards from remote locations, telemedicine can be used to educate patients about medicines and enable awareness within discussion forums (Bhatia & Taneja, 2018). Moreover, tele-health enables psychiatric counseling within the premises of the patient's home, thereby fostering private and secure discussion between the patient and healthcare workers (Totten et al., 2020). Especially during an emergency crisis situation like the COVID-19 pandemic, tele-health enabled the continuity of healthcare services without the need for physical face-to-face meetings. As older individuals have the highest risk of mortality from COVID-19, teleconsultations practices have enabled continuity in healthcare services to individuals without disrupting the social distancing norms (Fisk et al., 2020).

2.2.3 IT-enabled e-health awareness

The rise of online and social media communities has facilitated an accelerated proliferation of information technology within our personal and professional lives (Sjöström et al, 2022). This has led to the boom of online health communities and social networks to share health-related information (Agarwal et al., 2010). These online health communities help patients seek and offer support and connect to other individuals facing similar medical conditions (Neal et al, 2007). Patients can ask questions and seek advice relevant to their queries in an online community. It fosters a sense of connectivity and empowers patients by enabling interaction among people with similar health experiences (Rueger et al, 2021). Moreover, online health communities facilitate better decision-making, improved quality of living, and enhanced health literacy among individuals (Neal et al, 2007). Additionally, many organizations use online platforms to deliver health programs to the public. For instance, multiple insurance companies provide web-based health portals to provide health services to people (Agarwal et al., 2010). Multiple physicians also use online platforms to provide services to patients (Wang et al., 2020). Thus, online health communities enable health services to be accessible by reducing the capability gaps among urban and rural communities (Chen et al, 2019). Besides using the internet to deliver services (Wang et al., 2020) and promote health literacy among the masses (Rueger et al., 2021), the recent COVID-19 pandemic outbreak has seen multiple breakthroughs in the use of technology to provide services to individuals (Blandford et al., 2020). COVID-19 saw the extensive use of technology by the government to communicate information about the pandemic and to determine the contact for slowing the spread of the disease (Lin et al., 2021).

2.3 E-health challenges, benefits, and strategies

When it comes to digitalization and digitization of healthcare, e-health has played a significant role since most of these efforts can more or less be considered e-health. But with improved care

due to healthcare becoming more digital than before also comes negative consequences(Anderson & Agarwal, 2011). In other words, healthcare has greatly benefited from the diffusion of e-health. However, as with the diffusion of all new technologies comes challenges that need to be addressed and overcome. Since healthcare involves life and death, these challenges are not to be taken lightly. Especially considering that research shows that 46.5% of all e-health efforts fail during implementation (Granja, Janssen & Johansen, 2018).

2.3.1 Benefits

Besides the benefits of e-health services mentioned in the initial sections of the theoretical background, e-health helps in improving the quality of care (Fitzgerald, Piris & Serrano, 2008). Moreover, e-health helps lower healthcare services costs (Adjerid, Adler-Milstein & Angst, 2018). An additional positive impact of e-health is that it makes healthcare more person-centered (Tebeje & Klein, 2021), meaning the patients can be better informed and participate in the treatment plan. One of the main benefits of e-health is that it makes healthcare more accessible (Newman & Frank, 2013; Fitzgerald, Piris & Serrano, 2008). Especially for people living in developing countries and remote areas, e-health can help gain access to healthcare in an affordable way (Li, Rai & Krishnan, 2020). Another benefit of using e-health is that it can help medical personnel in their decision-making (Jardim, 2013). Among most physicians, e-health is perceived to lower the error rate of care and increase productivity (Anderson & Balas, 2006). It also increases the collaboration between medical personnel (Fitzgerald, Piris & Serrano, 2008). With e-health services, it also gets easier for the medical personnel to access and exchange data and information (Scheibner et al., 2021) between each other and between them and the patients.

According to Scheibner et al. (2021) the most common benefit reported in articles related to e-health is that it improves the efficiency and effectiveness of healthcare processes, coordination, and delivery. Or as Li et al. (2013) describe it, e-health improves the operational efficiency of healthcare. Alkhaldi, Sahama, Huxley and Gajanayake (2014) reason that e-health can be used as a tool to help relieve overburdened healthcare systems. This is something our study further intends to investigate in the context of COVID-19.

2.3.2 Challenges

When it comes to e-health, there are multiple stakeholder groups. The stakeholder groups focused on here are the patients, the medical professionals, and the developers. The challenges identified in the e-health literature are many, and they differ depending on where in the world e-health is being implemented. Examples of challenges faced are social and cultural challenges, financial challenges, technical challenges, and challenges related to policies and legal aspects (Khalifehsoltani & Gerami, 2010). Politics play a crucial role in health affairs, influencing the ways citizens and policies react to the social conditions and policies. Therefore, the public healthcare sector needs to recognize the political dimension concerning health affairs (Oliver, 2006). It is also essential to not forget about challenges related to cost since, according to Granja, Janssen and Johansen (2018) the most common contributing factor when it comes to failed e-health efforts is the cost. Several other papers also bring up cost-related areas as challenges(Anderson & Balas, 2006; Fitzgerald, Piris & Serrano, 2008; Scheibner, Sleigh, Ienca & Vayena 2021).

The challenges that this chapter will focus on are those reoccurring in the literature that are of high relevance to IS research.

2.3.2.1   Privacy and security
E-health Challenges related to privacy are often connected to challenges regarding the security aspect of e-health. Therefore, these two topics will both be covered here. Since healthcare deals with sensitive data like medical records and other personal health information, it is of the highest importance that this information is kept secure and that only the persons authorized to access it have access to it. Also, it is important to authenticate all users and keep records of who has accessed the information and at what time, this is a big challenge, especially when it comes to using cloud services(Al-Issa, Ottom & Tamrawi, 2019). For example, Region Skåne has been criticized for its decision to use an American cloud service provider since it could mean that they have to give American authorities access to information if they ask (Fridh & Lärka, 2020). When talking about Information security, the CIA triad consisting of confidentiality, integrity, and availability is often brought up (Stallings & Brown, 2018). This is also the case when it comes to e-health. Storing medical records on cloud services increases the risk of data ending up in the wrong hands, and it may lead to patients not trusting that the confidentiality of their data is being kept (Al-Issa, Ottom & Tamrawi, 2019). According to Al-Issa, Ottom and Tamrawi (2019), this may result in patients becoming less likely to share sensitive information, leading to an increased risk of faulty diagnoses and treatments being given. Integrity and accessibility of the data are also important since data errors and services being non-available at all times could also have big consequences (Al-Issa, Ottom & Tamrawi, 2019).

2.3.2.2   Accessibility and technology readiness
One problem with the digitalization of healthcare is that service must be available and accessible for all users. Most e-health services can only be accessed through the internet, which means that many people do not have access to these services. There is a digital divide where older people, less educated people, and lower-income people are less inclined to use the Internet (Kreps & Neuhauser, 2010). Even among digital natives who are not affected by the digital divide, the readiness to adopt new e-health services is often lacking. For example, according to Lam, Hines, Lowe, Nagarajan, Keep, Penman and Power (2016), the understanding of e-health among health science students is uncertain or limited even though they feel confident with using ICT in general. So, if even those who are supposed to work with e-health in the future struggle with the technology it is safe to say that technology readiness and accessibility need to be heavily taken into consideration when developing e-health services and that the digital divide also applies to e-health, both when it comes to patients and medical personnel.

2.3.2.3   User resistance
Another challenge for e-health is user resistance to the service (Kreps & Neuhauser, 2010).To lower user resistance toward e-health it is essential to have the target audience in mind when designing the services and that information provided is interactive, engaging, and tailored to the context or situation where it is needed (Kreps & Neuhauser, 2010). It is also important that new e-health services are of good quality and that they live up to the expectations (Granja, Janssen & Johansen, 2018).

2.3.2.4   *Standards and workflow problems*
Healthcare systems face issues interacting with the existing old systems. These legacy systems are old and lack common national standards, making interoperability a challenge (Iroju et al, 2013). Moreover, most of the legacy systems are designed to do specific tasks and have restricted interoperability by the vendors in order to promote more purchases from the same

hospital or clinic (Iroju et al, 2013). Investments in legacy systems may lead to compound "technical debts" (Gopal et al, 2019). It has also been reported that there is a lack of standards for e-health (Kreps & Neuhauser, 2010). This means that it is difficult for e-health devices and services to communicate with each other, resulting in their full potential cannot be reached. According to Granja, Janssen and Johansen (2018), it is also a challenge to fit new e-health services into the old workflow without changing it. It is consequently essential to adapt the workflow so that the benefits of the new services can be fully utilized. Another problem is that the products and services that the vendors provide are not suitable to be accepted for implementation (Anderson & Balas, 2006).

2.3.3 Existing e-health diffusion strategies

Even though e-health services like HIE, EHR, telemedicine, and many other services have proven to be effective in improving the quality of living, the adoption of these services across the EU is relatively low owing to the barriers and challenges (Luca et al, 2021). The perception of citizens and the professionals using the systems and digital infrastructure greatly influences the diffusion of e-health services (Luca et al, 2021). Luca et al (2021) point out the presence of a gap between the adoption planning and implementation of e-health technologies to obtain future strategic benefits. Below are the few strategies described in the previous literature to overcome e-health diffusion challenges.

2.3.3.1 Privacy and security

Handayani et al (2020) suggest that one of the prominent ways to tackle the privacy and security challenges of e-health systems is to ensure that the e-health services and systems conform to the privacy and security regulations of the country. Furthermore, emphasis on improving the quality of system data and ensuring the design of the systems as per the regulation standards can help tackle privacy and security issues to diffuse e-health services. Certification of e-health systems can also ensure trust and reliability among the users (Handayani et al, 2020).

2.3.3.2 Accessibility and technology readiness

One way to improve the accessibility of e-health services among the masses is by strengthening the infrastructure (Lorenzi, 2005) among the masses and improving the documentation of the e-health resources (Li, Ray, Seale, & Macintyre, 2012). Healthcare services must be accessible over fixed and wireless services across all world areas (Lorenzi, 2005). One way to do this is to set up "grids" to boost the computing power of the networks and improve interaction among them (Lorenzi, 2005). E-health systems must be designed keeping in mind the users' requirements and be user-friendly (Ross, Stevenson, Lau, & Murray, 2016). Furthermore, interactive digital support to facilitate the adoption and diffusion of e-health innovation must be administered (Ross et al, 2016). Apart from educating the users on the benefits of e-health innovations, emphasis must be laid on enhancing cooperation among the staff to actively engage themselves in the design and development to improve the quality and efficiency of user-friendly e-health innovations (Ross et al, 2016). Considering the unexpected changes around crisis situations like the COVID-19 pandemic, government organizations need to promote and educate users on the use and benefits of e-health innovations (Alsharif , 2020). Collectively, this can enable faster diffusion of e-health services and better preparedness for future emergency crises (Alsharif, 2020).

2.3.3.3   User resistance
E-health services enhance the quality of living and empower and ensure the active participation of patients (Erlingsdottir & Lindholm, 2013; Lorenzi, 2005). Designing user-friendly e-health systems and educating the users on the benefits of e-health services tackle accessibility and technology readiness challenges (Ross et al, 2016) and helps mitigate user resistance (Davidson & Heineke, 2007). Further studies suggest that involvement within the social system and enhanced social interaction among targeted communities helps in overcoming the natural resistance of the users (Davidson & Heineke, 2007).

2.3.3.4   Standards and workflow problems
The shortage of domain experts in designing and developing e-health systems contributes to e-health integration and adoption challenges (Lorenzi, 2005). Hence, involving e-health experts can help to overcome the challenges involved in e-health diffusion. Moreover, interoperability challenges need to be looked through. One of the strategies to overcome interoperability among the systems within the e-health sector is to ensure that proper standards are laid down (Lorenzi, 2005). These standards must ensure confidentiality and smoothen the interrelationship among the other e-health systems (Lorenzi, 2005). Private sectors are also proactively involved in the e-health innovations from which the public healthcare sector can learn and collaborate to enhance their performance (Handayani et al, 2020). Furthermore, increased communication (Erlingsdottir & Lindholm, 2013) and collaboration (Handayani et al, 2020) among the various healthcare organizations can help solve e-health diffusion challenges. Having well-defined change management (Saunders & Scott, 2014) and leadership visionary (Handayani et al, 2020; Ross et al, 2016) facilitates e-health diffusion. A good leader facilitates a competent workforce through continuous educational learning within the organization (Handayani et al, 2020). The observations from Erlingsdottir & Lindholm (2013) suggest that government rules and regulations must be kept in place to enable communication beyond organizational boundaries irrespective of the geographical boundaries to ensure a smooth transfer of digital information. Further, the financial resources and budgets must align well with the e-health diffusion goals (Ross et al, 2016; Erlingsdottir & Lindholm, 2013). Harmonization of laws, creating common infrastructure, and enforcing technological standardization was stressed even within Sweden's national e-health vision (Ministry of Health and Social Affairs, 2020).

2.4   Use of e-health during epidemics

Studies have shown the emergence of multiple epidemic diseases leading to global mortality or disability (Wilder-Smith et al., 2017). An epidemic or a pandemic is an outbreak of a novel and contagious disease within a region or a community associated with high morbidity and mortality rates (Stuijfzand et al., 2020). Epidemics or pandemics pose more significant risks to healthcare professionals (Stuijfzand et al., 2020) and the public as these diseases need more stringent regulations to stop their propagation (Akinnuwesi et al, 2022). For instance, the recent outbreak of the COVID-19 pandemic, which emerged in Wuhan, China, in 2019, had spread to approximately 130 countries and territories by March 2020 (Raza et al., 2021). It has obstructed the people's livelihood and caused a high mortality rate, thereby instilling fear among the masses (Raza et al., 2021).

Usually, a pandemic requires measures to break the disease's transmission chain by imposing nationwide lockdowns, maintaining physical distancing, and quarantining the affected individuals. These government policies to stop the transmission of disease affect the normal

functioning of society and influence the functioning of the government and public sector (Akinnuwesi et al, 2022; Napitupulu et al., 2021). The COVID-19 pandemic had unprecedented effects on human lives (Giuntella et al, 2021). Multiple cities and countries went through strict government measures like travel restrictions, nationwide lockdowns, and home medical aid to curb the spread of the pandemic (Dai et al, 2021). This has impacted the labor markets, consumption patterns, and economic activities globally and has also affected the physical and mental health of the people (Giuntella et al, 2021). Consequently, There was immense pressure on the government and on the medical healthcare system to flatten the COVID-19 infection curve. The outbreak of the COVID-19 pandemic has provided acceleration to digital transformation and enabled the early diffusion of digital innovations (Amankwah-Amoah et al, 2021). It needed to reduce physical or social interaction among individuals, home confinement and quarantine the infected patient, and deliver medical aid in every area within the country, especially to the people confined at home (Dai et al, 2021). Multiple e-learning, e-government, e-commerce, and e-health tools were developed to reduce the impact of pandemics (Napitupulu et al., 2021). The use of technology made the government's "stay at home" policy feasible with reduced disruption to essential works (Akinnuwesi et al, 2022; Napitupulu et al., 2021; Raza et al., 2021). For instance, the use of tele-health during the COVID-19 pandemic helped doctors and medical staff to address individual health grievances remotely. Additionally, in Africa, telemedicine application has shown tremendous success in deliveries, reporting, and tracking Malaria and Ebola outbreaks among patients (Ohannessian, 2015). Using ICT-based technologies in healthcare services provides a cost-effective and efficient way for health surveillance (Raza et al., 2021). Another instance of successful integration of technology is using digital contact tracing strategies by the government. Contact tracing is the process of identifying the set of people an infected individual might have contacted to quarantine them to stop the propagation of the disease (Urbaczewski & Lee, 2020). Apart from using GPS facilities in smartphones to digitally trace contacts, governments are using other technologies like CCTV cameras, drone footage, electronic payment information, and wristbands to track and control the movements of COVID-19 infected individuals (Urbaczewski & Lee, 2020). Furthermore, the use of social media and online health communities during the COVID-19 pandemic provided a means to gain valuable insights on health from government authorities, researchers and healthcare experts (Do et al., 2020). Additionally, studies show that the use of electronic prescription (ePrescription) and electronic appointment (eAppointment) is expected to save a considerable amount in the healthcare system and in an efficient way to simplify the procedures, standardize the quality and the treatment procedures of the patients (Stanimirović & Matetić, 2020). Apart from this, multiple symptoms checkers have been deployed for early detection and mitigation of COVID-19. The government has launched various portals and websites to educate the public on deadly diseases (Gerli et al., 2021).

Government plays a significant role in ensuring the well-being of the citizens. The Ministry of Health is responsible for creating policies, rules, and regulations to ease the diffusion of e-health systems (Luca et al, 2021). Even though the pandemic enabled digital acceleration (Amankwah-Amoah et al, 2021), it came up with a cost. An observation by Luca et al (2021) suggested that the digital acceleration during the pandemic has caused legal and ethical issues. However, several countries in the EU have now come up with the EU4 Health program to support member states and contribute to post COVID recovery by designing resilient HIS and strengthening e-health innovations (Luca et al, 2021).

With these technological advancements, especially within the public healthcare services, it is critical to understand the various dimensions of technology adoption within the public e-healthcare services. Therefore, this thesis will discuss technology diffusion frameworks

existing within the IS literature and imply them into a conceptual model to study the state of public e-healthcare services in Sweden. This will help the other developing nations, still behind in the digitization of healthcare services, learn from the experiences and strategies for implementation of e-health within the public sector.

2.5 Selection of framework

Information Systems or Information Technology are critical to the functioning of an organization in today's technological era. There have been multiple developments and progress in the field of IS/IT, which benefited the organizations and helped increase the economy of the countries around the globe (Oliveira & Martins, 2011). Therefore, it is essential to understand the dynamic nature of the technology for faster diffusion of technology at an enterprise level for increased competitive growth (Lai, 2017; Oliveira & Martins, 2011). Understanding the determinant factors of technology adoption within an organization will empower organizations to integrate these technologies faster (Lai, 2017; Oliveira & Martins, 2011). However, adopting any new technology is not an easy task. It is full of challenges and needs strategic planning (Salahshour Rad et al., 2018). There are numerous IT adoption frameworks being used in the IS literature like the Technology acceptance model (TAM), Diffusion of innovations (DOI), Unified theory of acceptance and use of technology (UTAUT/UTAUT2), Theory of planned behavior (TPB), Theory of reasoned action (TRA), Delone and McLean IS success model (ISS) and so on (Salahshour Rad et al., 2018). Among them, two prominent frameworks are used to study the adoption of technology at the firm level, namely, TOE and DOI (A. Khan & Qudrat-Ullah, 2021; Oliveira & Martins, 2011). IT adoption, in general, is grouped into three categories, adoption by an individual, by an organization, or by a group or team level. Moreover, the most influential factor affecting technology adoption is perceived ease of use and perceived usefulness. Apart from that, other factors that influence IT adoption and acceptance are attitude, trust, user satisfaction, perceived risk, compatibility, and social interaction among individuals or groups (Salahshour Rad et al., 2018). Moreover, numerous studies have presented a need to increase the focus of technology adoption in firms and organizations rather than focusing on an individual (Salahshour Rad et al., 2018; Oliveira & Martins, 2011). This paper will be using DOI to create a conceptual framework to study the diffusion of e-health across the public sector in Sweden. DOI being one of the most widely used frameworks (Salahshour Rad et al, 2018; Oliveira & Martins, 2011) is used here as we believe it will help to focus on the macro perspective of technology usage and provide us an insight into the characteristics of innovation as well its use within the organization (Ilin et al., 2017). Unlike TOE, DOI provides an overview of the involvement of individual characteristics like the support of top management in the diffusion or use of IT (Ilin et al., 2017), which is an added advantage to promoting e-health in the public sector.

Multiple studies in healthcare have used DOI to understand the diffusion of new healthcare technologies at the individual or organizational level. For instance, DOI was used to understand the adoption of tele-health programs across the rural areas of New Mexico. Woodward et al (2014) used DOI to understand the use and diffusion of ICT-based e-health innovations to improve the healthcare needs of the individuals and aid the healthcare workers. The study found positive feedback about the use of e-health technologies to aid the healthcare sector. A study by Sanson-Fisher (2004) was able to understand the outcomes of clinical activity in the healthcare system through DOI theory. Zhang et al (2015) used the DOI framework to understand the characteristics of innovation and the innovation-decision process on consumers' usage

and acceptance of e-health. Therefore, the use of DOI in the context of e-health is not a new phenomenon; instead, it has been widely used by multiple other authors to study and understand the impact, acceptance, and diffusion of e-health innovations among the people and the professionals.

Examining the diffusion of e-health innovations using DOI will enable us to understand the key decisions that need to be considered while designing an e-health innovation technology. A study from the perspectives of the public healthcare sector will provide an overview of the strategies that the officials take to diffuse e-health services. To name a few, what is the relative advantage of using e-health services over the existing ones? How compatible or straightforward is the new technology instead of the existing one? Are there any observed benefits of the e-health services, or how is the diffusion of e-health innovation being carried out? Apart from realizing the key innovation-decision processes by public healthcare, it will also provide a wide range of knowledge about the communication and promotion strategies used by the public healthcare services to diffuse new technology among the masses and among the professionals. Moreover, the DOI theory will help us understand the potential factors hindering the progress of new e-health services and provide insights into the readiness of public healthcare to adopt new e-health innovations.

2.6 Diffusion of Innovation

Diffusion of innovation (DOI) has been studied closely to understand technology diffusion (Zhang et al., 2015). The theory was created by Everett Rogers and published in the many iterations of his book Diffusion of Innovations since it first was published in 1962 (Rogers, 2003). The theory can be used to identify the different factors that influence the adoption of a method (Mustonen-Ollila & Lyytinen, 2003). A big part of the theory revolves around the goal of removing uncertainty about innovation for it to get diffused.

Diffusion has been defined as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p5). The DOI theory consists of four main elements included in the definition above, the innovation, communications channels, time, and the social system. The innovation does not have to be an actual product. It can be an idea or product, and the most important thing is that it is considered new by the members of the social system (Rogers, 2003). When an innovation gets adopted, it can get re-innovated by the users to fit their needs better. The re-innovation affects the speed of diffusion positively, and the usage of the innovation can be prolonged, leading to a more sustainable innovation (Rogers, 2003). Similar innovations can be grouped in so-called technology clusters (Rogers, 2003). Our research treats e-health as one of these technology clusters since we believe that different e-health services are often similar enough to motivate this, and we wanted to get an as full picture of the use of e-health during the pandemic as possible.

2.6.1 The Innovation

When it comes to innovation, it can only be adopted fully by the individuals of the social system if it is also adopted by organizations (Rogers, 2003). For e-health, this means it can only be adopted by the citizens when it has been adopted by the healthcare sector organizations first. According to Rogers (2003), there are five main perceived attributes of innovations. Those

attributes are *relative advantage, compatibility, complexity, trialability,* and *observability* (Agarwal, R. & Prasad, J. 1997). They all affect the adoption rate, but relative advantage and compatibility are the most influential (Rogers, 2003). The attributes were identified through researching thousands of innovation studies and are based on the perception of the innovation and not the perception of using the innovation (Moore & Benbasat, 1991). The relative advantage measures how much better the innovation is perceived compared to its predecessor (Rogers, 2003). This includes several factors, such as how it affects the social image and status of the user (Moore & Benbasat, 1991). Compatibility is how consistent the innovation is perceived compared to existing values, past experiences, and adopters' needs (Rogers, 2003). Complexity is related to how difficult the innovation is to understand and its perceived ease of use (Rogers, 2003). Trialability is how well the innovation can be tested and experimented on, and finally, observability is how visible the result of implementing the innovation is to others(Rogers, 2003).

The five attributes of Rogers (2003) have by some researchers been expanded to include more attributes and to fit the IS field better. A heavily cited example of this is the research of Moore and Benbasat (1991) which listed the attributes as voluntariness, image, relative advantage, compatibility, ease of use, result demonstrability, visibility and trialability. Observability is from DOI and is split into two different attributes, demonstrability, and visibility and observability (Moore & Benbasat, 1991). Depending on the innovation, the relevant factors can differ, for instance cost can be an impacting factor (Premkumar, Ramamurthy & Nilakanta, 1994).

There are also external and internal factors that affect the innovativeness of organizations. With leaders who have a positive attitude toward the change, the organization gets more innovative (Rogers, 2003) and research has shown that top management support influences diffusion positively (Bradford & Florin, 2003). The internal characteristics of the organizational structure that have a positive (+) or negative (-) impact on the organization's innovativeness are (Rogers, 2003):

- - Centralization
- - Formalization (level of bureaucracy)
- + Complexity (in-house knowledge)
- + Interconnectedness (flow of ideas)
- + Organizational slack (resources)
- + The Size of the organization

2.6.2 Time

According to Rogers (2003), there are three main areas where the time dimension is involved in diffusion: the innovation-decision process, determining the innovativeness of system members, and determining the adoption rate. Within the DOI theory, adopters are categorized according to their innovativeness. Those more innovative adopt innovations sooner, and others can follow and learn from them (Rogers, 2003). It is also said that those who adopt earlier do it for more thought out reasons, such as perceived benefits, while the others follow without clear intentions (Beatty, Shim & Jones, 2001). When looking at the adoption rate, a key concept is critical mass. According to Rogers (2003), reaching critical mass means that enough people have adopted the innovation for the innovation process to become self-sustaining due to spread through interpersonal communication channels. When critical mass is reached, the diffusion process is accelerated.

2.6.2.1   The innovation-decision process

The innovation-decision process consists of five stages, according to Rogers (2003):

1. Knowledge - finding out about the existence and properties of the innovation
2. Persuasion - forming an opinion about the innovation
3. Decision - deciding whether to adopt or not
4. Implementation - the innovation gets used
5. Confirmation. - reinforcing the adoption decision to reach acceptance

For the knowledge stage, mass media is an effective communication channel. However, interpersonal communication networks are more effective for the persuasion and decision stage since the user wants to know how the innovation affects them personally (Rogers, 2003).

When it comes to organizational diffusion, the five stages are different, according to Rogers (2003):

1. Agenda-setting - problems, and innovations to solve them are identified
2. Matching - ensuring that the innovation fits the problem
3. Redefining/Restructuring - the organization adapts to the innovation and vice versa
4. Clarifying - by being put to use, the benefits of the innovations are seen by others
5. Routinizing - the innovation becomes a natural part of the day-to-day business

2.6.3 Communication channels

Rogers (2003) argues that diffusion is a form of communication where the message that is being communicated is the new idea or innovation. This can be described as how new ideas are spread between individuals and that without communication, innovation cannot be spread. However, to spread the idea, the message must go through so-called communication channels (Rogers, 2003). These communication channels include mass media and interpersonal channels, where the former has a higher reach. However, the latter has a higher penetration rate when it comes to making individuals adopt new ideas (Rogers, 2003). Interpersonal channels are deemed more effective since the message can be tailored to fit the recipient (Sanson-Fisher, 2004). In addition to these channels, so-called new media channels like social media play an essential role in diffusion (Sundstrom, 2016).

2.6.4 The Social system

A social system may vary in size and can be described as a set of interconnected units (for example, the healthcare workers in a municipality or the public) trying to reach a common goal by solving a joint problem (Rogers, 2003). This can be achieved with the help of innovation. Change and diffusion can happen faster if the social system fosters innovation and creativity (Sanson-Fisher, 2004).

Depending on the system, different structures and norms are applicable, these norms can affect the members' willingness to adopt an innovation (Rogers, 2003). The members of the social system have different roles. Their credibility and ability to influence other members vary depending on their role. Those most credible are called opinion leaders (Rogers, 2003). They are often innovative and have large communication networks within organizations that they can

utilize to influence others (Rogers, 2003). Often in the early phases of a project, they get included since their backing of the project decreases the resistance among the other members. The opinion leaders can get assigned to the projects by so-called change agents, who are those that want to make change happen within the organization (Rogers,2003).

There are three types of innovation decisions within a social system: optional, collective, and authority decisions, where authority decisions are more likely to lead to a faster adoption rate (Rogers, 2003). When it comes to the diffusion of e-health in Swedish healthcare, we have decided to treat the whole healthcare system as a social system.

2.7 E-health services diffusion framework
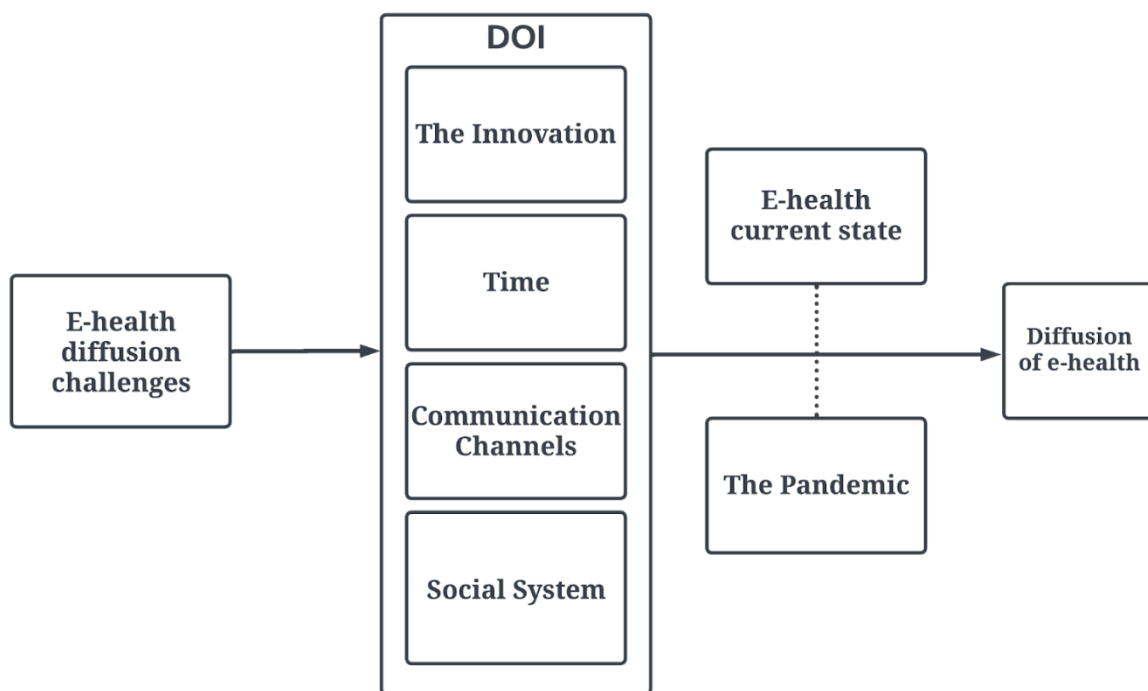
Figure 2: Diffusion of e-health innovations in the public health sector

With the theoretical overview of e-health and the DOI in place, this section will provide a conceptual framework that will be used to understand how the public health system of Sweden has been diffusing e-health innovation across the nation. The conceptual model above (Figure 2) primarily uses Rogers (2003) DOI theory to base the understanding of our study. From our understanding of the literature, we feel that e-health innovation is greatly affected by its underlying challenges. The public health organization will have to consider the challenges to successfully diffuse e-health innovations. The current state of e-health and the pandemic has affected the diffusion of e-health. We will use the above conceptual model to base our research and data collection method for examining the challenges and strategies for e-health diffusion, which will help grow an understanding of the diffusion process in the Swedish public health care system.

Firstly, within the DOI framework, we will examine the features influencing "the innovation" in public healthcare. One of the main aspects of the diffusion of technology is its perceived ease of use and relative advantage of using these services (Salahshour Rad et al., 2018). However, when it comes to the public health sector, government rules, regulations, and policies also play a major role in the acceptance and diffusion of new e-health services. Moreover, an organization must have adequate competency and readiness to accept and adapt to new e-health solutions.

Secondly, with "time," this thesis will examine how public health organizations carry out their innovation-decision. Thirdly, we will learn about the various "communication channels" used by government agencies to communicate and promote e-health innovations. With this, we will understand how a decision taken within the organization is communicated to all users. Lastly, "social system" will help us investigate how public health agencies use their opinion leaders and change agents to communicate and influence the use of e-health among the public and the professionals. These communication channels and social systems aid as a medium to collaborate and convey the developments with other similar organizations or teams working within the public sectors to implement e-health services successfully. We believe that this will enable us to delve deeper into the factors impacting the diffusion of e-health innovation within Sweden.

2.8 Summary

The Healthcare sector has transformed with the introduction of IT and it has been evident from the literature that are addressed in the theoretical background of this paper. A brief summary of the key concepts that helped us summarize and thematize previous literature relevant to our study is presented in the table (Table 1) below.

Theme	Concept	Author
ECS	- Developments of ICT-based e-healthcare services. - Examples are EMR/EHRs, HIE, PDAs, robots, digital monitoring, tele-health services, eAppointments, web-based health portals and so on.	Kohli & Tan, 2016; Kuoppamäki, 2021; Hwang et al., 2020; Blandford et al., 2020; Li et al 2020; Fisk et al., 2020; Totten et al., 2020
EP	- Use of wearable devices and camera aided technology to tack digital contact tracing - Use of tele-health to provide healthcare services to public - Using technology to make continuity of healthcare services while maintaining physical distancing. - Improving health awareness among citizens using social media and mass media networks	Fisk et al., 2020; Akinnuwesi et al, 2022; Stuijfzand et al., 2020; Napitupulu et al., 2021; Raza et al., 2021; Urbaczewski & Lee, 2020; Do et al., 2020; Stanimirović & Matetić, 2020; Gerli et al., 2021; Abouzahra & Ghasemaghaei, 2021
DOI (DI,	- Innovation - Time	Rogers 2003; Moore & Benbasat, 1991; Agarwal and Prasad,

DT, DC, DS)	● Communication Channels ● Social System	1997; Zhang et al., 2015; Woodward et al, 2014; Sanson-Fisher, 2004; Salahshour Rad et al, 2018; Oliveira & Martins, 2011; Ilin et al., 2017; Agarwal & Prasad, 1998
EB	● Enables timely detection of diseases ● Enables efficient decision-making ● Eliminate geographical disparity ● Improved quality of service at reduced cost ● Aid healthcare providers ● Enables efficient time and resource management	Fitzgerald, Piris & Serrano, 2008; Newman & Frank, 2013; Anderson & Balas, 2006; Scheibner et al., 2021; Luca et al, 2021; Alkhaldi et al , 2014
EC	● Privacy and security ● Accessibility ● User resistance ● Standardization and workflow issues ● Interoperability challenges ● Politics, Policies, and legal issues	Khalifehsoltani & Gerami, 2010; Anderson & Balas, 2006; Fitzgerald, Piris & Serrano, 2008; Scheibner, Sleigh, Ienca & Vayena 2021; Granja, Janssen &Johansen, 2018; Al-Issa, Ottom & Tamrawi, 2019; Kreps & Neuhauser, 2010; Iroju et al, 2013
ES	E-health diffusion is facilitated by: ● Ease of design and implementation. ● Ease of use. ● Relative advantages of using e-health. ● Perceived benefits. ● Promotion, marketing, and campaigns	Salahshour Rad et al., 2018; Rueger et al., 2021; Lin et al., 2021; Kohli & Tan, 2016; Rogers 2003; Moore & Benbasat, 1991; Agarwal and Prasad, 1997; Zhang et al., 2015; Woodward et al, 2014; Sanson-Fisher, 2004; Salahshour Rad et al, 2018; Oliveira & Martins, 2011; Ilin et al., 2017

Table 1: Summarizing table regarding themes, concepts and articles

3 Research design

3.1 Research Strategy

Hassan, Mingers & Stahl (2018) say research is a philosophy in action. Hence, the very fundamental of any research is its underlying philosophy. With this in mind and the context of the thesis described above, we believed a qualitative study would provide us with the best insights into the government officials' experiences in strategizing e-health diffusion across Sweden. We performed a qualitative interpretive study in a deductive manner to learn the various strategies and challenges faced by the public health sector in the diffusion of e-health. This is in light of Klein & Myers (1999) argument that interpretive research helps IS researchers to study and understand from the human experiences and actions in a social and organizational context. Using interpretivism will provide valuable insights from IS perspective (Klein & Myers, 1999) and enable understanding of the already existing subjective meanings of the social world and constructs them as building blocks of theory (Goldkuhl, 2012). Moreover, unlike the positivist approach, where knowledge is only linked to scientific artifacts, interpretivism facilitates IS researchers to draw knowledge from human cognition (Walsham, 1995). As Levallet, Denford, & Chan (2021, p 6) suggests, deductive reasoning is associated with employing "syllogism to logically deduce specific conclusions from general true premises", meaning that with deductive reasoning, a researcher can use the theoretical background to base their understanding for studying the research findings and to draw further conclusions. In this study, we have used the DOI theory to formulate our research and data collection method to further understand the public healthcare sector's diffusion of e-health innovations. The complexity of the Swedish public healthcare sector provides us an opportunity to learn from the people's experiences within the organization. Moreover, we believe that using DOI for interpretivism in a deductive manner has helped us draw some insightful linkages with e-health diffusion and its role in mitigating the COVID-19 pandemic.

3.2 Research Setting

The research setting of the thesis is the public healthcare system of Sweden. The healthcare system is divided into three administrative levels, national government, regions, and municipalities (Kliniska studier, 2021). Each level has its own responsibilities, but there is also collaboration between the actors and levels (Folkhälsomyndigheten, n.d.).

The national level of the Swedish healthcare system is responsible for principles and guidelines regarding health- and medical care (Kliniska studier, 2021). Examples of these agencies are the Public Health Agency, the e-health Agency, the National Board of Health and Welfare, and the Medical Products Agency (Kliniska studier, 2021). The E-health Agency is responsible for coordinating the e-health initiatives set out by the national government (E-Hälsomyndigheten, n.d). Sweden is divided into 21 regions. They are governed by a regional assembly that consists of politicians elected by the citizens of the regions (Kliniska studier, 2021). The responsibilities of the regions when it comes to topics related to health are many, for example, dental care, medical care, and health care (Folkhälsomyndigheten, n.d.). In this work, they also support the municipalities in the public health work (Folkhälsomyndigheten, n.d.). The municipalities are

considered the local level of the Swedish healthcare system, and there are 290 municipalities in Sweden (Kliniska studier, 2021). The municipalities are responsible for many of the public health functions in the society, such as schools, social services, care for people with disabilities, and elderly care.

3.3 Data collection

3.3.1 Data Collection method

The data collection method we chose to use was interviews. According to Recker (2013) this is the most prominent qualitative data collection method. Oates (2005) argues that interviews are a good data collection method when you want to gain detailed information and ask more complex questions. And according to Patton (2014), interviews provide the interviewee with a framework that allows them to express their thoughts and vocabulary within it. We believe this is a good fit for our interpretive study and according to Bhattacherjee (2012) interviews are the most used data collection method for interpretive studies. We decided to perform the interviews in a semi-structured way. This meant that we constructed an interview guide with questions, but we did not have to follow it strictly. According to Bryman and Bell (2011) you do not have to follow an exact order, and if the interviewee brings up something interesting, you can ask follow-up questions that are not in the guide. Since we wanted to gain a deeper understanding of the topic we deemed this fitting for our research. The questions will all be asked eventually (Bryman & Bell, 2011), and the interview guide acts more like a checklist to make sure all the questions have been answered (Patton, 2014). An advantage of the unstructured approach is that the person interviewing is more likely to see things according to how the interviewee sees them (Bryman & Bell, 2011). This aspect was vital since we wanted to avoid bias and know the interviewee's true thoughts.

Due to the limited time, resources and the pandemic, we conducted the interviews online via video chat. We did not think that this would affect the quality of our research since it has been proven that video interviews can be performed during the pandemic with maintained quality (Moises C. Torrentira, 2020). Even though our respondents are Swedish, we decided to conduct interviews in English so that both of us could take part in the interview process. In doing so, we hoped that the quality of the interviews would increase. We gave all respondents the option to conduct the interviews in Swedish if that made them more comfortable and told them that they could mix in Swedish words if needed. No respondent was opposed to getting interviewed in English.

3.3.2 Respondent selection

Our qualitative research approach made us choose purposive sampling when it came to respondent selection. Purposive sampling is described as selecting respondents based on specific properties of interest (Recker, 2013). Since Swedish healthcare is divided into different government levels, we wanted to find respondents from all levels to make sure that we would get a complete picture of the diffusion of e-health in Swedish public healthcare. We, therefore, decided to conduct interviews with representatives from municipalities, regions, and the Swedish e-health agency to get multiple perspectives. Other agencies could have been interviewed at the national

government level, but we deemed the Swedish e-health agency the most relevant agency for our research. We were especially considering their role in the Covid-19 pandemic. We wanted to get an equal representation of the different levels as possible and ended up with a 2/3/2 split. The organizations and respondents were found through news articles and governmental reports about e-health and the digitalization of healthcare. Some of the respondents were also identified via LinkedIn searches. We reached out to the respondents via e-mail and LinkedIn and explained the intentions of our research to them. In some cases, they gave us contact information of other people they deemed more relevant to contact for our research. The respondents all have roles that give them a good insight into the implementation process and its strategies. Most of them can be considered what Rogers (2003) describes as change agents.

3.3.3 Respondent presentation

The respondents were given respondent codes based on what type of organization they represent. This was done to provide easy access to what kind of organization the referenced respondent represented. R stands for region, M for municipality, and E for the Swedish e-health Agency. Only one of the respondents wished to remain anonymous, and they are presented as Region X in the table below.

Code	Organization	Role	Date	Time	Appendix
M1	Lerums kommun	Development leader	20/4	54:44	2
M2	Karlstads kommun	Development leader – Digitalization and welfare technology	25/4	47:35	3
R1	Region Sörmland	E-health Strategist	25/4	45:25	4
R2	Region X	Transformation Leader / Implementation Strategist	25/4	53:48	5
R3	Region Värmland	Implementation/Development Leader	26/4	53:11	6
E1	E-hälsomyndigheten	Investigator / Senior Adviser	27/4	55:33	7
E2	E-hälsomyndigheten	Investigator	28/4	52:54	8

Table 2: Respondent presentation

3.3.4 Secondary data

The respondents provided us with secondary data after the interviews in some cases. This data had different formats, plain e-mails, links to reports, internal reports, and external reports. According to the table below, this data will be coded in the findings and discussion.

Respondent	Code	Type	Title of document	Source
M1	M1:S1	E-mail meeting notes		M1:169
M1	M1:S3	Internal document	Svar från Lerums kommun till GR angående frågor kring stödjande material och hinder för breddinförande	(Lerums kommun, 2022)
M1	M1:S4	Internal document	Handlingsplan för digitalisering 2020-2021	Diarie.nr: KS19.1036
E1	E1:S1	Report	Uppföljning Vision E-Hälsa 2025	(E-Hälsomyndigheten, 2022)
E2	E2:S1	Website	Digital Verksamhetsutveckling under Pågående Coronapandemi	(E-Hälsomyndigheten, 2021)

Table 3: Secondary data

3.3.5 Interview guide

As described in chapter 3.3.1, we decided to use semi-structured interviews as our data collection method. We, therefore, needed to create an interview guide. As suggested by Bryman and Bell (2011), the basis of our interview guide was to construct it in a way that made us able to answer our research question. In semi-structured interviews, the questions follow predefined themes (Oates, 2005) or topic areas (Bryman & Bell, 2011). This we also had in mind when creating the interview guide and used the themes we identified during our literature review. We tried to write open-ended questions to gain detailed insight, as suggested by Patton (2014). Creating questions was iterative, following what is suggested by Bryman and Bell (2011). Meaning that we returned and refined the questions when we deemed necessary. While creating the interview guide, we followed the structure Myers and Newman (2007) proposed: an opening, an introduction, key questions, and a closing. In our opening, we introduced ourselves, then during the introduction, we went over ethical formalities and introduced our research topic. We also explained that we would use the term adoption instead of diffusion during the interview since we believed that the diffusion concept might be hard to grasp, which could lead to confusion. Our key questions were designed to be open-ended and touched upon our previously mentioned themes.

The interview guide can be found in Appendix 1.

3.4 Data analysis strategy

3.4.1 Transcribing

During our interview, a few of our respondents wanted to share some additional information about e-health innovations and their current state, so they shared them via email. We have included these as secondary data for drawing inferences for this research. As mentioned by Benbasat, Goldstein & Mead (1987), using data from multiple sources offers a good opportunity for data triangulation and enlightens researchers with new dimensions of findings for the study. This enables richer data collection and ensures greater data accuracy (Benbasat, Goldstein & Mead, 1987). Once all the data was collected, we started by examining the collected information. The data analysis of our research began with understanding the existing work in e-health innovations, drawing patterns from the research in the e-health sector, which is in accordance with Patton (2015). This helped us to organize the data required for analysis. Furthermore, we transcribed the interview on the same day the interview was performed so that we could analyze our data further. Patton (2015) further suggests a few steps to ensure a solid qualitative analysis which were followed during our data analysis process:

- Begin analysis during fieldwork: The existing research in the e-health domain was analyzed, and also the use of HIT during the recent outbreak was examined to base our data collection and analysis process. The recent COVID-19 pandemic outbreak provided a means to understand the innovations in e-health within Sweden further.
- Inventory and organize the data: The interview data generated during data collection was humongous. They were compiled and organized in order to prevent data mishandling.
- Fill in gaps in the data: The interviews were transcribed on the same day. Moreover, Bryman and Bell (2011, p 483) suggested that it is a good practice not to keep the interview data piled up and perform the transcription as and when available. This is one of the most tedious and time-consuming methods (Bryman and Bell, 2011, p 483). We used voice-to-text recognition software "Otter AI" to convert the audio recordings to text. After that, both of us manually verified the transcribed text because there were cases where the software was unable to recognize the dialects. In a few places, interviewees had used Swedish terms which needed to be translated. The transcription process was done iteratively to eliminate any loss of data.
- Protect the data: The transcribed data were sent to the interviewees to cross-verify the authenticity of the transcription. We made sure that only we had access to the data and it was protected and backed up securely.
- Reaffirm the purpose of your inquiry: The purpose of our interview was well communicated to the interviewees.
- Schedule intense, dedicated time for analysis: We did iterative examination and analysis of our collected data.
- Clarify and determine your initial analysis strategy: Our data analysis method was coding, agreeing with Carroll & Swatman (2000).
- Be reflective and reflexive: We transcribed and coded our interview iteratively. This allowed us to be more reflective of the collected data.

3.4.2 Coding

A good formulated interview is a fundamental step to efficient data analysis. Semi-structured interviews provide meaningful dimensions for data analysis (Goldkuhl, 2019). The details collected during the semi-structured interview were analyzed iteratively to draw meaningful insights. As qualitative research is based on drawing meaningful insights from people's experiences and observations, the data collected through interviews would be words, phrases, or images (Carroll & Swatman, 2000). This makes coding an ideal data analysis method (Carroll & Swatman, 2000). Coding involves grouping together important segments of words or phrases through labels or tags (Recker, 2013; O'Flaherty & Whalley, 2004). As deductive coding ensures higher precision in the study (Haug, Rietz & Maedche, 2021), in this research, we have done deductive coding as we have developed our codes based on our understanding of the DOI framework. We used nine color codes corresponding to 9 different themes. They are presented in table 3 below:

Code	Category	Color
ECS	E-health current state	
EP	E-health pandemic	
DI	DOI Innovation	
DT	DOI Time	
DC	DOI Communication	
DS	DOI Social System	
EC	E-health diffusion challenges	
EB	E-health diffusion benefits	
ES	E-health diffusion strategy	

Table 4: Color codes and themes for the transcript

Our conceptual model was primarily based on DOI theory. Our themes reflect the key influencers for the successful diffusion of e-health innovations like innovation, time, communication channels, and social system. Furthermore, the transcription is further analyzed to determine the various factors affecting e-health adoption, followed by the current state of e-health in Sweden. We have also analyzed the developments in the e-health sector with the advent of the COVID pandemic and its associated benefits with the diffusion of e-health innovations. Moreover, challenges and other strategies that affect the diffusion of e-health services among the public and the professionals are discussed. Table 5 below explains a snippet of the coding method followed.

Line	Respondents	Transcription	Codes
60	E2	Hmm....Yes, for sure. And also that you are doing it in a more agile way. Not I mean, when I started to work, we have those big projects that take took years. But I believe much more in working in closer steps or testing all the time to say that you are in the right...uh...right direction. So you don't develop something from....haha... many years. And you spend a lot of money and then we see that maybe you're too late with your solution when you have finished with it or maybe that you didn't solve the right problem. I mean, this is issue i would say but, it happens often.	DI, DT, EC

Table 5: Coding example

3.5 Ethical considerations

Research "is not just about the nature of reality and how we can know anything about it, but also about how we evaluate it" (Hassan, Mingers & Stahl, 2018, p. 18). Semi-structured interviews may intervene in someone's personal space (Kaplan & Maxwell, 2005). Therefore, it is critical in qualitative research to maintain the privacy and confidentiality of the data (Kaplan & Maxwell, 2005). Our research aimed to gather meaningful insights into the diffusion of e-health by public sectors and its effect on pandemic mitigation. Hence, we made sure to be transparent about our research topic and interview process (Bhattacherjee, 2012). As suggested by Newman (2007), we sought permission from our interviewees before recording the audio. Our interview started with an introduction to various ethical formalities in agreement with (Recker, 2013). For instance, we maintained the anonymity and confidentiality of the interviewees as per their request (Myers & Newman, 2007). As mentioned by Myers & Newman (2007), confidentiality, security, securing transcripts, or presenting findings were the fundamental commitments that research should fulfill. Accordingly, interview transcripts were shared with the respondents for review.

Ethical consideration helps distinguish between the right or wrong approach (Hassan, Mingers & Stahl, 2018) and helps preserve the study's authenticity (Recker, 2013). Our respondents were given an option to opt out of the interview anytime if they were not comfortable with the interview (Recker, 2013). Recker (2013) points out that ethical considerations must be followed while conducting the interview and while transcribing, evaluating, and segmenting the data for analysis. We have been transparent about our findings and conclusions. As Floridi (1999) says, one must follow the "golden rule" of minimizing harm and maximizing benefits while researching IS systems' design and developments. We have taken utmost care of analyzing the data to prevent any harm to any particular individual, organization or community and have also been sensitive with the data collected.

3.6 Scientific quality

Research is greatly influenced by the quality of its research strategy, data collection, and its subsequent analysis. Typically, the quality of social science research is tested within four dimensions, namely, *construct validity,* where the operational measures are studied and measured. *Internal validity*, which is assessed by the causal findings and explanations, *external validity* which establishes a connection with the research domain where the study can be generalized, and *reliability* which studies the operational characteristics of the findings (O'Flaherty & Whalley, 2004)

3.6.1 Validity

Validity is a critical factor in a qualitative study (Garcia & Quek, 1997; Kaplan & Maxwell, 2005). We have maintained the validity of our study by assessing it against the data collected. The collected data was sent after transcription to the respondent for verification and to further increase the study's validity. As suggested by Kaplan & Maxwell (2005), we maintained the validity of our research by collecting rich data, examining the patterns and irregularities in our study, cross-validating the collected data among ourselves and with the existing study, and assessing the data for any discrepant or negative cases of the study. We have based our understanding from journals, papers, books, and various other internet sources. Furthermore, insights from the people responsible for strategizing and implementing e-health services across the regions and municipalities have aided in a close-knitted examination of the benefits, challenges and diffusion of e-health services done within Sweden, thereby preserving the scientific quality of this research.

3.6.2 Internal Validity

According to Jacobsen (2002), there are two main ways to ensure that internal validity has been reached. Those are comparing your conclusions with previous studies and critically evaluating the conclusion yourself. This we did. By critically evaluating our respondents before and after the interviews, we believe they can be considered knowledgeable and trustworthy sources. The respondents talked about their own experiences, and they worked in close connection with our research phenomena. This is following what Jacobsen (2003) says about evaluating your sources. Our interview guide was also based on the findings from our literature review. In agreement with Linneberg (2019) suggestion for inter-coding reliability tests to improve the data analysis process, we followed inter-coding reliability tests within ourselves, providing us with distinct perspectives of the data collected, making it more credible and unbiased. The full coded script is also made available in the appendix.

3.6.3 External Validity

External validity is achieved by ensuring that the study is generalizable and that the results are not circumstantial (Oates, 2005). First and foremost, we believe that by conducting seven interviews, we have enough participants. Therefore, they represent different organizations, and we believe that our result is generalizable for organizations within the Swedish public health care sector. But given that healthcare and government structures differ in every country, there

may be a lack of generalizability on a larger scale. But in accordance with what Recker(2013) proposes, we have richly described the context of the research setting.

3.6.4 Reliability

In addition to that, the reliability of a study is critical to determining the robustness and consistency of the study within the condition (Bhattacherjee, 2012; Keller, 2017). Moreover, Kaplan & Maxwell (2005) argue that qualitative study is more reliable than quantitative due to the closer examination of the social and organizational perspective from people's experiences. Moreover, we will be precise about our study environment. Jacobsen (2002) argues that the interview's context affects the interviewees' answers. Since the interviews were performed remotely, the interviewee could by themselves choose a context where they felt comfortable. Also, given how most meetings have been conducted via video conferencing during the pandemic, we believe the interviewees were used to this setting. Another aspect that, according to Jacobsen (2002), affects reliability is the handling and analysis of data. To ensure no loss of data, we recorded the interviews and transcribed them on the same day. We also made sure to verify each other's transcripts. The transcripts were also sent to the interviewees.

4 Findings

4.1 The current state of e-health

The E-health Agency, the municipalities, and the regions in Sweden have different experiences when it comes to E-health diffusion. Across the municipalities, e-healthcare focusing on aiding the elderly and people with disabilities indicates that e-health diffusion and adoption primarily depend on people's willingness. The quintessential part of e-healthcare adoption in the public sector is focused on improving the quality of life and promoting a self-reliant and self-sustainable style of living (M2:18).

> *"....you can say these last four years the direction has been "be yourself as long as you can by doing what you can"...."* (M2: 81)

There are a lot of collaborative efforts, such as Inera, which is a platform where e-health services for regions and municipalities are shared and can be bought from (R1:39). Within the municipalities, e-health seems to be mostly used for improving the quality of life and the care of the elderly (M1:12; M2:6). The elderly are given new devices such as electronic medical medicine dispensers and cameras for remote monitoring (M2:6). With remote monitoring, medical personnel does not have to visit the elderly homes to check in on them (M1:87). These cameras are starting to introduce artificial intelligence and features such as detecting accidents such as the elderly falling (M1:141). Many products for the elderly are intended for social and brain stimuli, such as games and tablets for communication (M1:12). The care personnel is also given new e-health service tools, such as digitally signing medications (M2:10; M1:12).

> *"....We have digital signing for medical use, for the personnel. We have digital, mobile and documentation. So the personnel can read journals in the telephone, mobile. We have the digital surveillance.... "* (M1:12)

The e-health services provided by the regions are not only aimed at the elder like in the municipalities, instead, they can often be accessed by all the citizens of regions through the 1177 website (R2:6; R1:12; R3:8). Through 1177 citizens can get medical advice (R1:12), book appointments (R1:53), have a look at their medical records (R2:6), renew a prescription (R3:8), and have a remote video chat with their doctor (R2:6; R3:26). All regions use the digital infrastructure of 1177 (R1:39), but the services that 1177 provides differ a lot depending on what region you live in E1:51.

> *"... we have the e-prescriptions in the whole Sweden. we have that like in the national…uh… services. So if you go out to the pharmacies, you get the prescription electronic and we handle it in our systems…"* (E1:8)

The regions also provide e-health services to medical personnel. For example, they provide virtual reality tools for medical training and exercises (R1:14). The regions have their own medical record systems (R1:66), which can get accessed by both medical personnel and citizens. The e-health services for the regions, such as video chat, get used more and more today, but they still just represent a small part of the total visits (R1:53). The regions have many services, but at times they have a hard time keeping up with the services that the private sectors offer (R1:104). According to R2:80, the e-health services are not developing fast enough, and

even some basic features and services are missing. Furthermore, at times they get criticized for not being user-friendly enough (R1:24).

The Swedish e-health agency is responsible for the digital prescription services of medication and the COVID certificates of Sweden (E1:8). Their mission is to improve those systems and to ensure that they run 24/7 (E2:8). They are developing the services they are asked to develop and are currently working on a way to certify e-health monitoring apps and products used by private citizens so that doctors can trust their readings (E1:118). Regarding the diffusion of the medication service (Nationella Läkemedelslistan) R1:83 claims it has been a bumpy road for the regions and the E-health Agency.

A study revealed that more than sixty percent of the population are not using digital e-health offerings, which is surprising (M1:131). E1:S1 provides us with a report regarding the current status of "Vision e-hälsa 2025"(E-Hälsomyndigheten, 2022). According to E1:S1, it is hard to follow up on how the e-health adoption work is going since there is a lack of good indicators. They are therefore working on updating their framework regarding indicators. The indicators use data from multiple sources such as Inera and SKR (E1:S1). Interestingly, now the younger population is very used to technology (R1:118), which boosts the older population to use and accept the recent technological advancements. Many of the interviewees claim that we will see a big leap in the adoption of e-health in healthcare (M2:62). For example, R3:59 claims that the digital divide is shrinking and that the implementation process will be much smoother in the future. So, for now, this needs to be considered when it comes to the current state of e-health, but this will change with time.

4.2 E-health during the pandemic

The e-health services developed during the pandemic had a primary goal to reach every individual across Sweden, irrespective of their geographic location. A strategy catering to every individual within Sweden was needed. A quick solution was to use existing systems and modify them to fit the conditions of the pandemic (E2:22; R3:20). This helped save a lot of time and resources (R3:14). E2:18 argues that it was hard to introduce new e-health products during the pandemic. However, the views on how the pandemic affected e-health development vary. Some say that new e-health services were developed, and others that older services were put to new or more use (R3:14; E2:22; R1:32; R2:14). An example of an existing service being put to new use is a tele-health platform developed for a youth clinic that could also be implemented and used by all other healthcare services in the region when the pandemic came (R3:26). E2:S1 shared a site where the E-health Agency had published success stories regarding digital business development in the municipalities during the pandemic. The site was developed for people working within social services and healthcare in the municipalities with the intention to spread ideas regarding how to stop the spread of the virus and how to protect the elderly (E-Hälsomyndigheten, 2021).

There seems to be a consensus among the respondents that e-health services helped combat the pandemic (R2:12, R3:14, E2:18). For example, there were many solutions, including the COVID certificate (E1:8; E24). Tools for contact tracing were developed by and shared among the regions (R3:18), which means that not all regions had to develop their own service. Another effort developed to promote collaboration was a tool for the municipalities that helped track where medical supplies and staff were available so that they could be moved according to their

needs(E2:20). This tool also tracked the spread among the patients and the personnel (E2:S1). Through 1177 citizens could book medical appointments (R1:53) and appointments for taking vaccine shots (R3:14). These services and other services developed for the pandemic can still be used after the pandemic and be adapted to new things and scenarios (R1:34, M2:32).

"…You just login to 1177 to get an appointment. And we had at an early stage we organized different locales, geographic locales, through out the region where you could go and get your shot. And also, if you don't, I mean, you need to use a 1177 to login, you need your e-identification, and almost everybody have that. But there still is a number of people that don't have that. Maybe you're new in Sweden, maybe you don't have a Swedish personal identity number so then we have a call center where you can call and get an appointment as well as book yourself by the internet…." (R3:14)

Not only were many new services developed, they were also developed much faster than before (E1:21), and some corners were cut (E2:18). Historically the implementation process for e-health has taken years (E1:21). However, with the imminent threat of the pandemic, the implementation and development process sped up a lot (M2:26), and instead of years, it took months(E1:21). The faster development (E2:24) and the realization that it is possible to work faster will speed up the development process in the future (M2:32, E1:141). However, M1:40 contradicts this statement by claiming that the pandemic did not change how they worked with e-health or the pace.

"the COVID certificates as an example, we had to do everything so much quicker than before. Before maybe you had years to develop something. And now we have months to produce. So we had to speed up really." (E2:24)

Regarding how the pandemic affected the overall usage of e-health services, the view is somewhat conflicting, and this is also in accordance with a report that E1:S1 shared. The report states that the pandemic has both halted and accelerated the adoption of e-health services. This is because healthcare had to focus on clinical work, so IT initiatives were put on hold (E1:S1). However, the use of digital communications like telemedicine increased (E1:S1).

E1:43 means that the usage has not changed that much. This is something that M1:30 also agrees with, at least when it comes to the usage of e-services by citizens and the elderly, while still stating that the pandemic still led to more people having to use digital things (M1:154). However, on the contrary, several respondents claim that the pandemic helped push the usage of e-health services among the population (R3:22, E2:12, R3:59; M1:34). A consequence of this was that it made people realize the benefits of digital solutions (R3:57, R2:12) and made them more accepting of new technology (M2:28). The circumstances around the pandemic gave the much-needed acceleration to the e-health diffusion and digital transformation in the e-health sector (M2:26; E1:13). This will make it easier to introduce new e-health services in the future. The pandemic caused massive growth in the usage of e-health services. For example, digital meetings and bookings through 1177 had an explosive growth according to E1:13 and R1:53. Digital medical appointments were used before the pandemic but mainly by the private sector, but they became widely implemented throughout the regions (E1:25). Some regions lacked these services, so they needed to buy new platforms to support them (E1:39). Since the elderly in care homes were not allowed to have visitors, the elderly needed to use digital meeting services to stay in contact with their relatives (M1:26).

"....But I think also the technology has arising in in them in the future for us and just also there during the pandemic, like the medical dispensers. When the pandemic started, we have 40 units out at our customers. Today we have 120. And I don't think we had that...uh... I don't know how to explain this, but I don't think we have that Increasing of numbers if the pandemic hasn't given us the kick in the back." (M2:21)

Regarding the question about the interviewees' main takeaways from the pandemic when it comes to e-health, we got many answers. For example, the development of new services can be much faster than before (E1:139), and digital meetings can be utilized to a much greater extent than before (E2:103; M1:158). Organizations need to organize and mobilize resources faster and at the right time to solve the issue (R3:79). We should develop things that fill a function and that we need to get better at prioritizing what is the most important at the moment (R2:84). R1:116 means that they were not prepared for the pandemic since they were still in a development phase and that this development phase is still ongoing. Nevertheless, with fast transformation and development and work done on a national level, they prevailed (R1:28). However, R1:116 claims it is not clear if another pandemic came, they would be better prepared for it. R3:14 agrees that nobody was prepared for the pandemic. M2:101 means that they have learned that they can work in different ways and have a better organization and that digitalization is not always the solution. The pandemic forced more collaboration in the healthcare sector since organizations could not work in silos anymore (E2:26). However, there are also negative aspects of the pandemic regarding e-health. According to E2:32, there is a backlog of things that could not be done during the pandemic. All the consequences of the e-health adoption during the pandemic are also yet to be seen. R3:30 states that they have not had time to assess and evaluate this yet.

4.3 Diffusion of e-health services

4.3.1 The e-health innovations

Regarding e-health innovations, many factors affect the diffusion rate and need to be considered, including strategies. This is also reflected in the answers of the interviewees. Innovations or modifications in e-health are analyzed to show the benefits and ease of use from the user's perspective (E2:52). As e-health services are needed to cater to the needs of every individual irrespective of their demographic challenges, regions, and municipalities, the systems have to be tried and tested via pilot studies before being put to actual use (R2:46; E2:88). Dedicated testing teams test the usability, compatibility, and accessibility of e-health products and services (R3:44). If the systems do not work in the actual scenario among the professionals and the public, they will not use them. Hence, the usability of the systems in all scenarios is critical for e-health services. Another critical factor often brought up is the need for more compatible and standardized systems(M1:71; E1:129; R3.36; R1:89; R2;56; R2:34). The respondents mean that the lack of standards leads to integration problems. R2:86 believes this is especially true regarding standardization and integration between the public and private sectors.

Assessing economy, quality, and consumer satisfaction is critical to understanding if the system is performing well as expected by the public (M2:46). The regions receive continuous feedback from the users (R3:42). For example, the usage of 1177 and its services are being tracked, and with that data the services can be updated and improved (R3:77). The feedback provides a

means to include users within the development process of the system as well as increase their visibility and reach to the public. Overall, most respondents see involving the users in the development process as a crucial strategy (M2:62; R1:26; R1:71; M1:105; R2:46; E2:60). This way, the benefits can be shown to the users, and the system can be developed with the help of their input to make it more user-friendly. R1:24 and R2:36 mean this makes a system less complex for the user. Consequently, E2:52 stresses the public opinion that influences the e-health sector developments.

> *"...So I think that you really need to have a strong connection and with the clinic and the personnel and to keep them motivated……. They often just want it to work and so it's very important for them to feeling motivated and If they have, like the right kind of services then."*
> (R1:83)

It is also essential to have an understanding of the user's needs (R3:10; M2:103), market offering (M1:97), and adequate technological competency (M2:105; M1:148). Once systems are carefully assessed and developed, they are launched for public use (M2:30). It is then within the whim of the public to use these systems if they find them beneficial for their needs (M1:61). Image can be an influencing factor in e-health diffusion. M1:125 says that some might feel embarrassed to wear e-health devices. This is one of many reasons why e-health systems need to fit the users' needs.

> *"...Yeah people need to be motivated, they need to understand why they're doing it and you have to have a strong change management through the whole organization..."* (R1:59)

Beyond analyzing the complexity and compatibility of the e-health systems, it is important that users intended to use the systems are well motivated. M2:62 feels that people are well motivated to use new technologies in e-health as they are aware of the benefits. However, they have some resistance as municipalities mainly focus on services for the elderly, a less motivated group. Evaluating the system's benefits is essential before implementing it (M1:65; R2:56). If there are no benefits to show the users, they will be less likely to adopt the system (R2:76). One strategy to show these benefits is through sharing success stories (E2:78).

There are also internal factors within the healthcare organizations that affect how innovative they are. When talking about how the size of an organization affects innovativeness, M1:107 says it is easier to run pilot projects in smaller municipalities. Furthermore, E1:131 says that private organizations can be more innovative since they are closer to the money and, therefore, they can work faster. Another factor that seems to be affecting the innovativeness of the public healthcare system is the access to resources that can be used for innovation (E1:143; E2:6; E2:88; R2:76). The innovativeness of public health organizations can differ a lot since they are self-governed (E1:59). Even within an organization, innovativeness can differ depending on the department (R3:28).

According to our interviewees, there is a need for strong leadership to drive change and innovation (R3:34; E2;74; M2:82; R1:57; R2:74). However, just strong leadership is not enough. Change management is also needed (R1:57; M1:61; R3:34). Otherwise, there is a risk that the innovation does not get used after the implementation. Effective decision-making and efficient resource utilization are vital for successful e-health diffusion (R2:78; R1:59). R1:57 claims that buying new services is easier than putting them into actual use and fitting them into the organization. An example of this is provided by R2:40, who explains that many e-health services are not utilized but still cost money due to contractual obligations.

"....But what if you have systems for 2 million that are not being utilized? Next year…you say yes to five different new systems, you only utilize one and implement that one, then you have maybe a 5 million cost. And that just escalates every year. Because when we say yes to one thing from an Inera, we pay it because we have sort of signed up to do so whether or not we use it." (R2:40)

4.3.2 The e-health innovation process

Diffusion of innovation in the public healthcare sector happens in stages, and different strategies are applied. M2 says any innovation process in e-health involves a series of analyses, evaluations, and decision-making from business and customer perspectives (M2:42; M2: 50). As the economy is a driving factor in e-health innovation, it is essential to have an agenda and a budget before proceeding with new innovations (M2:42; R1:63). A benefit analysis is needed before the implementation (M1:65, M:42), to ensure that some benefits can be communicated and shown to the users and the organization. The decision process requires evaluation of the user's needs. When it comes to healthcare, it involves understanding the grievances of the receivers, medical professionals, and the personnel serving the patients (M2:50). There is multiple documentation, evaluations through interviews, forms, and studies of business cases to make an innovation-decision in the e-health sector (M1:65; M2:50).

"…We have evaluated the automated shower service thoroughly, were both customers and personnel have described what they do and what they need help with and then they have used the shower during a longer time to evaluate the service. Both from a customer- and personnel perspective. At the moment we also have several studies running in collaboration with KAU, Linköping University and the Mid Sweden University. The studies are about the value of independence in one way or another." (M2:114)

Every person within the organization must be in line with the development goal. R3:34 says management dramatically influences the decision to proceed with developing a particular e-health solution by communicating a goal. The importance of having a goal or an agenda in place at an early stage of the innovation process is shared by most respondents (M2:42; R1:63; R3:71; R3:34). There is a need to anchor the need and reason for the change (R:83). As stated by M2:66, all users within the social systems must adopt the new technology. It is not enough to only have a select few so-called super-users. To achieve the buy-in from everybody, most organizations say that opinion leaders are included in the projects(M2:56; M2:87; R3:38; R3:40). Another strategy to get everybody on board is proposed by R1:100, who says they first target those most innovative and willing to change, then the most hesitant. By doing this, R1:100 argues that those in-between will follow. E-health diffusion requires time and effort (E2:76). The development is slow, and it can take several years before the implementation phase is reached (E1:59). Once the evaluation of public and professional requirements is made, it is essential to prioritize the implementation of the requirements. This process requires a careful examination of the user's need versus the economic viability and the technical competency of the people within the organization. The requirements cover things such as regulations that need to be followed and requirements for integrating the new e-health system with existing ones. Having the correct requirements for the procurement process is crucial (R1:85), but even with requirements, the municipalities struggle to find services that fit their needs (M1:123; M2:103). They argue that there is a disconnect between them and the market.

Regions and municipalities have an innovation process that involves continuous analysis and examination of the requirements with respect to the focus groups (R2:50). Designing and developing e-health solutions within the public sector involves multiple implementational strategies. It often starts with the focus group (R2:50) for whom the systems are required to be developed, followed by an economic assessment of the product (E2:52). The development process includes collaboration between the personnel using the product, the developers, and the UX designers(R2:36; R2:50).

"…That's the main thing, whether it's for personnel or citizens, whatever, to have a process where you sort of have iterations, and you go through this development process very thoroughly.." (R3:43)

R1:98 reason that e-health services never get finished or fully adopted. Instead, an iterative approach is used where the solution is developed, and feedback is taken from the user(R2:18; E2:64; E1:104; R3:46).

"Well, I don't really think that you can lay back and say that you have developed it …like that you have finished your development. I think you have to look at it like a "livscykel", life cycle perspective that you implement something and you use it for a while, but then you have to improve it and develop it because there is always like new questions or like new demands on the techniques and today is developing so fast that something that is new today might be old tomorrow. So yes, you can say that you have implemented something and you can work with it, but I don't really think that you could like say that that you are finished with it, yeah.."
(R1:98)

This strategy promotes the diffusion of technology and aids in improving the quality of the services. While still arguing that organizations need to define when the e-health service can be considered fully adopted (R2:68). R2:68 proposes two ways of defining this, either to have a measure for the lowest acceptance of the implementation that is acceptable, and the other is a "dream scenario" (see quote below). E1:106 also argues that a project is a success when there is acceptance among the users.

"..like if you do in an ideal dream world when It is totally adopted and finished well that is when the usage and work methodology surrounding the system is so advanced that it sort of influences other services and sort of creates shortcuts within…According to me something is fully adopted when the implementation, education/training, communication and the dialog within the operation have been good enough. And when that dialog has in some magical way spread through communication tools to the citizens so that the benefits stack, like with stock you get interest on interest. The systems talking with each other..there is a step called inertia which means you only utilize a system for the bare minimum. Through a good implementation you can go upward and beyond where the health care operation begins to create their own processes and routines that are tailored to benefit them with the help of the systems." (R2;66; R2:68)

The public healthcare sector is challenged with multiple dimensions of requirements and issues that need a close examination (R3:50; E1:104). That is why e-health innovations in the public sector are slower (R1:104). They need to be developed and further innovated to better their reach among every individual citizen of the country. Furthermore, public healthcare organizations are comprised of mixed sets of management. Few people are quite innovative and look into transformation solutions quite often, while there are also people who are relatively slow in

adopting innovative solutions for e-health development (M2:87; R3:28; E2:76; R1:81). As M1:95 says, they are still in a transitional period for e-health adoption. E1:91 says that users often complain about systems, but they prefer the previous system when updated. However, one thing that can be said about the innovativeness is that the private sector is more innovative than the public sector and that the public sector learns from them (R1:91; E2:107; E1:57).

When it comes to willingness to accept innovations among the public and the professionals, there are mixed answers, some are self-motivated, and others are more resistant (M2:62; R3:50; R2:52). How innovative the organizations within Swedish healthcare are is hard to say. Nevertheless, some are more innovative than others, for example, the model municipalities previously described. Some factors negatively affect innovativeness. For example, the respondents from the E-health agency claim that they have little room for coming up with their own ideas(E2:6; E1:8). Instead, they mainly develop services that the Ministry of Social Affairs has told them to develop. The respondents also feel a need for the public health sector to learn from private health organizations (E2:107) and that the private sector has forced the public sector to be more innovative (E2:109). Being smaller, private health organizations have an added advantage in implementing changes for their consumer base. Within the same lines, M1:107 too feels that being a small municipality is an advantage in developing new e-health innovations. E1:131 explains that the private sector has the advantage that they do not have to deal with legacy systems which makes development easier. Moreover, the private sector is more innovative and continuously improves its services as they depend on money to stay in business (R1:91; R1:104). The public health sector, being tax-driven, can not be this innovative (E2:113; R1:91; R1:104).

4.3.3 Communication channels for diffusion of e-health

For an innovation to be adopted and eventually diffused, its existence and benefits must spread to the intended user. The regions and municipalities in Sweden use various strategies and communication channels to inform and stay connected with the users, both through media and interpersonal channels. 1177 is an important channel (R2:6, R1:12, R3:8) since both medical staff and the public use it. It also acts as a bridge between patients and medical personnel (R3:10).

It is important to keep users updated with the ongoing developments in the public e-health sectors. The interviewees have several channels for this. In general, the use of social media to spread knowledge and information is utilized a lot (R1:102; R3:38; E1;123; M1:109). However, more analog communication channels are also used, such as newspapers (R2:72). R2:56 proposed that organizations should run targeted campaigns and advertisements to spread knowledge to the public to educate them. And depending on who the target audience is, there is a need for different means of communication (R2:72). R3:10 attributes a lot of their success to marketing campaigns. Communication is also important on a smaller scale, especially when targeting groups such as the elderly. M2:54 says that they have a physical showroom where they can demonstrate the benefits of new technologies and involve interest groups (M2:79). Having a feedback system assures users of their involvement in e-health development which eases the diffusion of e-health. Region Värmland has a platform for the users to file complaints and provide feedback regarding their e-health services (R3:42). Other ways to get feedback from the users is to host discussion forums (R2:56), through interviews, and by forms (M2:42).

Also, within the organization, it is vital to have strategies to involve and use communication channels to keep the organization's staff updated (R1:68; R2:44; E2:66; R3:38). Examples of

such communication channels are intranet and forums (R2:72; R3:38; R1:102). By including the staff, they also get a chance to affect development. Collaborating and communicating between the regions and municipalities seem essential for diffusion. E2:105 feels that this is one area that needs to be developed further as there is a lack of communication between the public organization, which hinders e-health innovations.

> *"Communication, Collaboration I think is very important. That we have the technical structure...is in place…."* (M1:117)

Despite this, Sweden fosters learning between the public organizations(M1:54; M2:38), SKR and Inera provide platforms that promote collaboration between regions, and municipalities where they can share experiences and take implementation ideas from each other (E1:29; M1:73; R3:20; E2:4; R1:47; M2:36; R2:10), this leads to faster and more effective diffusion. This strategy was utilized a lot during the pandemic. One example is the contact tracking service developed by one of the regions(R3:18). SKR also has a "model municipality" project, which promotes collaboration and networking between municipalities, and they can meet up and discuss their issues and challenges (M2:36; M2:38). The project inspires other municipalities facing similar issues (M2: 36; M2: 38). Another similar collaborative effort is AllAgeHub, a platform for collaboration between academia, society, and the industry (M1:S4). During the pandemic, the e-health agency also provided a site where municipalities shared success stories that other municipalities could learn from and implement (E2:S1).

4.3.4 The Social System influences on e-health diffusion

Society needs to understand the benefits of e-health and be self-motivated to adopt e-health innovations (R1:59). The e-health services used within Swedish healthcare have two main stakeholder groups, the citizens and medical personnel (M1:17; M2:10; R1:4, R2:6: R3:8; E1:8; E2:8). Depending on which stakeholder group an e-health service is being developed for, different things need to be considered (M1:23; M2:15; R1:24). Norms and structures also need to be considered when developing for the social system users. For example, people get used to specific ways of doing things, and habits are hard to change. Also, the age of the users seems to be an influencing factor. E1:112 argues that older doctors are the most challenging group when adopting e-health services. The same patterns can be noticed among the citizens, the healthcare organizations, and other medical personnel (E1:112; R3:50; M1:98). But, the digital divide is shrinking due to global technological developments. Furthermore, the outbreak of the COVID-19 pandemic has further pushed the adoption of digital services among individuals (R3:59). Today, services are available over the internet, consultations are faster than before, and the users have understood the benefits of using e-health solutions (E1:112). As more and more individuals are getting acquainted with digital devices and mobile applications, the diffusion of e-health among the masses is increasing. The generation shift fosters an added ease in e-health diffusion (E1:112; R3:50). The generation shift will lead to a giant leap in the usage of e-health (M1:156).

> *"….But that's group is decreasing. So we have we see, every every new people is going from education out in the healthcare. It's natural. Yeah. And but you have the people over 60 They have more problems to handle it. But it was worse for for 10 years ago, but it's now everyone everyone is think yes, it's...naturally, we do it with IT…"* (E1:112)

The management is needed to be driven to diffuse e-health solutions (E2:74; R3:38; M2:56; M2:87). By utilizing opinion leaders or ambassadors within the social system when implementing change, the diffusion process gets easier (M2:56, R3:38). These opinion leaders do not have to be managers or bosses. They can be anyone (R3:40). Digitalization in healthcare is not a quick process. It requires time. Hence, the leaders must have a long-term implementation strategy (E2:76).

> *"...I think with the COVID passes, it was sort of a given, you needed a COVID pass in order to go to go to Gran Canaria and get tanned, I think that was a motivator. And I think it also is sort of a social stigma in many groups not to be an anti Vaxxer for example, I think there are like social constructs that sort of push people to use different services..."* (R2:64)

Certain e-health services are adopted due to government rules and policies (R1:83). Marketing campaigns and promotions can be used to make users aware of such services (R3:10). This strategy has been proven effective in increasing the use of e-health services (E1:112, R3:10). An example of a policy is that Sweden fosters trust among its citizens by strictly following GDPR (M2:93). This provides a safe environment for the users (R2:18; M2:93; E1:98) and alleviates the diffusion of e-health services that deal a lot with patient personal data. During our interview, another important aspect that came to the limelight was that politics strongly influences e-health development (R2:34; E1:67; E2:76). Most of our respondents feel that the development decisions in e-health are under the control of political leaders. Hence, the services that can be implemented quickly and have visible benefits across the public are preferred for e-health development. These services provide a practical means of gaining political precedence for elections. E1:49 and E2:88 claim that some of the systems they develop lead to forced usage, meaning that the user has no choice but to use the systems..

> *".... And everything is, as you probably have seen, everything is ...uh... it's the poli...politicians and political. They are the ones who decide what to do and what to invest money in. And they want to be elected. So they want to do things that people really see..."* (E2: 76)

> *"..it's not so much about technology and so as you can hear from the interview here, it's much more about money, organ...organization, politicians, and so on. And that's what we say when we are talking with people out in the municipalities that technology is a small part, when it comes to introducing e-health it's everything else around it. That's problems."* (E2:117)

As can be interpreted by the above quotes from E2, the innovation itself is not the most important factor in the diffusion of e-health. Instead, the social system it is being adopted into has a significant role in the diffusion. A similar view is shared by R3:81, who says that there has to be more focus on organizational issues.

4.4 E-health diffusion challenges

The respondents in our interview highlighted many prevalent challenges within the Swedish public healthcare system. These challenges can be further categorized into below areas.

4.4.1 Accessibility and user resistance challenge

One challenge for the municipalities regarding e-health is their target demographic, the elderly (M2:38), and people with disabilities (R1:118; R1:120). Many elderlies do not want to change how they live their lives (M:156). There are options and solutions available to help the elderly, but they often lack knowledge about this (M2:54). It is a challenge to reach out to the elderly with this information. They do not have enough digital experience (M2:62, R2:32) and competence, so when the e-health services are developed, they have to be developed based on the assumption that the users have zero digital competence (M1:23). Even though the older population is still hesitant to use new technologies, a generation shift is coming soon that will make e-health diffusion easier (M1:89; M1:131; M2:68).

There seems to be a challenge motivating the personnel to use the new e-health services. The personnel sometimes have resistance to changing the way they work and including more technology (M2:66), and for it to work, everybody has to be on board. There has been resistance among the personnel, and some of them lack the needed technical competencies (R2:44). According to M2:61, the personnel will not necessarily use the services if they do not have to use them by rules. R3:50 also brings up this challenge, and workers do not want to change the way they work since they know their current way of working is already working. According to E1:112, older doctors have the most challenging time adopting new e-health services in their work. In other words, people are stuck in their old ways of working, and therefore the services must be outstanding to overcome this resistance (E2:74). This is also something brought up by R1:57 that claims that it is easy to buy new services but that it is much harder to put them into actual use and fit it into everyday work at a clinic. Sometimes the technique does not meet the expectations (M1:63, R2:78), which creates resistance. The services are not user-friendly enough (R1:24); therefore, the acceptance is suffering (R1:83). There is a challenge to provide services that fit all user needs (R1:122). There are added challenges related to e-health services catering to disabled people and people speaking other languages from varying backgrounds (R1:120). This needs a critical intervention from government agencies to develop versatile systems catering to everybody's needs. R2:58 feels that it is almost impossible to cater to everyone's needs as the public health system is a large organization catering to a huge population base.

4.4.2 Privacy and Security challenges

There are challenges related to regulations around integrity and privacy (E2:96). A factor brought up as a hindrance to e-health services development is laws such as GDPR(M1:46; M1:S3) that slow down the development (M1:97), but it is not suggested that the laws should be softer. There are also challenges regarding privacy due to all the personal information handled by the systems (R1:110). Getting the services to work in a practical and legal ethical way is hard (R2:20). Many lack trust regarding information security within healthcare (E1:S1). For instance, while using cameras for digital surveillance, many elderly do not trust the camera and find conformity in personnel visiting them instead (M1:89). Moreover, E2:96 says that multiple privacy challenges need to be dealt with because of various layers of working within the public healthcare system. Also, while using technology for providing health services, like cameras for digital monitoring, the privacy of the individuals is one of the grave concerns (M1:135). Using e-health services eases the quality of life but intervenes a lot more in one's personal space.

"Yes, a lot of problems with integrity...haha..would say or the privacy. Sometimes it takes over the whole solution. And we have many lawyers working at the agency. Because you have to...uh.. what to say... you have to...understand all the different views of a solution. Because as an agency, we can't stand behind something that is not following the legacy then we are down set...then we will not live anymore. So it's it's a big issue to look into all...."(E2:96)

4.4.3 Standardization and workflow challenges

In general, there is a need for a methodology that can be used to identify needs, benefits, and evaluations regarding the implementation of e-health services (M1:S1).

Systems are not user-friendly enough, and there is no integration between systems which leads to unnecessary extra work for the personnel (M1:71). Legacy systems are still being used that need to communicate with newer systems (M1:85). This poses a challenge in integrating systems to work together (R3:36), and this is not understood by users who ask for the new system to be implemented. Moreover, different healthcare providers use different systems, especially in the private sector, which lacks standardization (R2:86). This is troubling for the public sector since they need to adapt. E1:129 points out issues due to the semantic interoperability of e-health systems and the need to standardize the e-health systems. For example, private e-health monitoring tools need to get certified so that doctors can trust their readings (E1:118).

According to a study by OECD referenced in E1:S1, Sweden ranks poorly regarding health data sharing intensity. Only 42% of the data can be shared with domestic and international stake-holders. This number for Denmark, Finland, and Norway is 100%. Also, when it comes to sharing health data between national caregivers, Sweden ranks poorly. Only 11% can be shared, compared to the neighboring countries that have achieved 100% data sharing capability. The Swedish healthcare systems do not share data with each other (E2:98). E2:26 also points out an added challenge due to the "silo" working style within the public healthcare system, which aids in data sharing and collaboration issues. Moreover, over administration is an added challenge for public e-health systems. As there are multiple IT systems, there is an overhead in the documentation process, which takes away most of the professionals' time and resources. They are forced to update the documentation in multiple systems rather than looking after their patients (E1:145).

The regions and municipalities use their own systems, making it hard to develop new services (E1:33). This is due to the local governments of Sweden making their own decisions (E1:67) which makes it hard to standardize. An effect of this is that citizens do not have access to the same services depending on where they live (E1:67). E1:129 and M1:S3 argue that there is a need for standards and better infrastructure for e-health. E2:76 agrees that the lack of a common infrastructure is a challenge. Both E1 and E2:76 argue that this aspect has challenges related to politics. It is challenging to utilize better all the data that e-health services provide to gain more value from the services since the health sector is not mature enough (E2:14,16). For the municipalities, a challenge that is brought up is that they are dependent on the market, but there are not good enough products on the market to fill their needs (M1:123, M1:150). M2:103 agrees with this view and reasons that the market does not know the needs of municipalities, and the municipalities lack the knowledge to develop the technique independently. So, there is a need for collaboration. Also, developers lack an understanding of how healthcare works (R2:50). This makes the procurement process hard since the municipalities cannot find the products they need (M1:S3).

4.4.4 Cost challenges

Cost is a challenge (R2:36, E1:143). Also, if the solution is too complicated, training is needed, which is also costly both regarding time and money. Making e-health beneficial to all is challenging, both regarding soft and hard values (M2:46). It can be hard to analyze the benefits concerning the cost (M2:50). It is easy to forget how much effort is needed to make a system useful (R2:36). Organizations need to show a fast return of investment in the public sector, or the project will get shut down, but digital transformation takes much time, which is a big challenge (E2:76). As E2:113 points out, one of the areas where the private sector stands out is that they are looking into ways to earn more money, while the public healthcare sector is more driven by the taxes, which drives the private sector to be more innovative and proactive. Few of the ideas are not implemented because of the lack of money (E2:6). In some instances, the public sector may have money only for the pilot project. However, it may not have enough money for large-scale implementation and deployment, which hinders the development of innovative e-health solutions (E2:88). R2:40 feels that the lack of prioritization of the implementation process of the e-health systems leads to money overhead leading to the public sector incurring more costs than expected.

"..it's not so much about technology and so as you can hear from the interview here, it's much more about money, organ...organization, politicians, and so on. And that's what we say when we are talking with people out in the municipalities that technology is a small part, when it comes to introducing e-health it's everything else around it. That's problems."(E2:117)

4.4.5 Communication challenges

Most of the challenges are related to communication (M2:99, M2:105). M1:117 says that communication and collaboration are some of the most critical challenges within the public healthcare organization. This can be partly attributed to the silo working style within the organization. R3:34 feels a need for the leadership team to start a leaderboard to effectively communicate the right decisions across all individuals within the organization. Moreover, as R2:72 puts it, someone will always be missed, no matter how much effort is put into communication. For example, a challenge regarding communication is to inform all the users of the benefits (M2:91). They need to know why they should use it (M2:97). Most of the time, users are not aware of the usage of e-health systems because they have not been well communicated about its benefits (M2:99), because of which they do not use the application. There is also often a lack of a clearly communicated goal (M1:S3).

"....It's a communication...It's a communication way...for digitalization, I think it's really, really important...." (M2:105)

4.4.6 Other Challenges

When it comes to the diffusion of e-health in the municipalities, the work is slow (E1:S1). This is for many reasons. For example, the restricted market significantly affects the current implementation of e-health. M1:123 working in Lerum municipality, feels that the limited availability of e-health options in the market influences the current state of e-health services. The products available in the market do not cater to the needs of every individual and need to broaden their offerings (M1:123). This is something that M2:103 agrees with while stressing the need for the

market to cooperate with the municipalities to better understand each other's needs. Apart from challenges due to limited market availability, e-health diffusion is also challenged by the limited resource availability (R2:36). There have been issues with the limited doctor or nurse availability (R3:67) or limited technical competency within the organization to implement a particular innovation (E1:143). In general, time and resources are a big challenge for e-health adoption (R2:76, E2:72).

"....resources and money probably if we see the development of AI and artificial intelligence we have a bottleneck in resources and knowledge just now and that things use very lots of resources in Sweden overall." (E1:143)

Moreover, the development of digital infrastructure in Sweden has not yet achieved its expected stage where it can achieve its expected semantic interoperability (E2:76; E1:129; M2:105). Owing to multiple levels within the Swedish healthcare system, there are multiple challenges in interoperating the systems to share information, and adequate digital infrastructure is needed to overcome these challenges (E1:129). Also, as E2:88 quotes that diffusion in e-health is much more about society as a whole. Along similar lines of thought, M2:105 suggests that society as a whole must take responsibility for being proactively involved in the diffusion of e-health services. This will not only help them to better their living but will also make them self-reliant.

"....But I think this society may take a…uh… bigger responsibility and in the growing of that. But also the individual responsibilities on users, of course. But I think that's there's some, it's a question that has to be penetrated some more, because it's…I think it's a key factor for the future…." (M2:105)

Aside from infrastructural limitations, e-health diffusion is also affected by the lack of information clarity. Sometimes e-health systems are developed but not in the proper manner, which hampers the diffusion of such systems (M1:102). E2:60 points out that sometimes the systems developed may require a lot of time and costs, but the development is not done within the right time, or it is not developed the right way, which poses a challenge in e-health diffusion. Hence, the timely development of e-health systems is critical to e-health diffusion (R1:106).

"..I think that the biggest challenge is how we could... how we need to work in the region through different departments to make sure that we have a quite fast developments of these digital facilities, and you know, I think that is one of the most critics things for us right now.."
(R1:106)

Another critical factor that challenges e-health development is politics (E2:117; R2:52; E1:71). Systems that can be developed faster to gain political preferences are preferred for the development than those critical for uplifting the current state of e-health diffusion. Diffusion of e-health services takes time and effort (E2:76). Therefore, the developments that are faster to implement and visible among the public within the political tenure are preferred, hindering the growth of the public e-health sector.

"....And everything is, as you probably have seen, everything is ...uh... it's the poli...politicans and political. They are the ones who decide what to do and what to invest money in. And they want to be elected. So they want to do things that people really see. And then it's tough because, as I said, this is the things that you don't see. From the beginning, it takes a couple of years, but maybe the politicians they have ended then or they are not elected or something

like that. So then they can't say that this was I decided about this. So then they don't do it…"
(E2:76)

4.5 Ways to counter e-health challenges

Many of the interviewees' challenges can also be considered factors critical to successfully dif-
fusing e-health services in the long run. However, the respondent also brought up many other
important factors and strategies which aid in an easier and smoother diffusion of e-health inno-
vations.

4.5.1 *Overcoming accessibility and user-resistance challenges*

To successfully implement e-health services, there needs to be acceptance among the users
(E1:105). You need to analyze and evaluate the needs and will of the patients, and it is not sure
that all patients want these new services (M2:30). Furthermore, organizations need to ensure
that the services are useful for the public and not developed from an organizational viewpoint
(E2:52). Designing e-health innovations from the standpoint that users lack knowledge of using
digital systems can aid in developing systems that they can accept (M1:23). Organizations must
design more user-friendly and easy-to-use services (R1:24; M1:30). E2:100 says that one of the
easiest solutions to ensure the diffusion of e-health services is to promote the product's useful-
ness. Moreover, the implementation of digital services in health care requires support from
technical professionals and IT to design a working, easy-to-understand, and adaptable solution
that can be standardized to ease its diffusion among the masses (R2:2). If they are clumsy, the
user will not be positive about using them (E2:52). The services need to work and be simple
(E1:125). Therefore the user must be involved in the design and development process (M2:60;
R1:68; R1:114). It is generally important to involve the user in the development (R3:71). Doc-
umenting all the processes and system limitations and usage help in better understanding the
systems that make it accessible for the users (M1:99). A careful examination and testing of the
e-health systems for launching it for actual use is necessary (M2:30). Lerum municipality has
a project called "AllAgeHub" where all the testing of e-health services is done to check if it
meets user expectations (M1:105)

*"..We have in our municipality a strategy that is for all the municipality. And then we have….
we work in our sector in health sector to, work with all the leaders to see what should we do
now? And how? So I lead that work in Lerum Municipality, it's very we are very open for dig-
ital things and we like to test some.. a lot of things. And we are in a project called Al-
lAgeHub…."* (M1:105)

*"We have the library that provides education and practical help with the technical things for
the citizens. And we have one unit in our sector that works with the..it's most elderly, but it
can also be anyone. That also... they have meeting points, they educate even. And and like I
said before, we have a project now that we are lending out iPads…"* (M1:144)

4.5.2 *Privacy and Security strategies*

When it comes to privacy and security concerns, Swedish public healthcare systems tackle se-
curity issues by adhering to the government's GDPR rules. This helps them address privacy

concerns and foster trust among the users (E1:139). E1:98 stresses that there are close to 40 laws regarding the way e-health systems need to be devised. This is so because e-health systems handle a lot of private data, posing security and privacy concerns. These laws help guard the data and foster trust with the users regarding the use of e-health systems (E1:139). Moreover, the systems are designed to work in accordance with the laid GDPR rules of the government. The e-health agencies and regions have lawyers working with them that look into the implementation of the systems (E2:96; R2:20).

"…support from within the regions, they have lawyers, they have specialization within that field. And they have like a nationwide dialogue. How are we supposed to do this.. As a nation as well…" (R2:20)

"To handle the data in the systems, yeah. We have the laws, how we can manage data, or how the care can manage the data, and what are the limits are to see things and how the patients allow the care to see our patient data. And so we have about 40 laws in Sweden, how you manage and how you provide and how you handle the data in h.. and in healthcare. So the were the very lots of roles of that, regulated, We have lots of regulation, how they manage…" (E1:98)

4.5.3   Standardization and workflow strategies

A success factor is to build an ecosystem where all the services and systems work together (R3:36). There is a need for integration between systems to make them more efficient (M1:75). Municipalities need to collaborate with the companies developing digital healthcare services(M2:103). Swedish healthcare is not mature (E:20), and Swedish authorities and agencies work in silos. There is, therefore, a need for more collaboration (E2:26). Also, the municipalities and regions need to collaborate and develop requirements for the developers of the services (M1:73). They can get services and products that fill their needs in doing so. M1:S3 also argues for the need for collaboration and coordination. R3:12 stresses the importance of using collaboration between personnel within the organization to design and develop e-health systems efficiently. Having an involved and passionate management team within the organization facilitates e-health innovations (R2:74; R3:34). Furthermore, implementing a feedback channel to address users' grievances makes users feel more involved and enables easy diffusion of services (R3:40). Many municipalities and regions in Sweden also use internal communication channels to communicate and collaborate with each other. Sweden has multiple government initiatives and platforms to enable communication and collaboration with each other, like e-Hälsa 2025 (R1:47), 2030 regional goal (R2:62), and "model municipalities' (M2:34).

"..we have channels, where we recently implemented a e-health service called feedback and complaints , where you can write your.. so it means you can… you can write your opinion about something or complain about something. And it's, it's a main, the main reason for that is to, for the citizens to…uh.. to complain if they want to about healthcare, they will see. But also, if you see something that could be developed, or so… That service is very well used. And I see that yeah, we get definitely get opinions from the public…" (R3:42)

There is a need for more change management when it comes to the adoption of e-health to ensure that services are used and adopted after implementation (M1:61, R1:57; M1:S3). M1:S1 argues that there is too much focus on the technology and that more focus must be put on change management instead. The organization needs to be ready for change and take the lead in the

change process (R3:63) otherwise, the implementation will fail. Through change management, the personnel can get more motivated to use the services, and change management must be used throughout the organization (R1:59; R1:63; R1:83). R3:81 and E2:117 argue that there needs to be more focus on the organization because it is there many problems lie. This is partly because the health sector is not mature and needs more development (E2:105). Having brave leaders and politicians is also being brought up as a success factor (E2:78), and so is support from management (E2:74). By involving the staff that is positive towards change and new technology, the rest of the personnel will follow (M2:56). It is important to include the right requirements in the procurement process to ensure that the systems can be integrated with other systems within the organization (R1:89). According to R2:56, it is also important that there is loose coupling so that organizations can make changes without "crippling" the whole system. Collaborating with multiple systems within the organization and the expertise using the systems helps meet user expectations (R2:44). E2:107 suggests drawing inspiration from the private healthcare sector and collaborating with them to boost e-health innovations and improve the services within the public healthcare sector. R1:85 argues that policies, regulations, and standards must be followed to have an infrastructure that allows for integration between systems. Also, M2:105 mentions that digital infrastructure is needed for realizing the full potential of e-health services.

"Yes, that's very important to have. And if you look at those success stories, usually municipalities with a high degree of digitalization, they have brave politicians, and brave managers." (E2:78)

The development process must become faster (R1:106). Organizations need to work more goal-oriented and do follow-ups to ensure that goals are reached (R3:67). By working agile, organizations know they are heading in the right direction as soon as possible and that they do not develop something that is not needed or does not solve the intended problem (E2:60). Users are also needed to be involved in the development process (E2:58). Organizations also need to learn how to use digital infrastructure (M2:105) better to increase the usage of e-health technology. According to R2:2, it is essential to standardize the digital transformation process within the region to include everything needed, such as education.

4.5.4 Funding strategies

Cost is another critical factor influencing e-health diffusion. The economy (R1:63) to support the e-health services has to be in place since resources are a bottleneck for e-health (E1:145). If there is no funding, the implementation process will halt (E2:88). Before the design and development of the systems, there must be a plan in place with the resources needed for development, the needed competencies, the budget for testing and maintaining the product, the benefits that can be achieved from the product, and the return of investment that can be incurred (R2:36). Hence, the services should be analyzed and evaluated to ensure a return that motivates the cost (R2:38).

"…How much time will this take? When is the rate of return to be expected? When can we start seeing usage that sort of compensates for the costs of this? And I think that is a process that is always supposed to be evaluated, because that changes as well…." (R2:38)

4.5.5   Communication and collaboration strategies

Communication and collaboration are critical factors influencing e-health diffusion (M1:117). There needs to be transparent communication with the users regarding the benefits of the e-health services (E2:100; R3:38) otherwise, they will not use them. The message must be spread through communication channels and marketing to reach the users (M2:79; M2:91). Educating users on the use of e-health applications and conducting workshops to engage users in promoting the products also aid in diffusing e-health (M2:77; R2:56). M2:89 even claims that this information is the most important thing regarding e-health diffusion. Municipalities and regions use various social media platforms like LinkedIn, Facebook, and Instagram to communicate and promote their products (M1:109; R1:102; E1:13; E2:86). Sweden also uses 1177 to promote e-health services to the users (R3:38). It is a website with details of all e-health services existing in the regions. Apart from this, communication to personnel is made through leaders or via intranet channels (M1:109; R1:102). The Swedish public health system has a dedicated communication department that ensures effective communication with the users (M2:91; R2:50; R3:12).

"…you can do marketing by them, as you say, and spread the word, and then do some educations and then. Yeah, I think for the citizen, they are a key to spread the word. When it comes to our employees…I think it's about this, the assignment for the work. What… what do they need to do with the assignment, and you can say, and we have an obligation to inform them of that. And we also have an obligation to educate them in the way we want the work to go further on. So I think it's..uh.. it's quite different ways to go, but I think it's…uh.. the same goals for the right value. I think it's from information and communication is really, really a key player…" (M2:79)

R1:36 argues that there is a need for collaboration and communication among the regions and municipalities within Sweden and having a common goal. An example of good communication and collaboration is showing success stories from other organizations' e-health efforts (E2:78). This provides a platform for other regions and municipalities to draw inspiration from each other (M2:38; R2:74).

4.6   Findings Summary

Our interviews provided insights into various e-health diffusion strategies that the public healthcare sector uses for technology adoption. M2:30 says that they perform various levels of evaluation and testing before actual use, which makes them confident about the type of service they are offering and about its acceptance among the individuals. Apart from analyzing and contemplating every step an individual would take in the field use (M2:30; M2:42; M1:65), the collaboration in the public healthcare sector aids in strategizing and working towards a common goal. For example, the "model municipality mission" of the government is one such strategy to increase the diffusion of e-health services among the public (M2:36). E-health services must be available to all individuals irrespective of any demographic challenges (R3:8). With this vision, the government agencies are strategizing and drawing timelines for easier and faster diffusion of e-health services. Communication and collaboration are the core strategy that the public e-health sector is focussing on to maximize its reach to the public and improve its services' quality (R3:12). Moreover, educating the users on the benefits of e-health innovations makes it easy

for the users to adopt e-health services (E2:72). This is also the view of M2:77, who stresses the importance of education and information.

Consequently, involving the users in the development and design of e-health services by taking feedback from the users or testing the services makes it easier to diffuse new innovations (M2:62; R1:26; R1:71; M1:105; R2:46; E2:60). Making an economically viable, easy-to-use user interface helps in quick acceptance by the users (R2:36). This boosts the users' confidence in the e-health services and motivates them to use them (M2:60; M2:62; R1:59; R1:83). Apart from enhancing the collaboration and communication (M1:52; M1:117; E2:60) with the development teams and the leadership team, it is critical to enhance organizational competency by learning from each other's experiences to improve e-health services (R2:74; E2:66). Conducting various knowledge-sharing sessions or working together among the teams is an efficient means to uplift organizational skills (R1:68; M1:99; M1:144; R2:2; R2:44). Furthermore, having a well-planned innovation procurement process with a significant analysis of the services' design, development, and promotion strategy is also effective for the successful diffusion of e-health services (M2:72; R1:89; M1:141). Following an iterative development approach with well-defined user requirements facilitate the agile way of working within an organization (R3:43; E2:60). Inera, a national partner, is responsible for maintaining and collaborating the e-health services among regions and municipalities in Sweden (R1:39; R2:10). Investments in marketing go a long way in promoting the use of e-health services (M2:79; M2:81). Additionally, a vision from the leadership team (R3:34; R2:38), well-thought-out change management (R1:63), and government policies (R1:83) to strategize the adoption of certain services ensure successful e-health diffusion.

Although the pandemic outbreak was an abrupt one, the preparedness of the Swedish public health sector in e-health services helped mitigate the catastrophic adversities. The e-health services developed within 1177 were leveraged by the government to cater e-health services to every individual regardless of age, gender, or geographical area. There are several government visions like e-Hälsa 2025 (R1:47), 2030 regional goal (R2:62), "model municipalities' (M2:34), and so on to promote e-health innovations.

Our interview also reveals that few of our respondents feel that private organizations are more innovative than the public e-health sector and that there is a lot more to learn from them (R1:91; E2:107; E1:57). Due to the limited scope of e-health products in the market, M1:71 feels that they need to strategize and adapt the existing products. Hence, there is a need to broaden the scope of the e-health market, including more and more e-health services to all sets of individuals across the country. Apart from this, the presence of adequate digital infrastructure aids in strategizing effective e-health solutions (E1:129). Furthermore, the e-health systems are designed within the GDPR guidelines set by the Swedish government, and there are dedicated teams that examine whether the systems are adhering to the governmental rules and regulations (R2:20; E1:98; E1:139). This helps build trust with the users and promotes the adoption of e-health services.

5 Other Empirical findings

5.1 E-health benefits

During the interviews, the interviewees brought up many benefits of e-health, but one of the clearest benefits that were brought up is that e-health services improve the quality of both healthcare and care (E2:14; M1:S1). By using e-health services for the elderly, they can live a more independent life and self-sufficient life (M2:18), and they do not have to rely so heavily on care personnel (M2:114). M2:15 also argues that if the patients benefit from the new technology, the staff will get a better work environment. Through digital transformation with the help of e-health services, the healthcare sector can be improved (E2:10). A benefit analysis is performed to ensure the implementation is beneficial for all stakeholders (M2:42). To fully realize the benefits of e-health, it is vital to tailor processes and routines to benefit from the e-health services(R2:68).

"The main benefits is, of course, like transparency from the health care system, accessibility, we also have just saving time and effort for the personnel within the healthcare departments, trying to be more effective with the resources we have saved costs are different… sorts of different projects and different services have like different returns sort of, in what they sort of feel, function fulfillment in society, sort of. So some are for the benefits of the workers within the healthcare system, and some are for the public." (R2:8)

Cameras make patients (M1:141) and relatives feel safer (M2:26). The personnel can check in on the patients remotely, and the patients do not have to meet a lot of personnel and risk contracting some disease (M2:28; E:20). Technology that improves the quality of life does not have to be expensive or difficult to use, and M2:54 means that the elderly could buy it and put it to use by themselves without the involvement of municipalities. A benefit mentioned by R1:122 regarding e-health is that it can be used to make healthcare more accessible (R2:8, R2:58) for people with disabilities such as impaired vision or hearing. But, healthcare also gets more accessible for people who live in the countryside and otherwise would have to travel a long way to access healthcare (R2:32). In general, just contacting the healthcare gets easier with e-health services. Patients no longer need to contact them by phone, which can be very hard and time-consuming (R3:10). For the regions, adopting e-health services and products means that the employees can work more effectively and save time and resources(R1:18, R2:8). This leads to meeting more patients and spending less time on administrative work. Especially with the help of digital meetings. The fact that the transparency increases with the introduction of e-health services is also a benefit that is being lifted (R2:8, E2:20). Patients can see what is being written in their medical records, for example. Another benefit of e-health that E2:14 lifts is that it gives people the option to choose how they want their healthcare and eldercare more freely. Meaning that citizens no longer have to visit the doctor if they do not want to, and when they get older, they keep living in their homes longer(E2:14).

6 Discussion

6.1 E-health during the pandemic and its current implementation

In accordance with Hwang et al (2020), our study revealed the use of HIS to bridge the geographical disparity across Sweden. Moreover, the outbreak of an emergency crisis situation like the pandemic boosted the use of e-health services. This is due to the fact that the situation around COVID-19 needed social distancing norms to break the chain and flatten the curve (Amankwah-Amoah et al, 2021). The study also revealed the use of multiple wearable devices and digital surveillance to aid the continuity of medical aid while still maintaining social distancing. Being at the forefront of e-health innovation, Sweden had EHR and e-prescriptions already in place. Thus, enabling access to medical diagnoses for patients. Furthermore, the pandemic saw a rise in the usage of tele-health services. This meant doctors and hospital staff could effectively time their workload and ensure quality delivery of services simultaneously. With tele-health services gaining momentum, there was not any need for patients to physically visit hospitals and at the same time, medical care was provided to people staying at remote locations. Another interesting observation during the study revealed that the pandemic forced the public health sector to work more in collaboration, thereby helping tackle the issue of a "silo" culture within the organizations.

Apart from the massive use of digital services to reduce physical meetups and break the chain of disease transmission, the pandemic also saw an accelerated development of services like the development of the COVID-19 digital certificate, which was developed and designed within a few months. E1 and E2, who work at the e-health agency, are responsible for such developments in public healthcare. They receive requirements from the Ministry of Health and Social Affairs. The responses from M2 and E2 reveal that the developments during COVID-19 accelerated, which coincides with the study by Amankwah-Amoah et al (2021), stating the pandemic to be a "catalyst" for digital acceleration. Especially within the healthcare sector, there was little or no time for a detailed evaluation of e-health innovations. This is even reflected by R3 and E2 where they point out that even though the use of digital services and diffusion of e-health accelerated during the pandemic, it came with a cost. One of the major downsides of this rapid development was that it provided no time to examine if the systems were designed according to the law laid by the government. This led to grave privacy and security concerns about e-health applications. Especially the use of e-health systems for digital contract tracing and digital surveillance led to intrusion into one's private life, which caused fear among the citizens regarding the privacy and security aspects of the applications (Lin et al., 2021). A report shared by E1 points out that because the medical personnel was busy with clinical work during the pandemic, it also slowed down the developments in e-health. Furthermore, R2 points out that government rules and regulations made it possible to diffuse a few healthcare services like, for instance, digital covid passes. Multiple countries during the pandemic had eased their rules and regulation to enforce faster and easier diffusion of e-health services (Tebeje & Klein, 2021).

6.2 Understanding e-health diffusion strategies through DOI

6.2.1 The e-health innovation

It is clear that the interviewees must consider many things when introducing new technologies. It is important for the innovation to have certain properties for the users to accept them and for adoption and diffusion to happen. The perceived factors of innovations proposed by Rogers (2003) and expanded by Moore & Benbasat (1991) that affect the diffusion could be found in the respondents' answers. However, some were discussed more and seem to be of higher importance. The respondents often brought up compatibility concerning problems regarding standardization and integration between systems. The healthcare sector seems to be struggling a lot with compatibility issues due to its many legacy systems and systems lacking standards.

Regarding the complexity of e-health innovations, the importance of user-friendliness was brought up as one of the most important diffusion strategies. The respondents argue that if the e-health services are not user-friendly, the users will not use them. Strategies related to showing the users the relative advantage of the services could be recognized when talking about analytics performed before deciding to implement an innovation and discussing communication of the benefits to the users. This partly goes in line with the theory of Rogers (2003), which says that relative advantage and compatibility are the most important factors when it comes to how fast something is diffused.

Some activities are performed within the innovation process that touches upon several factors. Thus, affecting the diffusion rate positively in several ways, the respondents often consider these activities key activities. This can be seen as an indication that what Moore and Benbasat (1991) and Rogers (2003) say about these factors is true. An example of such a strategy is involving the users in the development process. Which by several respondents is raised as an excellent way to improve the diffusion of e-health services. It can be argued that this activity covers all or almost all of the factors presented by Moore and Benbasat (1991), hence it makes sense that this is considered a key activity.

There are also internal characteristics such as innovativeness, centralization, complexity, formalization, interconnectedness, organizational slack, and size that impact the diffusion (Rogers, 2003). These factors were also brought up during our interviews but often in talks related to different subjects. However, it is clear that these factors affect diffusion since the interviewees claim that successful diffusion is about so much more than providing a good innovation, especially organizational factors. For example, E1 says that the private sector is smaller and closer to the wallet, which can be interpreted as less bureaucratic and, therefore, more innovative. Also, M1 says that it is easier to pilot things in smaller municipalities. These two statements seem to disagree with the DOI theory, which says that the organization's size positively impacts the organization's innovativeness (Rogers, 2003). When it comes to organizational slack, which can be described as the number of resources dedicated to innovation (Rogers, 2003), most respondents also believe that a lack of resources hinders their innovativeness, which aligns with what Rogers (2003) states. Both E2 and E1 say that they primarily develop innovations based on the Ministry of Social Affairs instructions and lack the freedom to create their own projects. This can be considered formalization or bureaucracy, which negatively impacts an organization's innovativeness. Another variable that, according to Rogers (2003) affects the innovativeness of an organization is how positive the leaders are about change and innovation. This is something that almost all respondents agree with. Some respondents also stress the need to mix

leadership with strategies for strong change management, both when it comes to the innovation process and communication.

6.2.2 The e-health innovation process

The innovation process within the organization seems to be well thought out and during the pandemic, it was sped up a lot. Much emphasis is especially put into the earlier stages of the project. Many activities are performed before implementing the service, in other words. Agenda-setting and things like having clear goals were often mentioned by the respondents as crucial. This aligns with Rogers (2003), who brings it up as the first step of the organizational innovation process. According to M2, every innovation process step is analyzed before they decide to move on to the implementation phase. A crucial step in this analysis is identifying the benefits and what the organization and the users can gain from it. This is the belief of several of the interviewees. These benefits then need to be communicated with the users. Part of the reason why this is so important is due to the lack of resources the private sector has often had when it comes to innovation.

Regarding the municipalities, there seems to be a problem finding innovations that fit their needs on the market. This stage of the innovation process can be considered the matching stage. Without finishing it, they have a hard time moving on to the implementation phase and successfully diffusing the innovation, according to Rogers (2003). They seem to know about these problems and are working on strategies to solve them. Through working together with other municipalities, they can, for example, come up with requirements together.

When it comes to the need to persuade the users of the e-health innovation, most seem to be self-motivated to use the services, but far from everyone. This is something the respondents seem aware of, and they also apply a strategy similar to what is suggested by Rogers (2003) for persuasion, interpersonal communication. Often by using opinion leaders.

Once the decision to implement the e-health service and get it put to use, the most important thing seems to be that it is good and actually working. The final innovation process step is when the innovation is being confirmed, put to use, and routinized into the everyday life of the users (Rogers, 2003). We found that most respondents say that they work more agile and iterative. Some of them also claim that the development of an e-health innovation is never finished, and it can never be considered fully adopted. However, the agile way of working also facilitates re-innovation, which leads to diffusion. Although this agile way of working is not covered by Rogers (2003), it seems to fit the description of re-innovation he provides, modifying an innovation to fit the user's needs better. This would also imply that the agile way of working accelerates the diffusion since that is what Rogers (2003) says about re-innovation.

This concept of re-innovation seems to be a strategy utilized by the healthcare system, both through platforms such as Inera and existing services within their own organizations. The services developed for the pandemic can also be put to new use after the pandemic and be adapted to new scenarios. Also, the new agile way of routinizing the previously mentioned innovations can be considered a form of constant re-innovation. This aligns with the fact that Rogers (2003) claims that re-innovation makes the adoption of innovation more sustainable.

Regarding what Rogers (2003) says about adopter categories, those less innovative can follow the lead of more innovative organizations; it can be seen within Swedish healthcare where the

more innovative private organizations are looked at for inspiration. But it is hard to put the organizations we interviewed into the different categories. Even those who seemed the most innovative argued that this was not true for their whole organization. But they agree that having innovative management helps a lot.

6.2.3   Communication channels for diffusion of e-health

When it comes to communication, healthcare organizations understand the importance of having strategies for using mass media and other communication channels to reach out to the public with their message and spread knowledge. All the respondents share this view. To reach out to the citizens, the preferred method of communication seems to have been social media. However, more traditional communication channels such as newspapers are also utilized (R2). This is partly in line with what Rogers (2003) says about communication; mass media is the most effective way to spread knowledge of an innovation to the users. Social media has characteristics of both mass media and interpersonal communication, which would imply it is a good fit for both the knowledge and persuasion phase. Research has also shown that social media plays an essential role in diffusion (Sundstrom, 2016).

When the respondents target hard to get groups such as the elderly, they are communicated to via more interpersonal channels and direct marketing and education (M2). When it comes to communication within the organizations involving staff in the innovation process is a factor that is mentioned as important. There are also internal communication channels, such as intranet and forums (R2; R3; R1). By inviting the staff to forums, information can go both ways since the staff can also influence the development with their feedback. These more interpersonal approaches to communication are also what Rogers (2003) claims should be used to persuade hesitant users.

1177 acts as a communication link between the public and the medical staff (R2:6, R1:12, R3:8). It can be considered a platform or a health community, almost as described by Agarwal et al (2010) and Chen et al (2019). But instead of communication between the patients, it is mainly used for contacting healthcare and using the platform's services, such as services for self-tests.

The respondents brought up and stressed the importance of many collaborative and communication efforts between the public health organizations such as SKR(E1), Inera, AllAgeHub (M15), and Vision E-hälsa2025(M1:50), and the model municipality project (M2). With collaboration, the organizations can gain inspiration through shared success stories(E2:18). With this collaborative approach, the benefits of adopting the new services become apparent, and by that, the diffusion can be increased. This aligns with Moore & Benbasat (1991) and Rogers (2003) ideas regarding how relative advantage, observability, and especially result demonstrability positively affect the diffusion rate. However, the collaboration between organizations and how it affects the diffusion of innovation is not something that Rogers (2003) mentions. But it is apparent that the communication and collaboration between the organizations played a big role in the Swedish strategy to mitigate the spread of COVID-19.

6.2.4 The Social System influences on e-health diffusion

Within the social system, many things influence the adoption of e-health innovation. Just having a good innovation is not enough. Instead, political (E1; E2), organizational (E2), and resource (E2; R2; E1) factors seem to be what often decide whether or not an innovation gets adopted.

Within social systems, some norms and structures affect the diffusion rate (Rogers, 2003). This also seems to be the case within the healthcare sector, especially when making long-time users adapt to new innovations. This seems to be the case for citizens (M1), the healthcare staff, and its organization (E1; R3). According to the respondents, for both stakeholder groups, their age and how long they have done something affect their resistance to change. But these structures and norms seem to be changing with the coming generation shift. The respondents do not believe age will be an as significant factor when it comes to adoption anymore, which will lead to a big leap when it comes to the use and diffusion of e-health.

According to Rogers (2003), there is a difference in diffusion between individuals and organizations. These thoughts can also be seen in the respondents' answers where they say that their approach to the development differs depending on what stakeholder group the innovation is for (M1; M2; R1). Rogers (2003) suggests that an innovation can only be fully adopted by the individuals in a social system when the organization has fully adopted it first. This is something the organizations seem to be aware of. Within the social systems, there are so-called opinion-leaders that, according to Rogers (2003) can be used to spread knowledge and improve the adoption rate, often through interpersonal communication. In accordance with Rogers (2003), these opinion leaders have often been identified and included in the innovation process to gain acceptance and other users' trust regarding the innovation (M2; M2; R3; R3). These opinion leaders are extra essential to utilize during the persuasion and decision phase, according to Rogers (2003), since interpersonal communication is the most beneficial during these stages. This approach seems utilized by including the users and opinion leaders already in the early stages of the innovation process.

6.3 Ways to counter the e-health challenges

Being large organizations catering to every individual within a country, public health organizations face multiple challenges. One of the most prominent issues is related to the accessibility and resistance from the users; this is in line with the observation by Kreps & Neuhauser (2010). This is because some people do not have technological know-how on the use of services over the internet (Kreps & Neuhauser, 2010), which is a challenge for public organizations innovating e-health services. Lorenzi (2005) proposes that strategies related to infrastructure are needed to change this. The interviewees also aired these thoughts, but for now, this seems to be an area where Sweden can get better.

Many elderly do not want to adapt to new technology or change their daily life. M1, who works within Lerum municipality with elderly care, feels that sometimes patients feel more comfortable with personnel visiting them physically than connecting with them digitally. However, due to generation shifts and faster digital penetration, these limitations are less relevant. Apart from the digital divide, e-health diffusion faces resistance from users (Kreps & Neuhauser, 2010), which was brought up in the interviews by E1, E2, and M2. Further challenges are encountered when some of the e-health innovations do not meet user expectations and are not user-friendly,

leading to resistance to using these services. Kreps & Neuhauser (2010) and Ross et al (2016) suggest one way to tackle this issue is to design the e-health application according to the user's needs and make them as easy and interactive as possible, which was reflected by most of our respondents. E2 suggests designing a system from the user's point of view rather than an organizational viewpoint. Involving users in the design and development of HIS is another way to make users feel more included and aid in faster diffusion of e-health services. This strategy can be identified both in the interviews and literature (Davidson & Heineke, 2007). The users easily adopt innovations that provide improved medical aid without disruption to the normal functioning of day-to-day life (Granja, Janssen & Johansen, 2018). The same is reflected in our findings. Working in collaboration with IT developers, business analysts, system experts, UX designers, and the respective users is an excellent means to deliver a high-performance system. This strategy also aids in integration and adoption challenges (Lorenzi, 2005). E2 and M1 point out effective collaboration and communication strategies to promote faster diffusion of e-health services. Marketing campaigns, improving the information flow to users, and educating and training the users on the benefits and use of e-health services helped overcome e-health adoption challenges. The literature also argues that it is imperative to have strategies in place for this during a crisis like the pandemic, both to be better prepared and to enable faster diffusion (Al-sharif , 2020).

As e-health systems deal with sensitive personal data, it is critical to provide access to personal data to authorized individuals only (Al-Issa, Ottom & Tamrawi, 2019). While M1 feels that the strong GDPR slows down the development of e-health services, E1 believes that GDPR helps foster trust among the public. As personal data over the cloud has higher access to data being accessible to unauthorized personnel (Al-Issa, Ottom & Tamrawi, 2019), within Sweden, these personal details cannot be hosted in clouds outside Europe. This counters one of the possible reasons that people are hesitant to share their data with cloud-based e-health services (Al-Issa, Ottom & Tamrawi, 2019). Sweden has over 40 regulations addressing GDPR concerns, as mentioned by E1. There are also lawyers working in alliance with the e-health agency to inspect if the HISs conform to the norms laid by the government. This aligns with what Handayani et al (2020) say about the importance of having strategies in place to conform to the privacy and security regulations of the country. Another strategy Handayani et al (2020) mentions is having certifications for e-health services to increase their reliability. This is something that the E-health agency is working on now. They are currently trying to put together a framework to certify consumer apps that, for example, measure blood pressures so that doctors can trust the readings(E1).

Interestingly, the introduction of new e-health services is not only limited by technological competencies but is mainly influenced by financial factors, organizational limitations, and political parties. As Oliver (2006, p 1) suggests, "Science can identify solutions to pressing public health problems, but only politics can turn most of those solutions into reality". The interview findings reveal that e-health innovations that are faster to implement and help to gain political preferences are preferred over other requirements. A lack of change management, collaboration, and communication among people within the organization makes the innovations in e-health systems slow and a tedious process which coincides with the observation by Iroju et al (2013), Erlingsdottir & Lindholm, 2013 and Handayani et al, 2020. E2 argues that these challenges are more evident because the public healthcare sector is still not mature enough. As Iroju et al (2013) point out the need for a standardized goal and revolution in the organizational workflow as a means to enable interoperability between healthcare systems. Our study also reveals a need for strong change management and a good leadership vision to upskill the developments in e-health innovations. Our observations indicate that brave and passionate leaders

are instrumental in the successful diffusion of e-health services. The need for more change management and leadership strategies can also be seen in the literature (Saunders & Scott, 2014; Handayani et al, 2020).

Furthermore, there is an added challenge in integrating the new systems with the existing ones. As M1 mentions, Public health care systems have many legacy systems, which make it complicated to introduce e-health innovations which is in accordance with Iroju et al (2013). As Gopal et al (2019) refer to overhead due to legacy systems as a "technical debt", our respondent R2 also reflects a similar thought. It not only elevates technical issues but also worsens the financial debt of an organization. While the private healthcare sector motivates public health organizations, it comes with an overhead challenge of standardizing e-health innovations. Therefore, it is important to have standards in place for this (Lorenzi, 2005). As private sectors are separate entities and not within governmental control, the public health sector faces difficulty designing a standardized workflow.

Moreover, regions and municipalities have separate systems, making it challenging to integrate the changes. R3 suggests a more goal-oriented and agile development process to ease the diffusion and integration of e-health services. Alongside this, there are difficulties faced within the public organization with the standardization of processes and "silo" work nature. Therefore, there is a need for greater collaboration among the organizations and the teams within the organizations. Sweden has multiple government initiatives and platforms to enable communication and cooperation with each other, like Vision e-Hälsa 2025 (R1:47), 2030 regional goal (R2:62), and "model municipalities' (M2:34). Apart from this, SKR provides platforms to the regions and the municipalities. They can be used to discuss their issues and challenges in diffusing e-health innovations. This aligns with the suggested strategy for having more collaboration between organizations and staff is encouraged for designing efficient and high-performant e-health systems (Ross et al, 2016). There is also a need to have strategies for collaboration between the private and public sectors (Handayani et al, 2020).

Additionally, respondent E2 describes a scenario where she, as a patient, had to fill up the same medical form five times in the hospital because the systems within the hospitals do not share data which is a challenge. Sweden, having a decentralized healthcare system, can draw inspiration from the study by Demirezen et al (2016), focusing on the use of HIEs for sharing fragmented data among the healthcare providers for effective decision-making or better-utilizing strategies for documentation, as suggested by Li et al (2012).

6.4 Implications for Practice

The present state of e-health is greatly influenced by the outbreak of the COVID-19 pandemic, which is a global crisis situation. The condition around COVID-19 required a quick transfer of services virtually over the internet leading to an economic slowdown. This hugely impacted the healthcare sector, which needed to ensure continuity of services while maintaining social distancing norms. Our study highlighted that the pandemic has been an accelerator of digital transformation, especially in the e-health sector, while it has also halted e-health diffusion. The findings suggest that even though the pandemic geared up e-health diffusion, it has come up with a cost. The sudden outbreak of COVID-19 meant there was no time for elaborate studies and evaluation, and the innovation process had to be fast-tracked.

Furthermore, this study revealed that e-health is more than privacy and security challenges, it is more about politics and money. As already mentioned before, decisions to implement a particular HIS are greatly influenced by the political precedence of the leaders. But e-health diffusion and adoption take time. It involves catering to each individual's needs which means that these systems need to be developed continuously to improve their performance, and this needs time, patience, and perseverance.

Furthermore, our study revealed that communication and collaboration are among the most pressing issues in e-health innovation. However, countries in the EU have developed multiple programs and strategies to overcome these barriers. A more detailed study is required at the governmental-level policies, rules, and regulations and the critical e-health innovations that do not go to the implementation phase due to political and financial reasons. Besides an improvisation in standardization and workflow procedure within the public healthcare system, additional attention is required to enable collaboration and communication within Swedish public health systems as healthcare facilities in Sweden are decentralized.

Last but not least, the reflections from this thesis can help developing nations plan their future e-health innovations. The developing countries must consider the strategies and challenges before starting with the diffusion of new e-health services. Ethical considerations and privacy laws must be well laid out. The systems are needed to be tested thoroughly with a closer scrutinization of the security and privacy aspects. As seen from the study, e-health innovations have aided the government in mitigating emergency crisis situations like COVID-19. Therefore, other developing nations need to uplift their healthcare situation through a well-planned diffusion strategy.

6.5 Implications for research

In our study we identified a number of strategies used by the Swedish public healthcare to diffuse e-health services during the pandemic. Since we found that one main contributing factor to the diffusion of e-health during the pandemic was the collaboration within the healthcare system. However, this collaboration discussed was mainly on a country-wide level, it would therefore be interesting to focus on one municipality or region and see how the collaboration within that organization worked during the pandemic. Furthermore, to expand on that even more, to see how global collaboration between countries can affect the diffusion. This would be especially beneficial when it comes to developing countries. Our research could also be modified to look at the actual users of e-health services to see how they interpreted the diffusion of e-health during the pandemic.

In our research, a big emphasis was put on the DOI theory as a whole. Therefore, we believe a greater emphasis can be put on the time variable to understand the adopters of e-health innovations. This would help to understand better how the innovation process during the pandemic worked, and it would be useful to understand from the users' perspective. Another extension that can be made is to categorize the actors of the Swedish healthcare system into the different adopter categories. Further studies on the adopter categories among various healthcare organizations in Sweden shall help draw insightful learnings for the other organizations within the public healthcare sector.

7 Conclusion

7.1 Research question and purpose

The purpose of this study was to study the diffusion of e-health innovations by the public healthcare government and the role of e-health innovations during the pandemic. This study provided insights into the strategies for e-health services and highlighted a few of the most pressing issues instrumental in e-health diffusion. We believe that the onset of an emergency crisis situation like the COVID-19 pandemic has provided us a good platform to rewind and look back into the e-health services currently in use and learn from the past errors. With this intention, we aimed to answer the below question:

How did the Swedish public healthcare system work to diffuse e-health services during the pandemic?

Furthermore, this study has underlined the current state and the preparedness of public health organizations to combat future epidemic situations. The involvement of digital strategists, development leaders, and e-health strategists from the municipalities, regions, and e-health agencies across Sweden has provided us with a compact outlook on the e-health innovation and diffusion strategies. Furthermore, the paper looks into the ways to overcome a few of the critical challenges in e-health diffusion. We believe that looking at the strategies to combat the most common challenges and ways to diffuse e-health services from the viewpoint of the DOI theory has provided a holistic view to successfully diffuse e-health innovations.

7.2 Key findings

The public healthcare systems of Sweden worked in four primary ways to diffuse the e-health services during the COVID-19 pandemic, by improving collaboration and communication, including the users and opinion leaders in the development and by re-innovating their existing services. Since the healthcare sector of Sweden is divided into three levels and decentralized, all the regions and municipalities had to implement their own e-health solutions. But given the acute circumstances of the COVID-19 pandemic, there was no time for this. Therefore, collaborative efforts were needed to speed up the innovation process. Through communication and platforms such as Inera, innovative solutions were shared that other regions and municipalities could also use and adapt. One example of this was the contact tracing service developed by Region Värmland, which was shared via Inera and adopted by other regions all over Sweden. With the help of communication channels such as social media, knowledge about e-health services could be spread. Moreover, to persuade those reluctant to change, such as the elderly, more direct forms of communication and opinion leaders were often used. Other than getting the acceptance from the users, there were many other challenges related to the e-health diffusion process. Interestingly many of those challenges are not directly related to innovation itself. Instead, they are more organizational challenges, such as change management, political issues, and funding problems. The challenges related to the innovation are mostly standardization and integration problems. A solution to many of these challenges seems to be to include the users, and especially opinion leaders in the innovation process. Furthermore, educating the users on the advantages and benefits of e-health services through various marketing campaigns and

promotional events seems to be an efficient strategy to diffuse e-health. This has worked quite well for the Swedish public healthcare system.

As e-health development is an ongoing process, the healthcare organizations had already developed quite a few e-health services before the pandemic. These services were adapted to fit into the circumstances around the pandemic or were re-innovated. This strategy by the government had sped up both the implementation and the diffusion process. The pandemic itself also acted as a catalyst for the diffusion. The benefits of e-health were highlighted to a bigger audience, and multiple promotional campaigns were put in place to spread awareness among the users which led to even reluctant set of individuals to adopt e-health services. The pandemic also led to people being forced to adopt e-health services through government rules and regulations, which also helped the diffusion process. For example, people had to use 1177 more often for medical appointments as physical visits were avoided during the pandemic unless very critical. Our studies suggest that the pandemic both decelerated and accelerated the e-health innovations. Since clinical work had to be prioritized over innovation processes, the future developments in e-health services were halted. Our respondents are hopeful that post-pandemic will provide them the window to look through these pending tasks. But it is clear that early developments and diffusions of e-health services helped combat the COVID-19 pandemic.

Our findings suggest that it is common for healthcare organizations to work agilely. They argue that the innovations never get fully adopted. They constantly need to update the innovation to fit the current situation or the users' needs. However, this, on the other hand, facilitates re-innovation, which implies continuous improvements of the systems to fit the user requirements better. This strategy of the Swedish public healthcare system enables user acceptance and eases the diffusion of e-health services.

Since the healthcare system of Sweden is divided into different levels, they face different challenges. The municipalities mostly cater to the elderly with their e-health services, so they face challenges related to technology readiness to a greater extent. On top of this, the services they want to acquire are not available on the market, leading to a matching problem. Regarding the regions, many of their challenges seem related to adapting their organization to the new way of working that e-health services bring. Hence, strategies to improve the change management, procurement, and financial workflows are required to enable e-health innovations. A closer look into the region or municipality-specific challenges and strategies to overcome these respective challenges will enable better e-health diffusion, thereby enabling healthcare equity across Sweden.

If another crisis-like situation like the COVID-19 pandemic comes, the key factor for the Swedish healthcare system regarding e-health is to utilize communication and collaboration. This way, the less innovative regions, and municipalities can follow those who adopt earlier and learn from them. Apart from improving the collaboration and enabling information sharing among various e-health systems, expanding the market of e-health systems to fit users' needs can ease the crisis situations. Moreover, the recent COVID-19 outbreak showed that re-innovation enabled faster diffusion of e-health, which can be used for future emergency situations as well.

7.3 Future research and limitations

The public health organization is a complex system. Moreover, the public health sector systems need to cater to the needs of every individual. The services in the healthcare sector are not only directed to the general public but are also aimed at the medical professionals and the personnel involved in providing healthcare aid. A closer examination of how the users of e-health systems feel about them would provide a clearer understanding of the usage and effects of HIS and HIT on day-to-day lives. Was the adoption of e-health systems by the users smooth as planned? Were they working as expected? Many such questions need to be examined from the perspectives of the citizens and the professionals using e-health services. Secondly, during this research, it was found that the private e-health agency is more innovative and advanced in e-health services than the public sector. Understanding the factors influencing proactive innovations and easy diffusion of e-health services by the private sector can help the public sector to uplift its skills and strategies. Future studies on this aspect will enable an easier diffusion and adoption of e-health facilities. Thirdly, a closer look at the influencing factor and challenges faced by e-health organizations will alleviate e-health diffusion. A more detailed study on overcoming these challenges and how the critical success factors can be implemented for the public's smooth and easy adoption of e-health services is required.

Furthermore, a comprehensive investigation of the developments in e-health services over the past years through the various epidemics needs to be done to highlight the areas which need further improvements. A reassessment of the current e-health services is required to study the holes within the present public healthcare sector which hinder the future development of e-health services. This would enable the government to be well prepared to tackle the outbreak of similar epidemic situations in the future. Also, one of our respondents told us that it would be interesting to research why Norway and Denmark have come further than Sweden when it comes to e-health. This view was shared within a report another respondent shared with us. So this might be worth looking into. Lastly, this study is limited to people within the Swedish public organization and does not look into the policy regulars. We believe a future study on the perspectives of policymakers, including the suppliers, can provide more detailed and holistic insights into ways to faster e-health diffusion.

Appendix 1: Interview Guide

Ethics

- Introduce ourselves and thank for agreeing to do interview
- Briefly explain our research topic
- Ask for permission to record the interview
  -Deleted after transcription
  -Only we will have access
- Inform about their rights
  -Cancel at any time
  -Accept transcription
- Ask about confidentiality

Opening questions

1. To begin with, can you please introduce yourself?
   -What is your role, and how long have you had it?
2. What are your past experiences working with e-health?

The present state of e-health

3. For how long have you been working with e-health in your organization?
4. What type of e-health services do you have and how many? Is there any specific type of e-health service or system you are working with?
   -What are the benefits of the services?
5. Who are the users/stakeholders of the services? And how does it affect your development work in regard to making them adopt the services?
6. What is the reach of the current e-health services compared to traditional ones?

E-health and the pandemic

7. How well prepared were you to face the challenges of the pandemic and how do you think the development in e-health helped combat the pandemic?
8. How did the pandemic affect the way you worked with providing new e-health services?
9. Do you feel the outbreak of the pandemic accelerated e-health adoption? If so, how did you benefit from it?
10. How can the e-health services created for the pandemic be put to use after the pandemic ends?
11. Did you collaborate with other municipalities/regions?
12. Did the challenges differ during COVID when it comes to e-health adoption compared to before the pandemic?
13. What modifications did you have to do to existing systems to adapt to the pandemic?
14. How did the eHälsa2025 vision affect your preparedness?

DOI Innovation

15. How do you ensure that benefits of using the new e-health services outweigh the challenges of adopting it? and how do you make sure the users realize its benefits?
16. What are the key decisions you take before launching new e-health services for the citizens and healthcare professionals?
17. What steps do you take before you start implementing a new system?
18. How do you align the organization's competency with people's needs? Do you conduct any particular training to upskill the knowledge of the developers, professionals or public using it?
19. How are the e-health systems tested before being released for actual use?
20. What are the key factors you keep in mind while designing e-health services to make it user-friendly?
21. Do you feel that the public and the professionals are self-motivated to use any new e-health technology, or does it need persuasion through government rules, policies, education, or training?
22. How do you make sure that the new e-health technologies are well-integrated and easy to use by the users?
23. How do you adapt the organization to fit the new services? And how do you adapt the services to fit the organization?

DOI Time

24. When do you consider an e-health service fully adopted?
25. How is the transition period when switching from old ways to new e-health services?

DOI Communication

26. What strategies do you use to promote and ensure adoption of e-health technologies? How do you reach out hard to get groups?
27. Through which channels do you communicate your message? Do you use any specific service, social media platform or change leaders to reach out to citizens?

DOI Social System

28. Is it important to have people within your organization that drives and pushes for more innovation when it comes to e-health?
29. How do you ensure that new e-health services get routinized and continue to get used after implementation?

Challenges and privacy

30. What factors are the most important when it comes to e-health adoption?
31. Do you think there is a mistrust among citizens with the public healthcare systems and does it affect the e-health adoption?
32. What are the challenges related to e-health adoption?
33. What kind of privacy issues did you face while providing e-health service and how did you counter them?
34. What are the design and development steps taken to overcome the challenges in e-health?

Finishing Questions - Reflections and future

35. What are your main takeaways from pandemic? What have you learned that will be useful in similar situations when it comes to e-health development and adoption?
36. Are you satisfied with the developments in e-health? In which areas do you think there is a need for more development?
37. Do you think the private sector has come further when it comes to e-health adoption than the public sector? Is there anything you can learn from them?
38. Any finishing thoughts you would like to end this interview with?

Appendix 2: Interview Transcript M1

Line	Person	Transcription	Code
1.	JM	Yeah, OK, so to begin with, can you please introduce yourself? What's your role and how long have you had it for?	
2.	M1	My name is X and I work at Lerums kommun, in the sector for health. And I work as a development leader(utvecklingsledare), is that how you say that?	
3.	JM	Yeah I had troubles with that word too, development leader or something.	
4.	M1	Yeah, yeah.	
5.	JM	And So what are your past experiences working with e-health before this job or?	
6.	M1	I have worked for this in about six years.	
7.	JM	OK. And…uh..you have been working for six years at your current position at Lerum for six years?	
8.	M1	Yes	
9.	JM	OK, So what type of e-health services do you have at Lerum Municipality?And how many?	
10.	M1	Do you want to? Should I just say what we're having?	
11.	JM	Yeah, that would be….	
12.	M1	The definition E health is. It's pretty wide, so it's a lot of stuff. We have digital signing for medical use, for the personnel. We have digital, mobile and documentation. So the personnel can read journals in the telephone, mobile. We have the digital surveillance. How do you say that? Yeah, it's when you look at the person, with a camera instead of going through the person... We have a lot of welfare technology, and we have robotic cats and dogs. We have..We offer different kinds of social activities like on an iPad. And we have a game that's called to Tovertafel. It's a projection that's in the ceiling and yeah it, this is hard in English, haha. It's moving on the table, and they can interact with the flowers. It's different kind of games. We have Yetitablets, it's the largest iPad in the world I think..I have all these things documented, maybe I should just, send it simply.	ECS
13.	JM	Yeah, you can send it. You can send them after the interview.	
14.	AD	That's nice	
15.	M1	Because we have a lot of things, but we are not...We're getting to be in better.	ECS
16.	JM	So, then you have like different stakeholders or users? Both the personnel and the citizens?	
17.	M1	Yes, and we worked with the library, so, you can borrow iPads on the library.	
18.	JM	OK.And does it affect your development of the health services, depending on who the stakeholders are?	
19.	M1	What do you mean?	

20.	JM	When you develop these services do you work in different ways depending on if it's for your personnel or the elderly/users?	
21.	M1	Yes, we assume... Can you help me?	
22.	JM	I know what you mean is, you can talk Swenglish and we will translate later.	
23.	M1	We assume that the citizens don't have any digital competence. But when it comes to the personnel, we have a little bit higher expectation.	EC, ES
24.	JM	OK, perfect.	
25.	AD	Thank you. You have said you have a lot of social activities and games. These are like are these some sort of like promotion you are using it or for improving the awareness or for what purpose?	
26.	M1	It's different kinds of purpose. One of them is to under the pandemic the elderly for example, could phone and they have a talk... facetime	EP, EB
27.	JM	Yeah, they were not allowed to have visitors, I guess?	
28.	M1	Yes	
29.	AD	That's nice. So how well were you prepared to face the challenges of the pandemic? And do you think that E health adoption helped you to tackle the pandemic situation?	
30.	M1	Yes and no. I think the personnel got better to use digital meetings. And then work home, but in the relation to the citizens or the elderly. There was, not so much progress I think	EC, EP
31.	AD	OK, so why do you think it's not like a progress? Is there something you would like to reflect on?	
32.	M1	Yes, I think the competence is pretty, varying. So, the digital things that we use have to be pretty unadvanced. So, the personnel has to help the elderly to get going, but we notice there is more of the elderly that use digital like computers and phones and stuff and we think it's a generation shift that has to happen in place here.	ES, DS, EC
33.	JM	But do you think like the pandemic speed up, that process of the generation shift, or like...	
34.	M1	Yeah, a little bit, I think, uh.Those who lives in in special care homes, they live in a protected world. So, they don't get the influences as much in in this society, I think.	EP
35.	AD	OK, so did you collaborate with any other municipalities or region during the pandemic?	
36.	M1	And yes, we have many....Oh, yeah.	ES
37.	JM	In general, with e-health we can add to that question.	
38.	M1	Excuse me, what did you say?	
39.	JM	I mean both in general and during the pandemic, how did you work with e-health?	
40.	M1	We didn't make a difference in how we worked during the pandemic. With the work with the digital things in the municipalities And we worked pretty the same and we had the same pace in stuff so....	EP
41.	JM	OK.	

42.	AD	Did you like use any digital tracking services or something during the pandemic?	
43.	M1	Tracking services what do you mean by that?	
44.	AD	Digital tracking.	
45.	JM	OK, I think she means like it to see if people have met someone infected with COVID or so but I'm not sure if this is something municipalities does	
46.	M1	No, we have a problem with the laws. GDPR. So that has slowed down the digital development, I think.	EC
47.	JM	OK. We found out about this eHälsa2025 Vision or project? Is it that something you know about?	
48.	M1	Yes	
49.	JM	Has it helped you in your work with e-health	
50.	M1	Yeah, in in my job I'm pretty lonely, I worked here for six years and the whole municipality wasn't at the same stage. And we have now in Lerum Municipality we have our digital strategy that is common for the whole municipality	
51.	AD	What, digital strategies do you mean? Can you explain a bit.	
52.	M1	Yes, we have long in our sector in the health sector wanted to cooperate with the rest of the municipality. Uh, so there are no more colleagues in the other areas of the municipality. So we work more together and I have more colleagues that work with me. Because you can be lonely and working with a digital things	EC
53.	JM	But your cooperation mainly with other municipalities or with the regions also.	
54.	M1	Both	
55.	M1	I am, all over the place.We have a network in GR. It's the Gothenburg region and we work a lot together and meet up so we have colleagues all over.	
56.	JM	I see. What is the reach of the current health services compared to traditional ones? Like how many how many use them?	
57.	M1	Use what?	
58.	JM	The e-health services, but I guess maybe they have to use them for like signing medicines and stuff like that. They, have no choice to not use them?	
59.	M1	No, no choice yeah.	
60.	AD	But do you see any progress like on the adoption of E health, because of the pandemic? Compared to like how the traditional working style used to be, and now pandemic has made things a bit more digital in this thing, so do you see any influence in or any improvement in the adoption of E-health?	
61.	M1	It's hard for me to say. My experience most say that we introduce and present and provide digital things. And then it's up to the personnel to use it. And if they have to use it, they use it. If they don't have to use it. So, so we have to work with change management.A lot and I'm waiting for the management to become more aware and do the change management.	ES, ECS, EP

62.	JM	But was like that transition period tough going from the old ways to the digital new way.	
63.	M1	During the pandemic in the late 2021 we started to use digital keys so we can go to the citizen that lives in this society with digital key. And the personnel looked forward for this. But we have had….have some technical issues. So sometimes the technique doesn't meet up the expectations.	EC, EP,
64.	JM	OK, and then how do you ensure that the benefits of using the new E health services outweigh the challenges of adopting it?	
65.	M1	We use something that's called gain usefulness evaluation. Yeah, and then we go through. It's a document that says why are we doing this? And we also use the business case that Ekonomiverket has done so we use different techniques to get.the personnel on board. But it's a thing that certain talk and doing is a different thing in the real world of the personnel.	EC, DI, ES
66.	JM	And how are these new e-health services tested before you start using them for real?	
67.	M1	Yes, we have a lot of things that I mentioned. And I can send you a list and you can view it. And if you have any questions about this, you can just email me.	
68.	JM	Yeah, perfect.	
69.	M1	It's a wide term, e-health maybe you should have narrowed it down to just one thing.	
70.	JM	Yeah, we realized that it's wide. But ok, so what are the key factors to keep in mind while designing health services to make them more user friendly, do you think?	
71.	M1	Like I mentioned before, it's a.It's a very....The most things aren't so very user friendly now and the systems in the in Sweden all the distributors rule the market so we have to adapt our way of working because the systems are designed like that, unfortunately. And we have also a problem with developers that don't come together so the systems don't and the technique don't talk to each other and that creates a lot of double work.	EC, ES
72.	AD	Like how do you make sure? How do you if it like creates a double work? Do you have something in plan to like use? Are you using some information sharing devices so that they come together and interact? Or is there some ongoing plan on that?	
73.	M1	SKR, Sveriges kommuner och regioner. Are just now sent an offer to all the municipalities to go together and talk with the developers and make a requirement specification to set the bar higher. So we have to work together. One municipality isn't that strong to change things.	ES
74.	AD	And to make the developers work together. Is there any specific system or something you're putting into place? Or is it just like a sort of like a policy or a rule that the developers work together to Share the information.	
75.	M1	Yeah, we have something that's called that business system (verksamhetsystem). It's a system that everyone in our health sector	DT, DI,

		all the personnel are using. It's for documentation and logging medical treatment errors and it's, a law. It's required that we have journals for the persons that we care for and if that system could talk to other systems like digital signing, you have a more efficient process.	EC, ES
76.	JM	But these services have you developed them yourself or they're all made by external actors.	
77.	M1	External actors	
78.	JM	OK. So what do you think are the main benefits of using e-health services and how do you make sure the users realize these benefits?	
79.	M1	It's a lot of benefits. With the older systems I have something write I can send it to you, but the thought is to....It's different goals. Depending on who it is for.So I can send you some text about it. I think maybe it's easier than I explaining in my very bad English.	
80.	AD	So, you said that there are many systems which come from the external party.So, how do you make sure you integrate it with the existing system which is being used so that the citizens can adapt to it?	
81.	M1	I didn't quite understand the question	
82.	JM	How do you make sure that these systems you buy from external parties fits with your current systems so they can be used in flexible way?	
83.	M1	Yeah, we have a… a lot of our systems we had for quite long time so we have to do a procurement for…uh.. for new systems and we want them to talk to each other.	DI, ES
84.	JM	OK.	
85.	M1	So, we hope to be more efficient, but just now we digital heritage that makes us inefficient.	EC, ES
86.	JM	OK. Do you feel that the public and the professionals using their services are like motivated to use them or do you need to persuade them through rules and stuff like that?	
87.	M1	Yeah, we have for the elderly that get supervision/surveillance. We offer the elderly to have digital surveillance by camera, instead of going to the citizen we offer a camera instead, and we have this for like several years and we only have five citizens that want the the camera and so the old citizens that we had, that we have gone to and check on they still want the personnel to come there. But new citizens that come in wants more often camera. So, it's a problem when we are digitally....	ECS, ES, EC
88.	AD	Do you feel like is it because like with when you are digital, the it is like a limitation of using the by the people? There is a limitation of using the technology digital technology by the people? That's why they want you to come there? Or is it just like they feel it's more at home to be meeting you in person and talk to you like they can communicate better if they meet in person? Is that the limitation?	
89.	M1	I think it's many different reasons. Not just one I think there's some generation shift that has to be done. But I also think that the elderly is more afraid of digital things and don't want get near them and I think also it's a sign of safety, comfort, the personnel comes there.	EC

		maybe they don't trust the camera. It's a lot of things that has to do with us, I think.	
90.	JM	OK, how do you think the use of e-health services influenced the social status of the user? How is their image perceived by other so to say? So, I'm not sure if this is really applicable to what you have described like. I think we can skip this question because I don't think it's applicable to what you have described so far…. Uh, when do you consider an email service fully adopted? Like do you have like a goal you really are aiming for when you have these projects?	
91.	M1	Yes, I I think when the technique is working. Yeah, when the. developer, supplier are cooperating. And following the agreement and when the personnel are happy about the solution. I think that's the goal.	ECS, DI, DT
92.	AD	But do you like seeing to some number or some percentage that majority this segment of people should use it or this much percentage of population should use it? Or is it like? How do you see like the people who are satisfied? How many people do you take into consideration?	
93.	M1	It's a very difficult question because it's hard to explain that it depends on what what type of services we are talking about. So, it's....If you have a group of people at a elderly home and we for instance the robotic cats if one person adopt some cats and enjoys it and have a joy, I think we have succeeded. Yeah, it's a different... it's a hard question to answer. We don't look at number as much and we want to raise the quality.	DT
94.	JM	And how long is like the time frame of these projects from the idea to procurement to use?	
95.	M1	Several years. I'm sorry.	DT
96.	JM	OK, so it's a slow process.	
97.	M1	It takes a lot of time, and we get some criticism from the national organizations that it takes so much time but it has to take time because we have to do it by the book and it's a lot of laws to consider and a lot of people that are going to use it. So...and the market is also very narrow so...yeah.	DT, EC
98.	JM	OK, so what strategies do you use to promote the e-health technologies? And how do you reach out to hard-to-get groups?	
99.	M1	It depends on what services it is of course, and information is one of that. We work with a lot of documents..Is it for the elderly we work with documents for the elderly and for the personnel type, different types of information.Was that the answer to the question? Is information enough? Is it enough it enough with information? I think you have to repeat the question.	DC
100.	JM	Yeah, what strategies do you use to promote e-health technologies and how do you reach out to hard-to-get groups.	
101.	AD	Like any particular technology?	
102.	M1	We work with project modeling, and we also use a type of method that called service design(tjänstedesign) that is looking for the	ES, EC

		user's needs. Because sometimes we think that we know we need and when we check on it in a different way, we could see that it's not the solution that we once thought.	
103.	JM	OK. I guess this question is quite similar, but what strategies do you use when it comes to adoption of E health?	
104.	AD	Like communicating or something...	
105.	M1	We have in our municipality a strategy that is for all the municipality. And then we have…. we work in our sector in health sector to, work with all the leaders to see what should we do now? And how? So I lead that work in Lerum Municipality, it's very we are very open for digital things and we like to test some.. a lot of things. And we are in a project called AllAgeHub. You can look it up in the web. It's a test environment that test...we have two in Lerum Municipality that are testing digital things .So you could read it and more about that.	ES
106.	JM	Do you think you benefit from being a small municipality when it comes to like you, can you have more freedom to test these things, or you would have a bigger freedom if you were bigger?	
107.	M1	I think that if you are a little municipality, it's easier to try things in....rather than in the bigger like Gothenburg	DI, DS
108.	JM	OK. Through which channels do you communicate your message like of your new services and do you use any specific service, social media platform or some influencing to reach out to the citizens and the personnel?	
109.	M1	Yes, we have a different kind. We have an internal web. And we have external web, and we have a Facebook for Lerum Municipality and Instagram and I think we are on LinkedIn as well we are on many platforms that we send different kinds of information. Depends on who's the target for the information. But my main communication to the personnel goes through the leaders.	DC, ES
110.	JM	OK.	
111.	M1	But I…uh.. I also have a lot of communication with all types of function in the whole sector.	DC
112.	AD	So, when you say leaders are leaders in like the E health sector or you mean to say the leaders of a particular region or...who communicate with the citizens.	
113.	M1	And when I mean leaders, I mean the leaders that work in Lerum Municipality	
114.	JM	OK. What factors are the most important when it comes to the adoption of e-health?	
115.	M1	Just one thing?	
116.	JM	Yeah, if if you can only think of one thing, but if you have a few then it would be nice.	
117.	M1	Communication, Collaboration I think is very important. That we have the technical structure...is in place. I sent you a email with some obstacles. So you have them there!	ES, DC, ECS
118.	JM	Perfect!	
119.	M1	So, you can turn it around and see if it is there, it's a possibility.	

120.	JM	Ok, but you agreed with that list?	
121.	M1	Yeah	
122.	JM	Are you satisfied with the developments in the health and in which areas do you think there is still room to room for improvements?	
123.	M1	Like I told you before, it's not about Lerum. I think Lerum Municipality is very good with the digital things, but it's the market that has to change. And they have to listen more to us that needs their system. If you look at their...the alarm..security alarm. Wellfare alarm.	EC,ES; ECS
124.	JM	Yeah, for like yeah, homecare stuff like that.	
125.	M1	Yeah, the things that the elderly use is a little button on the wrist and it's looked like that since ages. And they don't think how..The developers don't think how will the elderly want the button to look like? For some it's very uncomfortable and embarrasing to have that button on. Do you want me to show you the bottom?	EC, DI
126.	JM	I have seen it.	
127.	M1	Do you know what I'm talking about?	
128.	JM	Yeah, yeah, I worked in home care before so I I know like the the armband with the red the button or the necklace in some cases.	
129.	M1	It has looked like that since the 70s. So I think it's, uh....They should develop it more	EC
130.	JM	And do you think there is a mistrust among citizens when it comes to health care? And do you think it affects the adoption of the health?	
131.	M1	I think there's a fear among the citizens. There's ***UNCLEAR***.... They're doing like this research every year among the citizens that shows that 70, no 67% of the population, it's not in for digital health. You should look that up.	EC, ECS
132.	JM	OK, yeah. I think all the questions looks similar now when I read them. But what are the challenges related to e-health adoption?	
133.	M1	Yeah, I I send you a list with that, so I think it's better to translate that.	
134.	JM	OK, So, what kind of privacy issues did you face while providing health services and how did you counter them?	
135.	M1	Yes, there's our ongoing discussion, regarding information safety, and the integrity of elderly with the camera looking. Yeah, so the new thing that we want to have is when you can use the camera but you can't see who the person is.	EC, DI, ES
136.	JM	Ok	
137.	M1	Depersonalize we call it	
138.	JM	OK. So will the face be blurry of the patient?	
139.	M1	Yeah, so you so you don't see who it is. So that is what we are going to use in Lerum Municipality and not the one that you can see very clearly what the people are doing.	DI
140.	JM	But these cameras they are not always on right, they're just on... you check in on a specific time. Then you turn them on?	

141.	M1	Yeah, in the home care you use that. But we have a project, a procurement right now that are looking at this at the elderly and the camera can do so much more than just look. It can have control over the situation, like if the elderly falls it can send an alarm to the personnel, so that is a technology that we are trying in Lerum right now.	ECS, DI, EB
142.	JM	OK, so you're moving more towards using more and more artificial intelligence so to speak.	
143.	AD	So, you said like 65% is not up for using digital services. So how do you like..try to...What strategies do you use to reach out to these people? A group of people who are not up for the digital services.	
144.	M1	We have the library that provides education and practical help with the technical things for the citizens. And we have one unit in our sector that works with the..it's most elderly, but it can also be anyone. That also... they have meeting points, they educate even. And and like I said before, we have a project now that we are lending out iPads. So it's it's going to be very interesting to see if they are highly using it or not?	DC, DS, ECS
145.	JM	Ok	
146.	M1	We know that that in Sweden in general the poorer gets poorer and the richer gets richer and so we see the opportunity to help those who don't have the money to buy their own iPad.	EB
147.	AD	That's nice. So like what design and development steps are taken to overcome challenges, because as you said that there are people who are not used to those type of technology and this thing. So what..How do you keep their opinions in mind while designing and developing.	
148.	M1	We don't develop things we're just using things, so we are very dependent on the market. So that's a difficulty.	EC
149.	JM	OK. So, your challenge is to write good requirement specifications to make sure that you get what you ask for.	
150.	M1	Yes, and like I said, the market is pretty narrow. So we can't write any requirements that doesn't exist .Because then we don't get any.	EC
151.	AD	So, it's like you have to bridge between the people requirement and the market too?	
152.	M1	Yes	
153.	AD	So, do you think the advancements in E-health helped the municipality in combating COVID situations? If so, like how, how do you think that it has helped?	
154.	M1	I think that a lot of people, not all, had to use more digital things but..I think like the bank, requires more and more that you have to digital things and bankID. I think that is a more drive. Uhm, because when you intervene with people's old habits and require things in that area. Then it's more likely they want to use digital things.	EP, ES
155.	AD	OK, so I also because you know you're developing as you said, one new technology where camera is going to blur the face and all. So, do you think this is really going to add up help in the adoption? More people will adopt and use, and you can use it during, uh, any future pandemic or epidemic coming up?	

156.	M1	I think, when the elderly generation or will I say the younger generation will become elderly I think it's going to be a huge change in users. The first lady that tried the camera in our Municipality she got the positive thinking by her son. So it's not the elderly itselves that owns the digital using. Many of them said, "I don't want to learn anything new. I just want my life as it is".	EB, EC
157.	AD	So what are your main takeaways from the pandemic? What have you learned that will be useful in similar situation when it comes to E health development and adoption? So, what can you learn and what did you learn during the whole process in pandemic?	
158.	M1	I can't answer that. I will only say that the personnel is..Have to use more of like FaceTime and teams and to meet up and work at home. Maybe I can answer you that later? I have a meeting with digital strategist of the municipality after this meeting and I can ask her if she has seen anything change.	EP
159.	AD	That's nice. In which areas do you think there is a need for more improvement when it comes to E health adoption by the people or anyone using e-health.	
160.	M1	How did I answer that question?	
161.	JM	Yeah, I think we kind of answered that.	
162.	AD	Yeah, and uh, OK, so like I think we are done with the interview. So, do you have any like finishing thoughts about the whole process or something?	
163.	M1	I'm sorry for my very bad English.	
164.	JM	No worries.	
165.	AD	You tried it I felt included, and I didn't have any problem.	
166.	M1	That's the thing with the digital things I think. Inclusion.	
167.	JM and AD	Thank you!	
168.	M1	Thanks a lot!	
169.	M1	*TRANSLATED FOLLOW UP E-MAIL* Hi!Sending you info that can help you regarding obstacles and opportunities, they are the opposite. If the obstacle is removed, it becomes a possibility. I think one would need to examine what Norway and Denmark do that Sweden does not. Those countries have come much further in digital development and I think that is because they control the work more on a national level. In conversations with SKR, they present a list of WHY help is needed with a methodology for developing, introducing and using "new" services and working methods. This list looks like this: • *have difficulty going from pilot test to width introduction* • *have difficulty achieving systematics in digitization* • *wants support in implementation* • *wants a method for how to work with identifying needs, realizing benefits, evaluating etc.* • *has difficulty navigating among several senders in the same area - which player offers which support?*	

| | | *have limited knowledge of and use of national support, tools, methods* *wants concretely designed support* *wants to increase focus on the new ways of working - instead of on technology (change management)* **Benefit (is more in the attached action plan for effect goals)** Welfare technology (included in e-health) provides opportunities for residents who, due to age or by others reasons have a disability that; maintain and increase security, activity, participation and independence stay in their home environment, receive support for self-care and better health have the opportunity for a continued active and social life feel confident that staff handle information and tasks in secure way. In addition, it can contribute to a better working environment, by giving the opportunity to lead and distribute their work based on the users' needs, which leads to safer, more secure and more efficient care. The benefit is also to enable efficiency, quality assurance and it can provide increased legal certainty. Reduced environmental impact. | |

Appendix 3: Interview Transcript M2

Line	Person	Transcription	Code
1.	JM	Okay. So then let's begin. So to begin with, can you please introduce yourself? What's your role? And how long have you had a for?	
2.	M2	Okay, my name is X. I work as a development leader at the health and care department in Karlstad municipality. I have been in this role about eight years now. And, my work is grounded in digitalization and welfare technology. So that's my, area.	
3.	JM	Okay. What's your past experiences with e-health, so to say?	
4.	M2	Just e-health, we don't use a lot of e-health, we just….well, we use the welfare technology. And that's the difference between that I think. And you can say e-health, is self-monitoring items and so on, that we don't use as much. And that's the regional responsibility.	
5.	JM	Okay, so…but what welfare technologies do you use then? Like..	
6.	M2	that we use medical devices, dispensers, digital dispensers, we use cameras, digital cameras for care, we use the smart toilets…uh.. the Japanese toilets, you know. We use..uh.. stand up seats, to help the disabled person to be self dependent in, in the life. We use….uh…. Oh, I have a whole battery of things we use, but I will think I will have a picture of okay….And we use the digital support in planning via mobile devices for people that are cognitively impaired. And we use..uh.. a lot of… you know, digital support for people with demen-tia, so they can have a better life, activity support and so on. And we also use…uh.. eating robots to help people eat by themselves. We use…uh.. what do you say? Supporting in…in… the active living, like high and rising toilet seats for independent toilet visits. We use a lot of things we have a whole battery of self independence…uh… support you can say	ECS
7.	JM	And what about for the employees? Do you have medical medical records that you do by the phone and stuff like that?	
8.	M2	Excuse me again, I didn't hear you.	
9.	JM	What about for the employees like of home care for example. Do they use any?	
10.	M2	Yes. Do they have devices…uh..programming in in the phones, they do the planning for all the visits at the customers and they also do the documentation. And we also are now providing…uh… a software for digital signing record..yeah..	ECS
11.	JM	Yeah ok, so you are just getting starting with that, but I think we know that digital signing.	
12.	AD	Okay.	
13.	M2	Yeah.	
14.	JM	Okay. So how does it affect like the development? Who is it for… like if it's for the patients or the workers do you have to take different things into consideration?	

15.	M2	Yes, we have, we are analyzing the benefits for these devices. And I can say like this, if it's good for the the customer, the patient, or what do you like to call them we say customers in Karlstad, then it's also good for the staff. Because…uh… if you're manage..uh.. to give the customers the power to be more self.., what do you say?	EB
16.	AD	Self-sufficient?	
17.	JM	Self-sufficient or self-independent?	
18.	M2	Yeah…Self-sufficient, then it's also good for the staff because that's…uh… it's the rolling process. So the smart toilets, for example, if you are self sufficient to go to the toilet, not maybe not in the whole process, but just to sit there by yourself and to be cleaned and to be dried and so on, then you don't need help in just that moment. And then…ah… that's also heavy moment for the personnel. So that's good for the both sides, for the integrity, for the individuals, and for the personnel also, in the work environment. So it's the two sides of coin, you can say.	EB
19.	JM	Okay.	
20.	AD	How well do you feel you were prepared to face the pandemic challenges? And do you think development in the technologies you're using helped you to combat the pandemic?	
21.	M2	I can say this, the, the pandemic was a little bit abrupt, I think this was…a…. a case in the whole system, it was a lot of things, we have to change in the…uh…in the in the system, as we work in, we had to, to be more person centered, that we have… you can say we work in smaller groups to not meet as much persons as we used to before so the continuity...uh… maybe will grow better. But I think also the technology has arising in in them in the future for us and just also there during the pandemic, like the medical dispensers. When the pandemic started, we have 40 units out at our customers. Today we have 120. And I don't think we had that…uh... I don't know how to explain this, but I don't think we have that Increasing of numbers if the pandemic hasn't given us the kick in the back.	EP, ECS, EB
22.	JM	So these medical dispensers is like a electronic device?	
23.	M2	Yes. For for those….uh…	
24.	JM	Apodos or whatever it's called?	
25.	AD	Ok, so do you feel that the pandemic has accelerated the development?	
26.	M2	Yes, definitely….. And…uh… also by our night care in ordinary homes… We have digital cameras for the care. We have a lot more cameras today than we had before the pandemic. So that's also a safety net for the customers and their…uh…their families and so on to not have..uh… the visits as we used to do before. So…uh… you don't need to meet a lot of persons that you…. we used to do. That's not working for everyone. I know that but for the most people for the safety, the camera is good enough.	EP, EB, ECS
27.	JM	So you feel they are more accepting to new technologies now?	

28.	M2	Yes, yeah. Because there is a also risk to meet new people. And the group we are providing care for they are also in the risk group for diseases and so on. So if we can provide care in another way that are more safe, that's positive. That's also an effect by the…uh… medication dispensers. So if you can take your medication by yourself with a reminder, instead that we are coming, that's good.	EB, EP
29.	JM	How does it work…uh..how can you tell that they actually took the medicine?	
30.	M2	We have logs. And we also do evaluation before we give this out… this medical devices out. So we are very sure that the person who gets this device, are positive to the medication. And they will show us that they are actually understanding how this is working, and that we are having a…uh… two weeks trial then. And then we evaluate and say yes or no. And if it's no then we are going by…uh…as we always do. Yeah. And if it's okay, then we're providing this.	ECS, ES
31.	JM	So these new services or so to say that you develop during the pandemic, you will still be able to use them after a pandemic?	
32.	M2	Of course, yes! And we use them before the pandemic also, but we have seen…uh.. what's?.. How can I say?....A fast by process…uh.. A faster process in the pandemic, because we have to do something different because we couldn't deliver the….the care in the same way for everyone. So I think the pandemic…uh…Yeah, it…it..it started a process that will be…will go faster than before.	EP,
33.	JM	So did you collaborate with other municipalities or regions during the pandemic to find solutions? Or…?	
34.	M2	Yes, and no, I would say, because I didn't know if you have heard about the project….uh.. "Model municipality" in Sweden,	DS, ES
35.	JM	is it the ehälsa2025, or something?	
36.	M2	No, it's not. SKR in Sweden has a government mission. And then they call it Model municipality, and called that is one of 10 model municipalities in Sweden, and they are binding network, and they exchange experience, and so on, and we listen to each other…uh… what they have done, and we collaborate to do something different. And I think all of the ten it's like the smallest municipality is Övertorneå in the northern Sweden and the…uh… largest maybe…uh… Borås I think	ES, DC, DS
37.	JM	I think Lund is in it also. Because now I think I actually know about it….uh..because that's how I found you actually…	
38.	M2	Yeah. And we have different ways to accomplish…uh…this, but we are…we are taking inspiration from each other. And we maybe we do something in different ways, but we are managed to do the same. Anyway, because we have the same…..uh…What do you say? Challenge!..Challenge we have the same challenge, the demographic challenge….uh… So we have to do things in a different way. And we learn from each other and we do different. And it's all about digitalization, it is.	EC, DI, DS

39.	JM	Yeah..So when you develop these new services, or how to call it, how do you make sure that the benefits outweigh the challenges of adopting newservices?	
40.	M2	I don't understand the question.	
41.	JM	When you…uh..How do you ensure that the benefits of using new services outweigh the challenges of adopting it, these welfare services do? How do you like plan… or do like do some analysis before you actually put them to use?	
42.	M2	Yes, of course. We have an innovation process that we're working from and then we are…uh… we are analyzing all the steps before we decide to try something on or use some…some devices. So of course, we are doing some analysis and we also do evaluate….evaluations during the process and after and do…uh…what do you say?...benefit analysis, both in…in the soft way soft values and the hard values so…uh… economics and so on, and…uh..the soft values for the customers.	DI, ES, DT
43.	JM	How do you like to reach out to the customers with…these are the benefits? It's not a hard process?	
44.	M2	The method we use is interviews or forms….Yeah.	DI, DC
45.	AD	So what are the key decisions that you take before launching these new services to the citizens and to the personnels?	
46.	M2	I think you have to look to the challenges in…in many ways. Because you have to…to analyze what …what is the benefit for the user and what's the benefit for the personnel or co-workers. And you can see, oh, this is just a working environment thing…maybe we will use it anyway because it provides some values. And maybe thats's just value for the customer or user, and that we will use it anyway because then…uh… we are…uh.. we can see an efficiency on in our operation. Yes. So…uh.. I think we will use different ways to look at the benefits, but..uh… what we can see in all what we are doing it's benefits for everyone in the process in some way. So we have done the evaluations, both economically and for... I don't know what you can say it but…uh.. soft values.	ES, DI, DT
47.	AD	So it's like you set up some agenda…uh…	
48.	M2	Policy…yeah policy you can say, yeah.	ES, DI
49.	AD	Is it like you set up some agenda and then go ahead in your roadmap…Or are you like, how do you start your evaluation?	
50.	M2	Our evaluation? I think it's…it's depend…. It depends of the…uh… of the pros... What do you say…uh.. the the device or the thing you are implementing, its sometimes…uh.. it's really easy evaluation, just some steps. And sometimes it's…uh… like for the medical devices, we did a huge evaluation, we interviewed a lot of users, the older people. And we interviewed the personnel. And we also did some really good economic analysis for this too, because it's also expensive to do this. So the monthly costs are expensive to leasing the devices. So we had to get it down on paper that we have some benefits from	DT, DI, ES, EC

		this. And we had that evaluation showed that we have benefits…uh… in both ways. So, that was an easy decision why we would have done that. But maybe, I think it depends on what it is all about. If it's some simple devices like a sensor or something that then it's just a much more easy way to do the evaluation. But if it's something that costs a lot, then you have to do it really on the hard ways…and well well done.	
51.	JM	Was it hard to get like acceptance from the employees? Because I guess there might be a fear that they will lose their jobs if they have...	
52.	M2	No, no, it's not. Because the myth is that they will lose their job and we can kill that myth. Because, we will need every hand we can give in the future and that we also show them. Okay, so yeah, and when we do that, they say Oh, this is good for us.So they have..they have got the key, I think…	DS
53.	JM	Okay, yeah, that's good. How do you align the organization's competency with the people's need? Do you conduct any particular training to upskill the knowledge of the professionals or the public using the new services?	
54.	M2	I maybe I don't understand this, but I will say like this when it comes to the citizen, we have showrooms. And in the showrooms, we…uh.. we show everything that we are providing as the welfare technology in the home care, but we are also showing that the customer technique that you can buy in technique store. So, we can provide them with knowledge that you can do this by yourself at home, and you don't need this from us. That's the most efficient way to….to get the citizens to realize that I have to do something by myself, if I don't want to go to the health care department, and the most people want to be independent. So they will provide this for themself. But then they have to know what they can do and that's the most important thing I think we can do is to the…to inform the citizens what we know so, they will know, do you understand me?	ES, DI, DT, DS, EB, DC
55.	AD	Yeah	
56.	M2	And for our co-workers….uh..for our co-workers I think this is a process in…uh..on the whole time in their work, and everyone isn't adopting it, I know that but we will but we say them we work with those who is positive and the rest will come.	EC, DS, ES, DC
57.	AD	So, like what medium do you use to educate the people any online platform or some particular device as such..?	
58.	M2	we are having different types of platforms you can say…We have a digital platform for everyone this is new….new employed with us they will go… go through some introduction digitally introduction…uh… and then they also have what do you say analog introduction with education on plate, but we also have a project now that call Competence Center that will take care of all our education for our personnel in the levels. So when you're a new employee, you are level one. So, there we have a program for what you will…you have need to have because you will start on level one. When you have worked with us or do you want…if you come and you have the base, then you are providing the educational level two, and level three,	DC, DI, DT, ECS

		there are more special education for….uh.. what do you say?..we have special educated nurses and special educators is that nurses in our organization and they would have targeted education. Targeted education…. for their their needs. So that…uh…and we also do a lot of e-learning. Very much can do by e-learning. But some can't, because, for example, medical education, delegation, and so on from nurse to assisteant nurse that you can't do on e-learning. Because you have to show that you actually understand what you're doing. So some education we can't do by digital devices, but very much we can do.	
59.	AD	And what are the key factors to keep in mind while designing these services so that they are user-friendly?	
60.	M2	In the key factor, I think it's to involve the users. When…uh..when we are starting a new project, we have to involve the users even if it's customers or if it's the personnel. Because…uh… this is not nothing we can do but by ourselves because, then the needs aren't provided. You have to go from the needs at the users and at the personnel. So yeah… users are needed, involving yes….	DI, ES
61.	JM	And do you feel that the public and the professional and customers are motivated to use the new technologies that you provide or do you need to persuade them through rules and like that....	
62.	M2	It's…uh…I think a lot of people are motivated. Yes… I think but they don't have the knowledge, but they are curious. Yes, and the age is just a number. I will say that because, a lot of the techniques that are on the market today or as we provide are intuitive, so that they can easily understand it, but we have to show them. But a lot of people has never used any technology in the older segments, I think. So, I will say, in five years, this is not an issue, because in five years, then we have a new customer group, and they are a lot more informed. And…uh… what you say they use a lot more technology today, and that…uh.. then they have a good knowledge of how they can use it. So I think what we see today is not what we will see in about five years, because what we see today, we couldn't see five years ago, so it's increasing all the time.	DI, EC, DS
63.	JM	Okay, so it will be a big push in your think like five years much more technology.	
64.	M2	Yes, of course, I can see, my father is now 90 years old. And he is he's saying all the time, just as you know, there will never be any woman who coming into me at the night and look at me. Okay…no, we can do we can solve this with a digital camera…of course… yeah… that's good..he says.. My husband's parents, they are lost more younger than him and they don't talk about this at all. They think… oh, if this happened, I will use this.. this is… they have it already in their minds. So, I think..uh.. what we see today is not the needs in five years	DS
65.	JM	Hahaha.. okay. Has it been tough to integrate these new services into the to the everyday life both of the customers anudp your employees like to....	

66.	M2	Yes, because we have the same problem by your employees, a lot of our employees are very practical, they are educated to…uh…to de-liver care, if you will say by hands. And when we now we are talking about the digitalization and transformation into to the digital world and with devices that should replace the care by hands, in some ways that there it can be hard to get them to understand why so on. But, the myth that I said that it will take our work that's not possible. It's the knowledge, the personal knowledge about technique. That's the real, the hard discussion. Yes. And everyone has to learn, because we can't build about just some super users, because everyone has to know this. So yes… that's yes, it's a challenge. But I think even there in five years, it's going to be a lot more easy.	EC, DI
67.	AD	When do you think a service or the technology is fully adopted?	
68.	M2	Fully adopted? It's hard to say. I think it's a process that as I said, in five years, we have come a long way. And I think in 10 years, we have come even further. So…um… yeah, we will always have people that are afraid for technology, I think because we are, in the ground an organization that will deliver care and the people who come to us for work are caregivers by nature. So we…we will always have peo-ple that are maybe afraid of technology, but we will…that will. I be-lieve it will change a lot in the years because, the young people today they are….for them. It's natural. The technique is natural. They have it in their minds all the time. And, that will also give effects on them on the process in our organization, I think. So I think it's natural that it's changing. But I can't say that the time I can't say, but I think it's will be much more easier.	EC, DS
69.	JM	But how long is like a common project? Like from idea to… to put… to be put to use?	
70.	M2	Oh, from idea to put to use, it's very different. It depends on what's, what's the matter is. I think when we…when we did the project with the medical dispensers, we had a timeline of ideas to use in six months.	DT
71.	JM	That's quite fast.	
72.	M2	Yeah, that's fast. When now we I'm…I'm working on a project where we are have a procurement of the digital education system. For Yeah…uh..its..its… it's one of the parts of the Knowledge Center I described before. And from idea to developed item, develop device because this was an innovation procurement, then we have a timeline of maybe one year…12 months from idea to developed product. And then we'll start use. So it depends, I think, is it ready to go? Is the pro-gram ready to go in and out on the market? Maybe in six months! Is the product not ready to go? When we will have some to do some tests and help the manufacturer for developing the product and so on? It's will have more time, but is it ready to go six months? I think, okay.	DI, DT
73.	JM	Okay, so through which channels? Do you communicate your mes-sage of your services and use it....uh.. I think you answered it.	

74.	AD	What strategies do you use to promote and ensure the adoption of those technologies?	
75.	JM	And how do you reach hard to get to groups?	
76.	AD	Like, yeah, there are many people who have technological barriers, and how do you convince them to use them?	
77.	M2	As I said before, it's for the citizens. I think it's about education and information. And to do workshops, and so on, and invite people to come to collaborate with us. And work with…uh… I don't know the word in English, but you can say, interest groups, so handicap interest groups an so on…You know what I mean?	DC, ES
78.	JM	Yes, Interest Groups they are called maybe, I don't know.	
79.	M2	Yeah. You can…uh…you can do marketing by them, as you say, and spread the word, and then do some educations and then. Yeah, I think for the citizen, they are a key to spread the word. When it comes to our employees…I think it's about this, the assignment for the work. What… what do they need to do with the assignment, and you can say, and we have an obligation to inform them of that. And we also have an obligation to educate them in the way we want the work to go further on. So I think it's..uh.. it's quite different ways to go, but I think it's…uh.. the same goals for the right value. I think it's from in-formation and communication is really, really a key player. I think.	DC, ES, DI
80.	AD	So do you use any change leaders in this process, some influencers or something?	
81.	M2	No, but we do digital marketing, and we have some campaigns. I think we are quite alone…. by that in Sweden. We do marketing cam-paigns every year about these… you can say these last four years the direction has been "be yourself as long as you can by doing what you can". And we have…uh.. we have done it in market places in all over the town, we have also done some commercial movies. And we also have invited the citizens to come to visit us for some workshops and lectures and a lot… a lot of events, you can say. So we will… we will also go to fairs, and then in and…uh.. do some exhibition, and so on to inform. So I think we…we have a method to reach out to the citi-zens, that's quite good, because we have, we have seen more effects in Karlstad than in other municipalities that because we are marketing the…uh.. our process, and we are informing our citizens in other ways than others do. You can see that a lot of things on this on Karls-tad.se. So the website is also we have a digital showroom there, for example, where you can see smart products that will make your life easier, as well. They definitely call the digital supporting home. Small things that you do quite a lot, I think.	DI,, DC,, DS, ES, DT
82.	AD	Okay..So how important do you think, within your organization, the presence of a leader to have like drive the innovation process of these technologies?	
83.	M2	Can you say that again? I didn't understand it.	
84.	JM	Is it important like within your organizations to have people involved that actually wants innovation and pushes for innovation?	
85.	M2	Yes. Yeah. Short answer, haha.	ES

86.	JM	And maybe it's the same for like in how to say?...In the within the home care, so to say is to do like, do you identify persons that are like willing to innovate and involve them in the process?	
87.	M2	Yes, we do. We do. And we have a lot of people that want to be involved, both employees and also users. So…uh..yes, we do that.	DS
88.	AD	What factors do you feel are most important when it comes to adoption of these services?	
89.	M2	I think information, as I said, because if you don't know, what is what the devices and the services can do for you, even if you're employed, or if you're a customer, then you don't want to use it. It's always the…uh.. goal, the purpose. You have to know the purpose.	DI, DT
90.	AD	And what challenges do you face when it comes to adoption of these…uh.. the services?	
91.	M2	The knowledge is the key there, I think, if you don't know anything about it, then you're afraid if you know a lot about it, you're not afraid. And that comes in both ways… both for users, the customers or the users in the organization, the employees. So you have to…uh.. to educate, you have to inform you have to communicate, that is the key factor, I think and you have to have a plan for that we have communication department here on the healthcare department and they are really useful to work with. So we are spreading the right message.	DT, DC, EC, ES
92.	AD	Okay. Do you fear any sort of privacy concerns when it comes to be..uh.. using the technology?	
93.	M2	Yes,of course, and we are. We are…uh..we are binding the ground rule GDPR. So we have information specialists for security in…uh.. data security. They will always work with us. So we are following the GDPR exactly. And we are not allowed to use cloud services that are not in the EU and we are always telling our co-workers and so on that's what they have to respect on this area. and also the manufacturers, what they have to do for…uh.. what do you say? The corporations that developed the devices, what they had to do for…uh.. what the demands are in this process, and they will also sign a…uh…an agreement and assignment.	EC, DS, ES
94.	AD	Do you feel that there is a mistrust among the citizens with the public healthcare system when it..uh.. and that affects the adoption of these technologies?	
95.	M2	Can you say that again, I dont really think I understand the issue.	
96.	AD	Do you anytime feel that the there is a mistrust among the citizens? Like when it comes to using the…the services, the welfare services and technologies you're providing. So, do you believe there is a mistrust?	
97.	M2	No, I don't think it's a mistrust. I think it's maybe they don't know why you have to use it. But I don't think it's a mistrust. Again, I say that it's the purpose, you have to reassure the users about why do we do this? And what can you have? What can you benefit from me? So…uh… maybe this is the wrong way to say it. But always think of what's in it for me. If it's good for me, I will use it. If it's not good for me. I don't want to use it. But I think no, no mistrust. But, of course,	EC, DS, ES

		some….some people always say, oh, you should just save money. Or you should just pass out the personnel or so. But I think we…uh… we don't, we don't have that as much today as we did five years ago, because everyone knows now we have a demographic challenge. And the citizens know that as well. And the employees know that, of course. And I think that may or may not be an issue further on later. But today, of course, the questions coming. But then you have to ex-plain. No, we don't do this, because of that. We do this because of that. Yeah.	
98.	JM	So most challenges are related to communications.	
99.	M2	Yes, I think so.	EC
100.	AD	What are your main key takeaways from the pandemic? What have you learned from the pandemic situation which can be used further?	
101.	M2	Umm…I think we have learned a lot. During the pandemic, I think…I just…I can just speak for the municipality here, I cannot speak for the regional health care. But I think in… in the municipal-ity, we have seen that we can work in different ways. And we can do some changes, and we can get a better organization for it. So…um… you have to, explore the needs, what's the need? And think about how can we do this in either way. Can we do this by digitalization or do we have to do it in another way? By visits and so on? So I think we'll have been better in these two years. Yes.	EP, EB DI
102.	AD	So, are you satisfied with the development done in these welfare technologies or do you see a room for more development?	
103.	M2	I see definitely a need of more development. And I also see a need of collaboration between the corporation who developed technology and the organizations and we will take partner and knowledge partner be-cause the corporations do not have the knowledge about the needs. We have knowledge about the needs that we don't know how to de-velop the technique. So if we can meet, I think we will create magic because,...uh..if the right products are on the market, they are also possible to scale and the market will grow for them. So, if we, if our contribution can be to be a..uh.. knowledge partner or knowledge speaker for them, I think we can do much better. And I think we have to have more products to use. Everything is not fitting for everyone. So we have to have more products. Yes.	EC, DC, ECS, ES
104.	JM	Okay. Yeah. and I think that's it, do you have any finishing thoughts that you want to share?	
105.	M2	Yeah. I think one thing we haven't discussed is the infrastruc-ture…the digital infrastructure. And I think you should mention that in your paper, because that's the key to using the technology in the fu-ture. Today, we are building of 4G, and so on, because everyone doesn't have the digital infrastructure on fiber technique and so on. But I think this society may take a…uh… bigger responsibility and in the growing of that. But also the individual responsibilities on users, of course. But I think that's there's some, it's a question that has to be penetrated some more, because it's…I think it's a key factor for the future. How we can use the digital infrastructure to use welfare	EC, DS, ES

		technology or e-health technology and so on? It's a communication…It's a communication way…for digitalization, I think it's really, really important.	
106.	AD	Thank you for the feedback.	
107.	JM	Okay, thanks a lot.	
108.	M2	Oh, thank you. I hope you have also got what you wanted from me.	
109.	JM	It was great. It was like a bit of a different perspective than the other interviews. So it was great.	
110.	M2	Okay. I really looking forward to see what you have got from me. It's so I'm very glad if I can see the paper before you publish it. If there's something I want to change.	
111.	AD	Yeah, we share you the transcript like by tomorrow. So you can verify if you have a one week period. To check and verify	
112.	M2	Yeah, okay. Good. Thank you.	
113.	JM	Thank you. Have a good day. Bye. Bye.	
114.	M2	*TRANSLATED FOLLOW-UP BY MAIL* I came to think about one thing I didn't say. You asked about how we measure and evaluate. I described it shortly in the interview but we also collaborate a lot with the academia. We have evaluated the automated shower service thoroughly, were both customers and personnel have described what they do and what they need help with and then they have used the shower during a longer time to evaluate the service. Both from a customer- and personnel perspective. At the moment we also have several studies running in collaboration with KAU, Linköping University and the Mid Sweden University. The studies are about the value of independence in one way or another.	DI, ECS

Appendix 4: Interview Transcript R1

Line	Person	Transcription	Code
1.	JM	OK, so to begin with, can you please introduce yourself? And what's your role and how long have you had it for?	
2.	R1	So I'm working in Region Sörmland. And I'm working as a e-health strategist- "E-hälsostrateg"and working at the Development department in the region. And then I have had my role since 2019.	
3.	JM	OK.	
4.	R1	So for about three years and a bit more than three years.	
5.	JM	So did you have any past experience with e-health before you started this role or?	
6.	R1	Well, uh, not really. In directly in my work, but I have been like in the area of these types of questions. Or yeah, yeah, discussions about e-health as a project manager at the recent works.	
7.	JM	OK, and do you know for how long Sörmland has worked with e-health?	
8.	R1	Well, yeah, if you talk about it as a e-health in informatics and then just not them developing then, what do you say like organization or clinics then I think for like 20 years.	ECS
9.	JM	OK, all right.	
10.	R1	Yeah 15 years maybe yeah at least.	ECS
11.	JM	OK, So what type of e-health services do you have like? How many and what do they do?	
12.	R1	I don't know what you have for definition of E-health, but we're talking about different like both infrastructure, but also close to the... what do you call it like hospital works or Primary Health care, so we have for example. 1177 yeah yeah you know 1177 the health care advisory for example	ECS
13.	JM	Yeah.	
14.	R1	But also digital help like support systems that are digital and then. Yeah yeah, what more digital meetings with the patients. And we have some virtual reality and we don't have that now, but the dentists have used it for their workers to try to and be more or get more experience of their work when they can't be out in the organisation so to say.	ECS
15.	JM	So the VR is mostly for educational purposes?	
16.	R1	Yeah, mostly yes.	EB, DT, ECS
17.	JM	OK, now you mentioned like quite a lot of services, but what are like the main benefits of e-health for you?	
18.	R1	Well, I would say that the employees finds it more effective. And they can take more patients. And they save the time, they save like the environment and neither the employees or the	EB

		patients have to travel to the meetings. So you can also do it wherever you are. So if you work in Stockholm but live in Sörmland then you can have a digital meeting or a support meeting or. So it's more independent than that you have to go to a special clinic. What do you call it?	
19.	JM	Clinic may be? I dont know	
20.	R1	Clinic yeah!	
21.	JM	OK, so you have both like a medical personnel and the citizens as your stakeholders. Then I guess, how does it affect your development of their services when you who you're developed them for, so to speak?	
22.	R1	Sorry, what did you say? Say it again.	
23.	JM	OK, so you have both make these services both for the personnel and for the citizens, like 1177 for example. How does it affect your development when you develop like who's it for? Do you take different things into consideration?	
24.	R1	Yeah, I think that we need to be more... we have to be more like... take the need of the population overall to develop more like digital and.... ...uh..tools... may be services. So that they can be more user friendly 'cause that's one of the main, challenges of today. Uh, they got.. Uh..They get quite a lot of critics.. Uh.. because they are not so user friendly either for the personnel or employees but not the for the....umm..inhabitants in their region as well, or the patients so I think we have to work more on that. And I know that other regions are like a bit better than us to work with the user friendly perspective in the development.	EC, ECS, ES
25.	AD	So when you say user friendly, what are the steps you are taking to make it more user friendly? Are you integrating some new system, new technology or any particular decision to take in mind when you are planning for making it user friendly?	
26.	R1	I think you have to bring like invite...ummm...patients for. Well, relatives to the developing part of the process. Maybe all the way just to see where do you need to have the digital. And like digital services. When do you need to have like personal meetings and the how should the function look like and so so this all through the whole way have a dialogue with the person who are supposed to or people who are aim to use it. And I think you need to have that with the personnel but also with the patient..Like for general inhabitants in Region Sörmland.	DI, DS, ES
27.	AD	Yeah, the citizens. So OK, how well prepared were you to face the challenges of the pandemic? And how do you think the development in e-health helped in fighting the pandemic against the pandemic?	
28.	R1	Well, I think that we have had a...We might not be so well prepared, but we did a very quickly transformation and because of the national work we had quite a lot of possibilities to transform and to prioritize what we should do and where we could develop quite fast...umm..like for.. Umm.. Through corona tests...yeah!!	EP

		And so, and so I think we had like a lot of things, but maybe not exactly in the phase that we had to. And... Or like so they could be so user-friendly, but we have them and we could use them and we have developed them over time. So I think they are like enough, but maybe not so good as we wanted them to be so. We made it but. It could be better for next time.	
29.	JM	So are there like any specific e-health services that you have just for COVID?	
30.	R1	Yeah... yeah we have some something called self test handling(egen provhantering).	EP
31.	JM	Self testing from home I guess.	
32.	R1	Yeah, self testing, yeah, but you use it to National Service digital service at 1177 then. Uh, so we have that one and then we have like those digital meetings that you have instead of the physical meetings we have developed quite a lot of support and treatment systems for patient to do that at home or at work instead of going to the healthcare as well, or a specific clinic as well so. And it's a few examples, but some that we have developed under this time to...yeah, support the clinics to manage their work through corona as well.	EP, EB
33.	JM	Do you think they will still use these services after COVID like the digital meetings and stuff like that.	
34.	R1	Well, I think we'll use some of the platforms that you can use to other things, and so like "egen provhantering" self testing at home. You can use it for a lot of other things than Corona and the support and treatment systems it's a platform that you can use for a lot of other things. And digital meetings you can use for a lot of other things, as well as i think they just gotta boom when we go a boom when corona came and now you just have to like hang in. Hang in and hold on(Hålla i och hålla ut) Yeah, .. Yeah and so so that you can use it and also develop it and a bit faster than we did before.	EP, EB
35.	AD	So do you feel like the incoming of corona, the COVID situation, helped faster development in digital services in the healthcare sector?	
36.	R1	I think that in our region it has been a big difference because you gave it a bit of other focus and you had to prioritize the digital services. So yes, because I don't think it's always so top of mind in our region than it might be in other regions. You really need to cooperate in the region as well, 'cause it's the clinic perspective, it's the IT perspective, it's safety perspective and so on. And then you have to have a common goal.	EP, ES, DI, DT
37.	JM	OK.	
38.	AD	Did you collaborate with other regions when it comes to e-health development technologies?	
39.	R1	Yes, we do we have this partner that's called Inera. It's a national partner and we have a lot of digital services through Inera and that's where we support or like work together or have	EP, ECS, DC, ES

		collaborations with other regions. For example with the self test handlling, self service system, self testing and but also the support and treatment platform. It's a collaboration with the other regions have like yeah it's 2 examples.	
40.	JM	And what about the municipalities in your region is there like a collaboration with them also?	
41.	R1	Yeah, yeah well. Yeah we have like special people they work with the municipalities.They're called local care cordinators(närvårdskordinatorer), and I think that their work is very important and.... But regarding digital health facilities, I think we could improve that kind of work. For example when we are talking about home monitoring. Distance monitoring... maybe I, I think that we could improve that work and people like citizens or a patient they don't really care or know where the line is between regions and municipalities, So I think it's very important for us to try to mind that gap for them as well. And then we have to like work on that kind of collaboration as well.	EC, ECS, DC
42.	AD	So how did the Ehalsa2025 has a vision affect your preparedness when it comes to adoption of digital services?	
43.	R1	Sorry take that question again.	
44.	JM	And we just we found about. Sorry we found out about this thing called eHälsa2025 its like a joint vision..	
45.	R1	Yeah, the vision.	
46.	JM	Yeah did that help your preparedness for the pandemic challenges?	
47.	R1	Uhm, well, not really, I I think that we are having like a local strategy for a region, and then we're trying to work after other like Inera the national framework as well, and but I think that we....No one has like an outspoken that we really have to follow vision 2025 or for e-health so....Maybe yes, but we're not doing it like on purpose more than it's a part of everything we do in regarding the digitalisation and e-health. But I don't know if...Yes and no, but I can't really like point out the example for that except for the national collaboration with the other regions through Inera.	DC, ECS, DS
48.	AD	And how do you think is the reach of the current e-health services as compared to the traditional ones which were existing?	
49.	R1	Do you mean like in our region or?	
50.	AD	Yeah, in your region.	
51.	R1	You said collaboration, didn't you?	
52.	JM	.. Uhh....no, its like how many, how many are using the e-health services compared to just the old ways? I guess it's maybe it's hard to question, but like for digital meetings for example or like.	
53.	R1	Yeah, OK uh well uhm...I think like if, uh, if you look at a statistic so. It's been like. Well, I can't really give you a concrete example, but it's raising the digital meetings and the treatments and support and so on. They are increasing definitely. There's still a	ECS, EP, EB

		quite, a small part of the total visits and. So through. the pandemic, an example "webbtidboken" where you have to make an appointment at 1177 they increase a lot under the pandemic, but it was because you had to force the people to book a time at the 1177. Not for like...uh... not that a doctor or nurse wanted to give you some digital times to book, but, uh...And is what was it more like uhh..? What do you call it? "tvingande", forced?	
54.	JM	Yeah forced.	
55.	R1	Yeah, you had to book your time at 1177. Otherwise you had to call the support..umm.. phone support to book a time. So yeah, they are increasing, but I think we have to do a lot more.	EP
56.	JM	OK, and how do you ensure the benefits of using the new e-health services outweigh the challenges of adopting it? And how do you make sure that the users realize the benefits.	
57.	R1	Well, I think it's this. This is one of our like achilles' heels that it's quite easy today to buy a new digital service, but to realize and really use it in the clinic. It's a bit harder 'cause you have to develop how you work as well and you also need to have the support of your personnel and leaders have to want want to look like have the.What do you call it "förändingsledning"	EC, ECS ,DI, ES
58.	JM	Change management.	
59.	R1	Yes, yeah, so you have....Yeah people need to be motivated, they need to understand why they're doing it and you have to have a strong change management through the whole organization.	ES, DI, DS, DC
60.	JM	OK.	
61.	R1	So does that answer your question?	
62.	JM	Yeah, I think so. OK, So what are the key decisions you take before launching new e-health services for their citizens and personnel?	
63.	R1	Well, mostly as we work today.. You have to....at least have someone who pays for it.So the economic must have to be like solid first. Yeah, but then you need to have the acceptance from the like "hälso sjukvårds..", uh... health director, or like the director for the department or so they are like on and and then you have to work with the organization so they have the change management in it as well, and so there are some kind of acceptance that we have to go through with this change for new digital service.	ES, DI
64.	JM	OK.	
65.	AD	Yeah, and and also when you speak about some sort of acceptance within the organization. Now, how do you align your organization's competency with the new design you are making the new system you're making? And is there any particular training the developers or the professionals or the public go through to adopt new technologies.	
66.	R1	Well, on the 1st question we are actually....developing a total new journal system. Do call it like that? e-health...	ECS

67.	JM	Medical record system or something? I don't know.	
68.	R1	Medical Record System yeah...And so, uh, there we use like a lot of people in the organization to work with nine or eight other regions to develop this. So I would say that just in that part you really use like the words from the personnel and you invite them to work in this developing projects and but, uh...,I think we might forget sometimes that we really need here and have a dialogue with the personnel or with with the citizens or patients when we make these kinds of developing projects as well. Was that answer the first questions?	DC, DI, ES
69.	AD	Yeah	
70.	JM	OK, how are the health services tested before being released for actual use?	
71.	R1	Well, you actually test them in test environments before you and you. Have a lot of testing with the ...uh …distributors?	DI, ES
72.	JM	Providers of the service?	
73.	R1	Yeah, Providers of the service. So you you do that with your like technique expertise and right you see the process with the clinic as well so that everything....Sorry i need to my cable for the computer, is that right?	
74.	JM	Yeah	
75.	R1	Sorry, yeah , so you have like this testing process both with the technicians but also with the Clinics or the personnel and, and sometimes I think you tested with the citizens as well but I'm not sure if we do it that often so that might be one of the and problems that some things are not as friendly using ….	DI,EC, ES, ECS
76.	JM	User-friendly.	
77.	R1	Yeah user friendly, haha, as it should be.	EC, ES
78.	AD	So what are the key factors do you keep in mind while making it like user-friendly? I think we already asked.	
79.	JM	Yeah, maybe we already asked that.	
80.	AD	So do you feel that the public and the professionals are self motivated to use e-health technologies? Or does it need persuasion through government rules and policies or education or training to use those particular e-health services?	
81.	R1	If they are motivated? Was that yeah, well I think that sometimes we have to take like...uh...national campaings..	DC, DI, ES
82.	JM	Yeah whats the good word for it..it's a public push for making these things.	
83.	R1	Yeah, like a public push from national or like the governance or like yeah something that you have to do in the whole country. And I think that it sometimes not have the acceptance 'cause it's not really user friendly. For example, the national list of medicines(nationella läkemedelistan) is something that the governance has pushed out in the regions through the e-health agency and it has been like a bumpy road, both for regions and for the governance and for the e-health agency. And I don't think you have that...They really have like anchored it, or have had the	DC, DS, DI, EC, ES, ECS

		clinicians within the...Yeah, what do you say like the first part of the job or the development? So I think that you really need to have a strong connection and with the clinic and the personnel and to keep them motivated and to really have this change management in the whole organization and also like understand their every-day life because digital services is not the only thing that they are doing. Their main job is to take care of their patients and they the only thing they often often say that they need is the like support, but they are not experts at the digital services though.They often just want it to work and so it's very important for them to feeling motivated and If they have, like the right kind of services then.	
84.	AD	And how do you make sure that the new e-health technologies are well integrated to the existing systems and they're easy to use by the users? The new technologies which you develop.	
85.	R1	Yeah Well I think it's very important to have, like right policies in the region and right regulations as well, and then use the standards that are like national or even global sometimes, when you develop like the infrastructure 'cause it's the way you like make the map for how everything fits together and how you can transform information and or some information through the different systems, so if everything is like..Yeah, if everything is...umm... put together, then it's easier to to make these integrations through the different systems as well. So I think you also have to what do you say? Have requirements	DI, ES
86.	JM	Have requirements in place?	
87.	R1	Yeah, when you "upphandlar"?	
88.	JM	Procurement I think it's called.	
89.	JM	Procurement yeah, haha. Then it is very important that you put this the right like requirements in the procurement so that everything can like put together or like integrates with the system you have and that you might have in the future as well. So you build this map together with.	ES
90.	JM	OK, how do you think the use of e-health services influence the social status of the user? How their image is perceived by others, so to say? ..Uh, example, for example, their wearable devices, or having a COVID pass.	
91.	R1	And I think it's very important for the users, and that's one of the things we hear in our region that... Right, private companies they're more...They're developing more perfect stuff or like more user friendly. So I think we need that.....That's it, that is something that we have to learn from the private companies and how we develop things and how we make it like more valuable for citizens. Is that right answer for the question?	DI, ES
92.	JM	I think it's fine because that question is a bit weird.	
93.	R1	So OK OK.	

94.	JM	How has the transition period been like before you have, when switching to e-health services..from the older ways? Has it been a rough ride or it's been smooth?	
95.	R1	Well, I think that we are still in it and that we will be in it for a very long time...as well, until we like really feel that that is something of the use like normal developing job in the like in the clinics and at our developing department as well. And so I think it's the as I said before...Like if the people or people like if the personnel are motivated then we can make it quite smooth. But if you don't have the personnel with you, then it might be a quite of a hard and bumpy road both today and then in the future as well so you really need to have a strong change management and I think that one of the most important thing is to look at the how we collaborate with the citizens and with the patients as well to take..uhh.. to develop user-friendly digital stuff.	DI, DT, ES, ECS, EC, DT, DC
96.	JM	OK, so you're still in the transit transition period period...But like when do you consider any health service fully adopted?	
97.	AD	Like is there some particular segment of people you want... Like maybe these people if they agree to adopt e-health services, then you feel that your e-health services are successfully adopted. Or how do you see the success ...measure the success of your E-health adoption?	
98.	R1	Well, I don't really think that you can lay back and say that you have developed it ...like that you have finished your develop-ment. I think you have to look at it like a "livscykel", life cycle perspective that you implement something and you use it for a while, but then you have to improve it and develop it because there is always like new questions or like new demands on the techniques and today is developing so fast that something that is new today might be old tomorrow. So yes, you can say that you have implemented something and you can work with it, but I don't really think that you could like say that that you are fin-ished with it, yeah..	DI, DT
99.	JM	And what strategies do you use to promote and ensure adoption of e-health technologies? And how do you reach hard to get groups?	
100.	R1	Yeah, well I would say that we are working with those kind of questions out of each project. But Umm...We use like the imple-mentation strategies and and quite often start with the people that you like, the ones that really want to develop and then you like have to work with the ones that don't really want it and also like try to transform the ones in the middle that see the benefits of the developing parts but and just go with the flow.	DC, DI, ES, DT, DS
101.	JM	OK, so through which channels do you communicate your mes-sage? Do you use any specific service, social media platform or influencing things to reach out to the citizens?	
102.	R1	Yes we do. We have a communi...yeah, communication depart-ment yeah ...uh..So they will help us up with the messages both to the personnel but also with the to the citizens. And we use for	DC

		example Facebook, Instagram, YouTube and we have something....uh..The intranet yeah.. I think that's all...Yeah mail maybe and sometimes and so on.	
103.	AD	So are you satisfied with the development in e-health services so far or do you think is there any other room for development?	
104.	R1	Well, I think we can do a lot more and that we really can learn from the private companies. I understand that we have to take it slow sometimes and we have big organization and so on. But I think that we have a lot of learn for how we can develop digital facilities...facilities...Maybe...yep... both for personnel l and for the citizens and the patients.	DT,ECS, DI
105.	AD	What kind of challenges do you face when it comes to e-health adoption?	
106.	R1	I, I think that the biggest challenge is how we could... how we need to work in the region through different departments to make sure that we have a quite fast developments of these digital facilities, and you know, I think that is one of the most critics things for us right now.	EC, ES
107.	AD	Do you face some sort of like privacy issues by providing health services? If so, how do you counter them?	
108.	R1	Sorry, can you take that question again?	
109.	AD	Yeah, do you face some sort of like privacy concerns ...if... when ...and how do you counter them?	
110.	R1	Yeah, we do. If you see like. Some of the digital services have a lot of personal information and sometimes people don't have, like, uh, access to them or they are being denied to have them because of different things in the like private lives that we have to do like judgments maybe so there might be quite a lot of private concerns regarding like, UM, the …., the information in the systems, but also like how you get access to them through BankID or FrejaeID and those safety authorization. Safe authorization. So it's not the...Well, it can be quite a lot of questions and discussions about this area overall.	EC
111.	AD	Do you think there is some sort of mistrust among the people citizens while using the public healthcare system, and that somehow influences the adoption of e-health services?	
112.	R1	Did you say mistrust?	
113.	AD	Yeah...	
114.	R1	Yeah, if I if I think that there is some mistrust? Yes, and I think..as we said before that you have to develop user friendly and digital facilities for the personnel, for the citizens and the patients as well and to get them to use their facilities. Otherwise they won't use them and they won't like....And not be a part of their health care either, so...Yeah, I think it's very important to have a dialogue with them as well to ask them what's their need and how we can use....umm...how we can develop things for them as well.	EC, DC, DI, ES, DS

115.	AD	Ok.. Umm...so what are your main takeaways from the pandemic and what have you learned like...how do you think we are prepared for the similar situations in the future?	
116.	R1	Well, I think that we were not really so prepared for the pandemic, and I think that we like because we are in this developing phase and still and was that before. Uhhh..I don't think that... we could have been done more maybe and. But we did a quick transformation we have....ohh yeah people have done a good job a very good job but I still think that I don't....I don't really know how we should really act or if we have the right things for ummm...the same situation if it would come like next year or so and maybe yes, but I think we have to work on these digital facilities more and to really step up and meet the.. Yeah, it needs that meets the ...uhh.. the need that we really have to have.	EP, EC, DI
117.	AD	So in which areas do you think is like very critical for as of now for the e-health to change in the technology.. like new improvements in the e-health adoption.	
118.	R1	And, well, I think that for people with the....uh.., for young people, at least that's one area that where young people today and they're like used to have their mobile or and use digital facilities through their whole day or life or so. I think that's one of the most critic areas, and I think that people, even in their 30s or 40s are quite used to use an digital facilities in their life and so I think that's quite like two different areas, but also people who are disabled....Can I say so, yeah?	ES, EC, ECS
119.	AD	Yea	
120.	R1	Yeah..that have different kinds of...need or ....I think that's a big area as well because today when we have like phone for physical...uh... mostly phone for physical meetings for people to meet the healthcare, but we need to have like a big, a broad palette or something like that and so that we can offer a different kind of solutions for our citizens, or patients ....even if you are deaf or speaking another language or so.. Yeah...	EB, EC, DI
121.	JM	Do you have like any special services that you created just for accessibility purposes like you said like you have like deaf or blind people? I think there is like a big customer..	
122.	R1	Well yeah, some of the people who are connected to the habilitation, maybe yeah...they say that it's much easier to contact us with chat services, but also sometimes it's easier to to have a digital meeting because we can read the lips as well and so that's like 2 examples. I think that's like if you get a call/invitation. If someone calls you for a...with the post it is very hard for some people to read it, and when it's on paper. So, if you can get it, like a digital invitation....then it it might be easier for people who may be need to have some support for their vision or, reading or so on.	EB, ECS, DI
123.	AD	OK, and so you pointed out quite a few challenges when it comes to e-health. So what are like specific design and	

		development steps which you are going to take or planning to take up to overcome these challenges?	
124.	R1	Well, at the moment we are looking at as I said before, the collaboration in the organization to get more or to get faster in the developing new parts and both from the demands from the citizens and patients, but also from the personal and the clinics.	ES, DI, DC
125.	JM	Yeah, I think that's it.	
126.	AD	So they have any finishing thoughts regarding this interview process?	
127.	R1	Yeah, maybe that i want to read it before...Yeah, no, I don't know...Yeah, not really... I think it's a very interesting area ..Did you come from Linnaeus university?	
128.	JM	Lund University	
129.	R1	Lund yeah OK, yes.	
130.	R1	OK yeah so no..But I would really like to read it when it's finished, and maybe if there's some comments..that no, I think you can use it.	
131.	JM	Yeah, Ok.	
132.	AD	If needed like we can share transcript if you need.	
133.	R1	Yeah, of course yeah OK.	
134.	R1	Yeah, OK, I think yeah, I hope I I could help you with something, yeah.	
135.	JM	Yeah..Thanks a lot.	
136.	JM	Have a good day.	
137.	R1	OK, thank you ..bye bye.	

Appendix 5: Interview Transcript R2

Line	Person	Transcription	Code
1.	JM	Okay. So to begin with, can you introduce yourself? What's your role? And how long have you had it for?	
2.	R2	This is sort of a new role I have….uh… Maybe I should start, I am sort of fresh in the market. I've been working just about a year with what I do at the public health sector, but I have had a new… assignment to be sort of an agile leader, transformation leader, implementation strategist. and…. I work with really in-troducing and sort of implementing digital solutions for the healthcare system in the different health care professions. Like health centres, and etc, I don't know really, what's that is specifi-cally in English. So yeah…uh… different health care clinics. So that's what I do. I've been working with this role for about three months now. And we are sort of enough exciting stage that we have new resources allocated for just my...... English is really rusty, I'm sorry. We have more resources, like people working with implementation of different digital services in the healthcare system since it has been proven that it is not really a feasible solution to just drop a technical solution in the healthcare without proper introduction and support from the IT departments. So we are proud to sort of Right now working out how can we standardize sort of high quality process and have like an implementation machine and checklist of different digital transformations that need to be done…Like support, education, autonomy of the different departments, we have communication efforts and stuff they're trying to mix together in one and have a better deliverate towards the different sections of healthcare. Okay. Yeah.	ES, ECS
3.	JM	Did you have any past experience before you work started here a year ago with e-health, I mean,	
4.	R2	I'm actually sort of right from the university. This is my first job, I got sort of a promotion because I am very interested and pas-sionate about like transformation management and digital trans-formation management. So I got an opportunity, and I took it and now I try to change the way we operate towards the healthcare system.	DI
5.	JM	Okay, so what types of services do you have in the region? And how many?	
6.	R2	Oh, how many? It depends, we have like sort of a pro-ject…uh..Project system in place where we have different gov-ernance. What do you cal?....uh.. departments, for different sec-tions towards the healthcare. So we have from, like, operation and special medicine, that is sort of one department that sort of governs those systems that are connected to that one I work in, it's called "citizen services" . And that is sort of, you know, for	ECS

		the public, different, like, when you log into 1177, website, then you have different options, like if you want to book a time, if you want to have a video conference with your doctor, if you want to get your journal sent to you, and those different sorts of services. So that's sort of my specialty, or my field, where I work most. But how many we might have 20….maybe different services just in this sort of governance object…you call it objects..yeah.	
7.	JM	And what do you feel are the main benefits of these services?	
8.	R2	The main benefits is, of course, like transparency from the health care system, accessibility, we also have just saving time and effort for the personnel within the healthcare departments, trying to be more effective with the resources we have saved costs are different… sorts of different projects and different services have like different returns sort of, in what they sort of feel, function fulfillment in society, sort of. So some are for the benefits of the workers within the healthcare system, and some are for the public.	EB, ECS
9.	JM	Hmm…Okay, so have, you make your services , both for the inhabitants and for the medical personnel then, and how does it affect like the development there, when you're…. when you're developing it? Who is it for? So to speak.	
10.	R2	That also depends, either we can have like a regional decision that we need to develop this to map some sort of need in some sort of department or if we want to cut some costs, then we can make our own development and then there's a process for that. Otherwise, we have a deliverer of services. That's called Inera… that sort of says, that is owned by different regions and municipalities. Yeah, within Sweden, and they sort of develop and present…. they have an idea. We want to do this and that will save this much money for you, it will cost this much. So they have like a business case. We want to develop a system for example, to improve accessibility for people that live in the country and just want to have a good access to health care or if it is be some transportation services with, you know, with health care, then they offer that to us as a region. And we can say yes or no, that we're interested, then they continue to develop the solution and give us sort of a declaration of what they are supposed to do. And then we can say yes or no to that. And if we say, yes, the second time that suggestion comes around, then we are bound to pay for it. So then we have accepted the cost as well. So we have one interest here, this seems nice. And then we have Yes, we would pay for it. So it's like this issue is in two stages, sort of. Yeah. I don't know if I answered the question properly. But....	DT, ES, DI
11.	AD	Yeah..So, also, like, how prepared are you to face the challenges of the pandemic? Do you think that development in e-health helped to combat the pandemic?	
12.	R2	Yes, I think it definitely has, it has actually been seen, like with the usage of 1177, you can see the statistics like just the number	EP, EB

		of like e-applications for healthcare, and contact informations that has sort of skyrocketed during the pandemic. And that has also in a way, paved…uh… the way for further usage of these different e-services, because it is very accessible to the customer or the public to use, and they have started to realize that so it has not only been been, I would say…uh..significant for the healthcare to function during the pandemic, but it is also made the use of e-services to be a little bit more standardized for the private citizen when they are looking for different healthcare services.	
13.	AD	So in a way, we can say like the developments during pandemic is very beneficial when it comes to future if there are any sudden outbreak of any disease or something?	
14.	R2	Yeah, they have developed systems, specifically for that purpose. But it has also sort of helped raise the private care recipient user of healthcare services, to adopt a more e-based contact feel… sort of for how you want to contact and how you want to use the digital services that exist in today, in order to just have a more effective process from you as a private person. Jesus it is a bit rusty, I'm sorry. it's been a long time since i spoke English like this….hahaha..	EP, EB
15.	AD	Haha… Yeah..How did the pandemic affect the way you worked with providing new health care services?	
16.	R2	The pandemic, it escalated everything. Because you didn't have the luxury of developing something until it was done, you have to always sort of put out fires, yes, with the pandemic, and how you had to link different systems like our vaccination system was supposed to be linked to the Department of Public Health(The public health agency)..... Yeah…. In order to map so it was sort of a big transfusion of kind of sensitive data. And with this vaccine passports, we also had, so it was sort of, you know, just a build up one one need, like triggered another need, in a sense.	EP, EC
17.	AD	Yeah, like just like a huge buildup and you didn't like actually had that much of time to check.	
18.	R2	Yeah you have to, because people were getting sick or they were dying, society was closing down, like just the effect on the cost for society in general. So when you try to find feasible solutions, for that you have to be very agile very fast with the development. And I would say that it was sort of a success in a way because it managed but it was really tough. I think with the development of the systems and with the GDPR, for example, to get it to work from a legal but also functional and ethical way. It's tricky!	EP, EC, DI, DT, DS
19.	AD	Okay, so did you feel that GDPR what we have was a hindrance to your…uh… development? And What strategies did you take to overcome that challenges?	
20.	R2	I am not that familiar with just like how they worked, because I was not in that project at the time. What I know is that there	ES, DS

		are… like support from within the regions, they have lawyers, they have specialization within that field. And they have like a nationwide dialogue. How are we supposed to do this.. As a nation as well… sort of? Yeah, yeah.	
21.	AD	So it requires a lot of collaboration with other municipalities or regions?	
22.	R2	Yeah. And different organizations as well. example for that is like the healthcare or the Public Health Agency. Yeah. Is it the department of public health?	
23.	JM	It is the public health agency or something, I think it's called.	
24.	R2	Yeah, yeah, that is what I mean, when I say something along those lines.	
25.	JM	So I think they are also involved in this called thing called ehälsa 2025. The joint vision for the region's and the governments and municipalities. Is that something you heard about?	
26.	R2	I've heard about it, but I'm not that familiar with it, we have more like a sort of a regional goal of 2030. That is maybe translated to a close and good care for all. Okay. Yeah. So, you know, the digitalization in my region is sort of based on that we want to provide an equal opportunity for care, no matter who you are, and where you live. So just like merging the gap between healthcare and citizen, that is sort of the big goal, right now, what I can see. I haven't been that involved with… like, the strategies upon like… until now, because what the work I do is sort of in the lines of meeting that 2030 goal for our region. If that makes sense… Yeah.	DI,
27.	AD	Like, how do you feel is the reach of the current e-health services as compared to the traditional ones?	
28.	R2	One more time, it is sort of flimmered?	
29.	AD	So how do you feel is the reach of the current e-health services in comparison to the traditional ones among the people or the professionals?	
30.	R2	Hm…The question is sort of how do I feel that the e-services has improved the accessibility?	
31.	JM	I think like how many people use it compared to traditional ones kind of?	
32.	R2	Oh, impossible to say. Like, during the pandemic, everyone was advised not to search, like to search out physical health care, if you were not like, really ill, that it was a threat to your life. Now, it's sort of it depends a lot like…. during the summer, normally, the different approaches from citizens to health care decline in general, but it depends a lot on maybe where you live. Like if you're in *ANONYMISED*, for example, maybe you live 70 kilometers from the nearest health care provider, then you might need to use e-services and that is sort of project that is ongoing in our region to have some sort of..uh… general…uh..general offer for the citizen of services, so that they will not have to travel that significant speed so that in sort of in retrospective that will not be discriminated against based on their geographical	EP, EB, EC

		location. But then we also have the fact about how well can like elderly people use e-services, that is also something that's problematic. They might not know that much about the internet and just general computer habits.	
33.	AD	So like, How do you tackle such situation where like, you have to reach to elderly care or those who are not used to using digital services?	
34.	R2	I guess one is an interface solution. You have to like design the different tools that are used by the citizens as a simple they can be, it has to have like a standardized easy code language or interface language, it has to be understandable. What we also do is try to standardize and sort of make the different health care providers have sort of the same information. So it doesn't differ from place to place, if you move, then you should still be able to know the functions and sort of what this service entails. So it should be described in a standardized manner, it should be like, the different forms should be standardized. And that is something we are working with. But with healthcare, it has to be like sort of, if you have to do something, it has to be decided on a very high level, almost political level, when you go in and sort of mixed with different departments… autonomy in what they can do with their different webpage and what services they have, you have to have a decision and preferably a political decision in order to make this happen. Because then it's sort of this this law, now, you have to do it, otherwise, it can't function, you are not. Otherwise, you will not be able to be a healthcare provider. But that also faces challenges with how they implement something they do not really want. How do you do that in a good way, then you have to be have like a very understanding and be sort of adaptable, and try to bend sort of the rules for just that department and try to say, Okay, we have to do this, but how can we do it so it suits your organization?	DT, ES
35.	JM	Okay, how do you ensure that the benefits of using the new health services outweigh the challenges of adopting it? And how do you make sure the users realize the benefits?	
36.	R2	Implementation is sort of the biggest thing I think, personally, but that is my…. I have a behavioral science background with the information systems. So I have sort of specialized in that it needs to be adapted in order to move on to giving some…uh.. like a significant return in the effort we put in, it has to be adaptable from the organization's perspective that we're trying to force it in as well. So we have to provide maybe different ways of working like it changed work habits. How can you use the system in a way you haven't before to make it more beneficial for you and the citizen, as well? Can we make it easier? It's supposed to be easier, you have to provide the support, they should not have to ask for it, you have to come with the notion that they did not ask for this, it has to be done, maybe in some cases. How can we make this transition as smooth and actually sort of	EC, DI, DC, ES

		beneficial for them? That is a lot I think about how you talk to the different organizations and health care providers when you visit them. It is how complicated is the solution that does it entail a lot of educational efforts? Is there enough staffing in this healthcare providers organization that they can manage this in a good way? And that is also like resources is one of the biggest hurdles in order to…uh.. make a good implementation effort of a service. So how much time do they have? Because some things, like if we're just make an update on a current system that isn't already in play and is implemented, and they know how to use it, that is one thing. But if you try to say that you would change the whole journal system, that would impact everyone. Then you have to get them to know the technology, the limits, you have to be able to educate them, like change work methods. It might suck, it might be some bugs you have to just deal with, like it's so much maintenance, so much work. And I think one of the biggest hindrances when you or…. this is my opinion, I should maybe say that, but my experience is that it is much nicer to deliver and like develop a really cool system. And then you don't really take into account how much time and effort will be needed in order to make this useful. How much education do you mean? How many updates how many technical supports? Do you need to make this run smoothly and like really benefit, like just cost and reward when it's the rate of return from this investment, that has been sort of blindsided, in my opinion, but that is something that I think a lot of region people in like the IT departments have realized that there is a sort of overflow with systems that we have paid for and bought, but they are not being utilized in a significant amount that it would be just like business wise….good to do.	
37.	JM	Okay, maybe you kind of answered this already, but what are the key decisions do you take before launching a new e-health service for the citizens and healthcare professionals?	
38.	R2	what are the big decisions? Or what do we investigate before deciding or something? Yeah, that really depends, I think that differs a lot from region to region. Normally, I as an employee within projects, or I like a project manager, I get assigned a task to do. So the decisions are based by the management or the sort of the IT departments… I would say, the digitalization strategists and how they do that… I think we have some sort of one internal process where a need sort of goes into a process and gets evaluated. And it might be a study done on this object. And then it goes up for the decision where cost and reward is sort of balanced towards each other and goes from a yes or no. But…. like, within Inera that I was talking about earlier, that is sort of service provider for regions around Sweden. That is sort of another process. And that is sort of unclear. That is something I have been asked to look at how can we make this process good. And I'm thinking that you have to do some sort of business case	DT, ES

		based on parameters… And like, Yeah, time within the healthcare might be one. How much time will this take? When is the rate of return to be expected? When can we start seeing usage that sort of compensates for the costs of this? And I think that is a process that is always supposed to be evaluated, because that changes as well.	
39.	JM	So the implementation process is quite long, I guess.	
40.	R2	Yeah, I would say so. And the implementation process is might be a little bit, sadly to say, the implementation process has not been pre prioritized enough which has led to a lot of systems just lying and costing money every year. And that sort of exponentially grows eventually. Because then you pay first year you have let's say, this is just an example. But what if you have systems for 2 million that are not being utilized? Next year…you say yes to five different new systems, you only utilize one and implement that one, then you have maybe a 5 million cost. And that just escalates every year. Because when we say yes to one thing from an Inera, we pay it because we have sort of signed up to do so whether or not we use it.	DT, DI
41.	AD	Okay. And how do you align your organization's competency with the people's need? Do you conduct any particular training to upskill the knowledge of the developers using it.	
42.	R2	one more time? What did you say?	
43.	AD	Yeah, how do you align the organization's competency with people's need? Do you can conduct any particular training to upskill the knowledge of the developers, the professionals or the public who are using it?	
44.	R2	We have in-house like to assess for maybe if you're supposed to be…if you get assigned to do a project you can go the project management classes and you can have like workshops leading and whatever it is, but I think one thing we are trying now is to combine…I have a sort of technical background and I have some leading qualities as well. I combine that with, I like to use when I go and implement, I like to use people from the healthcare system, because I do not have the proper understanding of what they actually do. So I try to combine a team that also have the technical expertise, we have the system expertise, we have the healthcare expertise, and then we try to have like a dialogue with the receivers of this technology, what do they need, because on one department or healthcare facility, they might be really adapted to technical changes. And like, yeah, that is nice. They might have big, different attitude. But we can, like face a lot of resistance and lack of those technical competencies that are needed to do this digital transformation. And then you have to like add resources. And that is something with the agile you have to be able to sort of flip and change because it has to be needed, driven them from the different departments with this, what needs that they have from support? Is it more a technical competency? Then we have to have a specialist that can come in	DC, DS, EC, DI

		and help in that area. Is it just different working methods to make this easier to use this service? Well, maybe then it is someone with a background in health care that has been working with this?	
45.	JM	Is that how you usually do testing also? Do like include healthcare workers and patients in the e-health testing?	
46.	R2	Not patients we work primarily to…uh.. like in this project is my first project…so let's know…. I'm understanding without that I don't have all the answers. What we do is we do a pilot when we're sort of transparent and say, You're the first one to do this. We are trying out a new way of doing things. Please give input if you need something, speak up about it, because we will do what we can for you. Okay, so yeah, so we're sort of changing the perspective because earlier it has been you need this, we have put it in your system. Now you use it, and then sort of back away, leave them hanging. And now we're trying to do like, do you understand this do like this more qualitative measures on it.	DI, DS
47.	JM	Okay. Yeah. So it's like an ongoing transition period. Where you update?	
48.	R2	Yeah.	
49.	JM	Yeah. Okay…. Okay, so what are the key factors you keep in mind while designing e-health services to make it more user friendly?	
50.	R2	Oh, that is when I might not be able to answer that…. Adequately. I think it is UX design, it has to be understandable. Like the, you have the communication departments, they know how to speak without it being, like, know what to write, and how to sort of have information flows, that it becomes logical and less likely to be misinterpreted. I think it's sort of a joint effort. And we have like this focus groups. Also, when you're trying to design a new standardized manuals for doing things, then you like do it with the people using it. So you have like, an input from people that work with this sort of so it's not like five guys from IT decided, let's change the world. And it doesn't work because we have never been in a health care context. We don't know how they work. What are the obstacles when you work in one organization? Is it really… I don't think we IT people… we are good at a lot of things. But we have sort of too little understanding about how the actual work, this is being done out in the fields to make assumption on how they should work, we have to have a like dialogue and trust that we don't know shit about what they do. And we have to have a sort of some humility about that. And include people who work every day in the systems.	ES, DI, EC, DC
51.	JM	They feel like the users are motivated to use the new, e-health services that you provide, or do you need to like persuade them somehow?	
52.	R2	It depends. Some things are just you know, tedious tasks, like just, you know, mailing, printing out putting letters in an envelope and mailing them out. That is really time consuming. Of	EC, DI, ECS

		course, they would like to have like a digital while you're doing that. People are screaming for that. But then there are sort of some systems that have not decided that might be a political decision. It might not be a good thing for their business, or for their work methodology they have to like…uh.... So I think it depends if it is decided how it's being used with the different health care providers. I think there's more of a acceptance towards it, because it's sort of you create an ownership of the service, we have created this together, sort of instead of the hot potato delivery. Yeah.	
53.	JM	Okay, how do you make sure that new e-health technologies are well integrated and easy to use by the users? Maybe it's similar to what we asked before. But…	
54.	R2	Yeah, the user? Are we talking about like the private citizens or we're talking about the health care providers that work in the systems?	
55.	JM	Yeah, both but mainly, the public I think?	
56.	R2	Well, that's a good question. I think when it's, it reaches to the public, the only thing you can do is to try to make it easy and understandable. Like when you design the interface, maybe you can have some directed communication, and advertisement like this is happening, this is how you use it like using advertisement or but trying to educate the public, it is not as easy as ones think, I think that is something when it starts being utilized the service, it will sort of just get rolling by itself. And then you can you also have sort of forums with the public as well, when you can say. Okay, this is us from this sort of governance object, we have the system, so you have an input, and then you can have some input, or if you have sort of a… public surveys, that also happens when they try to like better their products and services. But I think it's a hard one to crack because you lose sort of a lot of control when it goes beyond because I can't go out to like "Petter Johnsson" and say, Do you know how to use this, you're supposed to use it this way. Because it's too big. You have to sort of have clear communication, easy interfaces, good design, and be able to have loose coupling, so you can change things that doesn't work without crippling the whole system. I think. Yeah. But I'm not that technically advanced. know if that is something you do. But that is what I imagined could help. And when you're trying to educate like the healthcare workers, then it's just having a respectful dialogue and see to their needs. And what sort of thing this supposed to fulfill, like, what is the expected use and gain from the service? How do we make this work with the organization and still get that effect we are after? If it is cut costs, or if it is a better quality of health care…. Whatever it is, I think it's a dialogue. How do you do this and be like transparent and listen to the people that works with it.	DI, DC, ES, EC
57.	AD	So do you think these dialogues and services are successful in a way to reach out to hard to get groups?	

58.	R2	That is also a tricky one that I'm not sure that I think I would just be guessing. Actually, if I answer that, I think there are always problems like, if you have someone that has a deficit on their eyesight, then there are you know, this screen reader that can read stuff for you, but how do you like…you can't customize it for everyone, but then it has to have some different ways into the healthcare, you have to have some parallel alternatives like tele-phone. So you can get the verbal help sort of	EC, EB
59.	AD	Like the tele-health service?	
60.	R2	Yeah.	
61.	AD	And also like there are many e-health services and technologies like the wearable device or the digital COVID Pass. So do you think using such services or devices influence the social status of the user and like it influences the adoption of the technology?	
62.	R2	What do you mean with social status?	
63.	AD	Like wearing a wristband, a wearable device sort of like wrist-band or carrying your COVID pass or digital COVID Pass. So do you feel like they influence the social status of the user which in a way, persuade them to adopt the technology?	
64.	R2	I think with the COVID passes, it was sort of a given, you needed a COVID pass in order to go to go to Gran Canaria and get tanned, I think that was a motivator. And I think it also is sort of a social stigma in many groups not to be an anti Vaxxer for example, I think there are like social constructs that sort of push people to use different services. But I don't know if that has any correlation with how the health care works or if that's just a social construct that sort of grows from a phenomena.	DS, EP
65.	JM	Okay, So, when do you consider the health services fully adopted so to speak?	
66.	R2	I think there are two ways to consider the e-health services fully adopted. One is like if you have a project when is the definition of done you have to have a definition of done and that is sort of have a high, lowest acceptance of how bad can something be im-plemented and still give a good return and understanding and ownership within the healthcare sectors. How can you do that? And then we have that when it's supposed to…uh… like if you do in an ideal dream world when It is totally adopted and fin-ished well that is when the usage and work methodology sur-rounding the system is so advanced that it sort of influences other services and sort of creates shortcuts within…. Oh, I would need to be Swedish to formulate this I think is that alright	DT
67.	JM	Yes	
68.	R2	***TRANSLATED*** According to me something is fully adopted when the implementation, education/training, communi-cation and the dialog within the operation have been good enough. And when that dialog has in some magical way spread through communication tools to the citizens so that the benefits stack, like with stock you get interest on interest. The systems talking with each other...there is a step called inertia which	DT, DI, DC, EB

		means you only utilize a system for the bare minimum. Through a good implementation you can go upward and beyond where the health care operation begins to create their own processes and routines that are tailored to benefit them with the help of the systems. This helps them gain extra value from the systems. That's how I define a good implementation. But I'm thinking in a project the implementation is when the system is being put to use for real. So the difference is the quality. So I think there objective description, the time when the task is done….done in a project. They have the e-health services and they can use them. Then we have this more colorful and beautiful implementation where you achieve proper value and you get spin-off effects.	
69.	JM	Okay, How often do you achieve this dream scenario?	
70.	R2	I haven't worked that long but I hope so, haha.	
71.	JM	Through which channels do you communicate your message. Do you use an specific service, social media platform or change leader to reach out to the citizens?	
72.	R2	Uh….I think the communication ways are probably using newspaper…uh… we have our intranet when we want to communicate to our like… like our workforce within the healthcare system. Then we can put up news, we can have articles, we can have the different forums, you know, meetings with management's for different areas and different health care providers. So we have like different information ways but the funny thing is that when you implement no matter how much you communicate, you always miss someone. So it's really hard to have like a good but we have like communication plans that are like a preventative step in order to avoid miscommunication or misinformation.	DC, EC
73.	JM	Okay. Is it important to have people within your organization that drives and pushes for innovation when it comes to e-health?	
74.	R2	Yes, definitely, I would say, like, there are sort of two layers on this one, we have something called UK:are within our region that is sort of educational cordinators they're called ,development coordinator that are sort of administrative personnel that is assigned a task to, like, sort of…uh… see, and like listen in on what's happening and have a sort of connection within there, like almost every health care giver have one of these. And they have…..they have like a network when they exchange experiences and discuss news and new services that are coming in, and like have a forum in order to like, promote and discuss the, the different obstacles and potential gains that come from the services, and also provide, you know, sort of…uh… a forward thinking approach this one, but then it is also like, in our interactions, when we implement, it can differ so much when you have someone that is technology friendly, and technology resistant. That is why we like black and white, but you know what I mean? It depends, if you have someone that thinks it's exciting, if you have an involved management in this section, that can	DS, DI, DC, ES

		make the biggest difference, because those are the management's it is who decides for additional services for their unit, for example. So if you have like…uh…if you have a passionate of involved, management and team, of course, they will be able to adapt and see potential instead of problems, I think. But that is also my thinking. I don't know if there if it is significantly proven to be so yeah.	
75.	AD	What are the challenges you feel are related to the e-health adoption, and the problems.	
76.	R2	Time and resources I mentioned, I think that is one of the biggest because I also think that when someone is stressed and have a lot of work and have a lot of duties, they have to stress, then it is not a welcome interference when we come in and take three hours of their day and say, hey, we need to do this. And they have 5000 things to do and we just come and hijack their day and make it even worse. It is also like clear decisions, resources within the implementation team organizational acceptance of implementation as a significant part of making something give a good return and have a good effect. I think it's a lot of things like perceptions of what the implementation is and what it is good for. And why it's needed.	EC, ES
77.	AD	So do you face even any privacy issues while providing e-health services? If so, then how do you counter them?	
78.	R2	Well, I am very new in my role. I haven't been working with this for so long. What happens I think is if there is obstacles… what happens to it… just amounts to more work, of course. Because then you make an effort, it doesn't take because it was too narrow or too thin of an effort, too little information, too little education, too little dialogue. And then you have to go back and do it all over again. And that strains the resources within the team within the region and within the health care units are supposed to interact with.	EC, ES
79.	AD	Do you even sense some sort of like mistrust among the citizens when they are using the public health care's services and does it like is a hindrance within the further adoption of these e-health services?	
80.	R2	I think it's not like a hindrance. Really. I think it's more of a I think the healthcare the public health care system has not evolved at the same rapid pace as the rest of Sweden's Organizations. I think the disappointment or assistance that come is that we do not provide obvious services like booking time to meet the doctor online. Like… getting your prescription renewed if you have to like, call a reception or a healthcare provider. And it can take up to three days before we get the time on the phone…. I think that is what causes a resistance or annoyance may be an irritation within the citizens. I don't think it is more I think that the biggest obstacle is meeting the public's expectations of what sort of services they should be able to search, like use as a contact towards the healthcare system.	EC, ECS

81.	AD	So are you satisfied with the developments in the e-health services? In which area do you feel the need to be a bit more development?	
82.	R2	Oh…I think I am a little bit too invested in…. like the projects…but I am not like sitting in the sort of coordination spaces right now. And I'm sort of new in my role. So I don't think I can answer that properly. I think that like….just getting, like book a time online, those easy access points, is the most important for the citizens. But then we have what is more most important for the health care providers. That is not a question, but I don't think I can answer that properly.	
83.	AD	Yeah. What are your main takeaways from the pandemic? And what have you learned that will be useful in the situations like this pandemic situations, when it comes to e-health development and adoption?	
84.	R2	I think that I think there's a general lesson from the pandemic that also factors into this one, that you have to develop systems to make things work. And that was one of the biggest hurdles, I think society could… that it could have gone…. excuse the language, but tits up for Sweden. If we hadn't developed this, I think, also one takeaway is that you have to develop things that fill a function. And this is sort of sets a need. And the…uh…depending on how big this need is, it should be prioritized, I think. Because everything was put on the shelf in order to deal with that. And I think that is a good takeaway that you have to be able to prioritize up and down what is necessary in the society we live in right now.	EP,, EB
85.	AD	Do you think that the private sector has come far when it comes to e-health adoption than the public sector? Is there anything you can learn from them?	
86.	R2	That is interesting. Because we are sort of struggling with the private health care facilities that are health care centers they have different twist on the use different systems. And that sort of takes away from the standardized you know, goal that exists, but then you can't go into a private, like organization and say – do this in the same sense! Because we don't have that much control. If it is a political decision, this has to be you have to offer this to the citizens. If you are a healthcare provider, then it's another thing but it's sort of I think it's…uh… it same but different. That's a weird and vague answer but I think they can be more advanced in some areas, but they can also be a lot far behind in other areas, and if you go to you know, doctor.se or kry.com or whatever. I think there is another problem that is more sort of a political one. How much…. that's also my personal opinion…. and maybe keep that from I think it is…uh…. I think it is different problems but I don't think that... I think that it varys too much to generalize any specific answer.	EC, DS
87.	AD	So I think we are done with the interview. Finishing thoughts.	

88.	R2	Really interesting. I would love to get the copy when you're done. I am really passionate about the implementation and that stuff and yeah, I hope it goes really well for you. It feels like you're in a good field.	
89.	AD	thank you	
90.	R2	Yeah really nice. Good luck. Thank you so much. Have a good day. Bye.	

Appendix 6: Interview Transcript R3

Line	Person	Transcription	Code
1.	JM	Let's begin. You kind of already introduced yourself, but can you maybe we can do it again. So we have it on record, so to speak.	
2.	R3	Yeah, my profession is occupational therapist. And I've been working in the rehab department for nearly 20 years. Mainly with stroke patients, and also other patients groups. And about 10 years ago, I have been involved in the IT development, started my career as an occupational therapists. So it was natural for me to change career when this opportunity came up about 10 years ago, to work with 1177. You know about…obviously about 1177.., and my main task then was to develop to implement and develop the use of 1177 in the whole of the healthcare sector. And, well, that's what I've been doing since then. And also been involved in other implementation processes. For example, a couple of weeks ago, I was the project leader of implementation of an app where a patient can contact, have meetings with their healthcare staff, through a video platform. So…aa..I'm doing different things during these years. My main role is to be the bridge between the.. core healthcare service and IT department. So that's what I do. I'm well aware of the applications but my main role is to be the connection between…uh…the healthcare and IT.	ECS
3.	JM	Do you work for Region Värmland right?	
4.	R3	That's right, at the IT department	
5.	JM	Okay, yeah. So what type of e-health services do you're have right now? And how many?	
6.	R3	In the region ? How many? Well, that's a little bit hard to answer, because we have... do you specifically mean, healthcare services between the citizens and the healthcare?	
7.	JM	Both, and like those that only the health care personnel use also	
8.	R3	Well, you know, the 1177 contains a lot of e-services. So I'd say that all our units, all our, clinics we have approximately 400 units in Region Värmland healthcare services… In outpatient and inpatient care… that's Good... So we have about 400 units. And I'd say that all units use a base…uhh..a base of e-health care services. So you can contact the unit, you can speak to your doctor, you can have video call video conversation…. uhh…So it's from the leaderboard, it's… it's a decision made many years ago that all units should be able to reach with e-health services. And..uh..it varies a lot, what kind of services they give, but it's a sort of base, where you should be able to..uh.. as an individual should be able to contact each and every unit where they have services. Ah…so, and also, I think the largest one that we have is to renew your prescription. That's the largest one and also	ECS, DT

		medical records via the web when you can read your own record on the internet. And I think we have the highest use of that in the whole of Sweden, in Region Värmland. And what do we have? This is a continuous development of e-health services. So I think it's…ahh… it's difficult for me to sort of name everyone because there is so many. But it's a very large use of these services…uh.. among the citizens of Värmland.	
9.	JM	Ok so what do you think you have done to achieve this, like the you said, You're the highest, you have the most users?	
10.	R3	Well, I think there are several reasons. I think one reason which maybe it's not the best, is that it's difficult. Traditionally, it's the.. the main way of getting in contact with the healthcare is by telephoning. And… many years ago, maybe it's been like that for ages. It's when you call your health center. Maybe you have experienced of that yourself. If you call your…uh… health center..uh.. your local medical clinic.., it's difficult to reach them by phone. So the best way of reaching them is to use..uhh… We're not allowed to use mail. So, the best way of reaching them is to use 1177 and write a message and about 15 years ago, a decision was made from the leaderboard that all… as I said, all units should have this service. And we had a quite a colorful marketing campaign for 1177 in Värmland. This is a possibility.. this is something that all citizens should get involved in. That was the purpose for this campaign, so I think we were very successful in that marketing campaign. And… and also, yeah, I think that's the main reason actually. And also, along with the digital development in society, on the whole, it's natural for, us citizens to use, e-health… to use this IT services, even in the healthcare services, as well as in the bank or whatever. So it's a normal development for our society.	ECS, DI, EB; DC, DS
11.	JM	HMM…So you work a lot with communication to get out to the message about your service?	
12.	R3	Yes. Not always me personally. But we work together with communication department. IT department is very well connected with the Communication Department and other departments. That's, that's a core…uh.. That's a very important thing that we sort of.. our cooperation with all the different parts of the county council organization, is that we work together. And also reason why we're being quite successful, but last year, a lot of issues that it's not working very well. Maybe you'll get into that further in the interview	DC, ES
13.	AD	Yeah..So how do you feel that how well, you're prepared with the pandemic situation? And how do you feel the development in e-health helped in combating the pandemic?	
14.	R3	Well, I think also in that matter, we….uh.. I mean nobody could be really prepared for it, because we didn't know, we didn't see what was coming. But at the early stage, we saw that the e-health services that we have already implemented, could be at use in this case, we didn't want to implement something new that	EP, EB, ECS

		would take a lot of time. it would be very time consuming and resource consuming to start something new. So we decided to 1177 even in that matter. So at an early stage, we did develop the make an appointment through 1177 for your vaccination. And we've been doing that ever since for those couple of years. And..uh.. that's been very successful, easy and successful. You just login to 1177 to get an appointment. And we had at an early stage we organized different locales, geographic locales, through out the region where you could go and get your shot. And also, if you don't, I mean, you need to use a 1177 to login, you need your e-identification, and almost everybody have that. But there still is a number of people that don't have that. Maybe you're new in Sweden, maybe you don't have a Swedish personal identity number so then we have a call center where you can call and get an appointment as well as book yourself by the internet. So well. It's been working quite well. I think	
15.	AD	Is there anything you developed specifically for the COVID situation any technology and do you think that will be useful even in the future coming..?	
16.	R3	Yes, we do, I wasn't personally involved in that but my colleagues developed certain tool to track….uh….	
17.	JM	Contact tracing?	
18.	R3	Yeah..contact tracing to track people that has been infected, and the tools for that and to sort of ahh…. So that's actually developed in, in Värmland county council. And we have also shared this with other regions. And I can, I can't really be more specific than that, because I don't know more about it. But it's a it's a tool. That's been very helpful. And do you know about Inera? do you know? the organization?	EP, EB, DI
19.	JM	kind of we heard heard about it from the other interviews we did	
20.	R3	Yeah. So Inera is..uh.. we all the regions own and the municipalities in Sweden own Inera. And they're sort of administration. And they are sort of maintaining all the e-health services within the 1177 area. And this tool that we developed during the pandemic, they have taken over that, to keep the maintenance of that tool, and to spread it all over Sweden. So yeah, so that's what we.. one new tool that we developed. But apart from that, we've been using already existing tools. And it's…it's been working quite well.	DC, DS, DI, EP
21.	AD	So did the pandemic affect the way you were providing e-health services the way used to provide before and after the pandemic? Did it affect any way?	
22.	R3	I'm not quite sure what you mean. You mean it has increased the use of e-health services Yes, definitely. I experienced a large increase of use of existing e-health services for example, the implementation of the online appointment booking.	EP
23.	JM	Appointment booking?	
24.	R3	Yeah..to book an appointment through the net. We've been running this project for years and years and years and it's been	ECS, EC, EP

		really difficult to sort of persuade or talk to two different units about this because they always come up with..ah… well "We don't have enough of doctors we don't have enough appointments. We can't leave that to the individual to book an appointment" But since during these two years this we've been contacted many times just to sort of have help the units to implement this service to let the inhabitants book their appointments by themselves. So I see an increased need to implement more e-health definitely during those two years and not only book appointments, but also have video calls. This video platform more and more units want use that and…uh… they want to digitalize. I had a conversation just a few days ago with the manager in the north of Värmland that wanted to set up a whole digital unit for health center. Yes, one one unit up in the north that they want to implement this service for the population up there.	
25.	JM	Okay	
26.	R3	And the video…uh.. one thing that we actually…uh.. I forgot about that… one thing that we at an early stage of the pandemic we had just implemented this video platform for the youth clinic. But when when the pandemic started my… I and my department and got a question from from the the leaderboard, and they asked us can you implement this so that the whole of healthcare services in Värmland can offer that patients meetings through this video platform, because obviously, that was very difficult to... to keep up a service. People to move physically and to physically make appointments in the hospitals and so forth. So this is what we did then. And so now all of units can use this platform.	EP, ECS, DI
27.	JM	You seem very, like innovative, and you don't, you don't seem to wait for others to do it, do it and test it.	
28.	R3	No..I think we. And its all due to…. I wouldn't say the whole of the organization is innovative or… but it's, it's a mix.	DT
29.	JM	Okay, so how do you ensure that the benefits of using the new e-health services outweigh the challenges of adopting it?	
30.	R3	I don't know how to answer that, really. We have to we haven't had…. we haven't had a chance to or the time to assess that. Because we've been so much in the middle of everything. So I think now, when hopefully, the pandemic is over, or at least decreasing, we will have time to look back and assess these matters. More specific.	EP
31.	JM	But what are the key decisions you take before launching a new e-health service for the....	
32.	R3	Can you repeat that question?	
33.	JM	What are the key decisions you take before launching new e-health services for the citizens and the health care professionals?	
34.	R3	Well, it should be. I mean, it's a challenge really, because I think the main difficulties in… in as far as e-health goes, it's to sort of develop an efficient organization around it, that the leaders the start the management leader board, and that they can take the right decisions and communications throughout the whole of the	EC, ES, DC, DI

		organization. And I think that's a key problem, when you lack of that communication, and that decisions are not fully communicated. So I think that's to be successful, you have to work very well, with a very obvious goal. And yeah, I think that's the key of it all, to be.. That the management is very clear about what is going to happen, what they want to happen. And the people that are sort of working on the floor with the implementation, that they're well connected with those who make the decisions. I think that's the main thing about not at all. So what…. wherever you are in an organization, you have to be aware of what to do, what's the goal? What's the main goal and yeah.	
35.	JM	And how do you ensure that the services are integrated with other services, so they work together?	
36.	R3	Well I think that's a problem, because they don't… they don't work together. We say some work together. Some. I mean, that's…aa.. in my position and my colleagues position its…it's what we deal with every day that when we get to when we get in contact with healthcare unit, and they say, We want this and this and this, can you help us? We have to sort of illustrate the process. What's the problem, this solution that you want, what problem is it going to solve, and what do we have already that can maybe be part of the solution? Because I see a potential risk, but we just implement things and they don't work together. So that's it daily issue for us to talk about how can we do this so that our services and systems work together. And we have an integration for this, I talked about, for the citizen to book an appointment, we have an integration between 1177, and our journal…medical record system where you make what I'm talking about. But I see there is an obvious need of, of an increased connection between all the services that we offer, that we often talk about an ecosystem, that all those services and systems should be working together in a ecosystem. So that's a, I'd say, that's a vision, but it's not working. As well as it had the potential of doing. But it's on everybody's lips these days to to see the those... What do you say?..I can't find the right word. But you know what I mean..	EC, ECS, ES
37.	JM	Okay, so how do you align the organization's competence with the people's need? Do you conduct any particular training to up-skill the knowledge of the developers, professionals or the public?	
38.	R3	Hmm…Okay, so you mean... Okay…ah…how do we do that? Well, I think as far as the public go, I think communication with the public is very important. And we, the communication department use all available channels for informing and communicating with the public like you know Facebook, Snapchat, whatever, to inform and 1177…. to inform about different things that's happening with a with e-health. And you also asked how we develop, educate personnel staff..? ah… it's very important to have people on each and every unit there has to be people that are, what you say? Ambassadors or experts of all those different	DC, DI, ES, DS

		systems and services that we offer, because it's important to have administration, the IT department, the maintenance of the systems and services and people like me, it's very important that we get full grip on what we offer, but also they're very important that are experts out in the organization that we can work together with, because every each and every nurse, and each and every doctor, they can't know everything. So you have to have the ambassadors out in the organization, I say, we…uhh… we have that to a certain extent. But I think we have to develop that we have..aa.. when we implement a new service or system, of course, we have..uh… educational appointments that we have e-learning. And we have an intranet, where we publish films…..uh…educational appointments, that goes on continuously to and also the staff learn from each other. So I say, but I mean, that could be much better than it is I would say.	
39.	JM	what you mentioned, like ambassadors, so it's important to find people who really wants to push for change, you would say,	
40.	R3	Yeah,definitely. If you don't, if you don't have that, you can't be successful because I see…uh…. It's often those people that contact me and say, Can we have this? I want to… want patients to be able to see their booked appointments on 1177. Can we have that? And if I ask myself who are those people who contact me but it's always people that take an interest in development or see that while this could be used, I could develop my own position at work or I can make things better for the patients, if I implement this. So I think it's very important that we have those people out there. It doesn't have to be a manager or boss, it can be anybody really a doctor or nurse or anybody else just that takes an interest and we can work together. Very important!	DI, ES,
41.	JM	Do you ever get like get suggestion from the citizens, Also? We wanted this…?	
42.	R3	Yes, definitely. We were open to… we have channels, where we recently implemented a e-health service called feedback and complaints , where you can write your.. so it means you can… you can write your opinion about something or complain about something. And it's, it's a main, the main reason for that is to, for the citizens to…uh.. to complain if they want to about healthcare, they will see. But also, if you see something that could be developed, or so… That service is very well used. And I see that yeah, we get definitely get opinions from the public.	DC, DS
43.	AD	And how do you test the e-health systems before being released for the actual use by the people?	
44.	R3	Well, how can I answer that?...uh.. I'd say that most of the e-health services that we implement, has been developed by Inera that I mentioned before, and Inera is very good at testing, involving, both personnel and staff, but also citizens…uh… to pre-use the service,...a… and also measure and assess. So I'd say, yeah… so that's the main…uh.. yeah.	DI, DS

45.	AD	And what other key factors to keep in mind while designing e health services, making it user friendly.	
46.	R3	Well, how can I answer that? While you have to..uh.. maybe it's... I might not be the right person to answer that, because I don't sort of make the… I don't develop services…, but I sort of take them in use. But I think the main thing is to work with the people who are supposed to use, of course, the designers, the UX-designers and the developers…uh... That's the main thing, whether it's for personnel or citizens, whatever, to have a process where you sort of have iterations, and you go through this development process very thoroughly…uh... So Yeah, I think that's a very normal development processes these days…you know… I mean, 20 years ago, if a system developers, they just developed things, and here it is.. take it…but, it's not like that anymore.	DI, DC,DS, ES, DT
47.	AD	Yeah. Do you feel that the public and the professionals are self motivated to use it? Or do you feel that they need a persuasion from through government rules or policies?	
48.	R3	The systems?	
49.	AD	citizens and professionals like that? Are they like self-motivated to use the new e-health services?	
50.	R3	Yeah, I think the citizens are very, self-motivated. But I think we have we had a problem in within the organization, because I think that's an issue for all large organizations when they are in the process of changing something. I think that…. sometimes it's a very painful process to….Well, I've done this this way. For my whole work life. I've done this for five years. And now we're supposed to do it in another way. I think it's a….uh… as a professional that seems to be a lot harder than for when I'm in my. when I am private. I mean, we have had.. We always take this example 15 years ago, no one knew what this was an iPhone or a smartphone. But now, everyone has one. And it hasn't been a problem to implement that. But when you get professional, when you need a large organization, where you work with systematically with processes, you do it in a special way. I think it's a…. resistance to change because I know this is working. It's a pain not for all people, but to a certain extent, for everyone. Oh I suppose to change the way I think the way I do things. Well there's some resistance there.	EC, DI, DT
51.	AD	okay…now you see a lot of e-health systems services and technologies, the wearable device or having a digital COVID Pass or something. So do you think such services or technologies like a wearable device or the COVID passes, they influence the social status of the people? And that is a sort of a persuasion for them to use the e-health services?	
52.	R3	I'm not sure i follow can you take that again? What do you mean, haha? It's a very long question..	
53.	JM	We're not the big fan of this question ourselves, either. Should we just skip it?	
54.	AD	Yeah, we can skip it.	

55.	R3	Are talking about status or?	
56.	JM	Yeah, like, status, the image?	
57.	R3	The image? If this could sort of increase the use of, yeah. I mean, everybody has been forced to use digital solutions during the pandemic. And I think, even if we have a..uh.. large amount of the citizens using it already used before the pandemic, now even more people have been forced to use. But even if they have been forced to use it, they now see that. My mother is 82. And she used Facebook before the pandemic and other social media. So now she can see the advantages with having, for example, the COVID pass in a phone or she can see her appointments with her doctor in her telephone. I mean, she has been forced into it, because she doesn't have a choice. But now, she see the benefits of it. I don't know if that answered your question. I don't know…. I don't know whether it's, well, I think people that it's not comme-il-faut, it's not okay to say these days. You never hear anyone say, Well, I don't have a smartphone. I don't use digital services. You think there's something wrong with that person…. I don't think that. But I mean, in the mindset is, if you don't, if you're not digital in any way, you're out of society. You're sort of the weird one.	ECS, DI
58.	JM	How do you think like the transition period goes when switching from the old ways to using new health services? Is it a smooth process, or is it rough or how would you describe it?	
59.	R3	I think it has been rough, but I don't think it's rough anymore. I think the more you talk about the digital divide. It's sort of shrinking. So l see… I think…ah… the pandemic has been like a lubricant…uh…The pandemic has sort of been a push forward. So, so I think these days, when we have developed, the society has gone in this direction towards digitalization. I think, to develop even more services, it's a smoother process now than it used to be 10 years ago, or five years ago or two years ago. That's what I'm saying. It's easier to implement something now than it used to be.	EP, ECS, DS
60.	JM	So, in this, when you have new services, you have to both the organization both have to adopt to the service, but the service also has to adopt to the organization so to say, Do you think there are challenges regarding that?	
61.	R3	Hmm…Can you take that again? I'm not sure what you mean.	
62.	JM	These services, you got your new services and you have to adapt the services to the organizations, but you also have to adapt the organization's to the services?	
63.	R3	Yeah. I mean, it's an active process, it's not just happening. So you could, I mean if the organization isn't ready for it, nothing is going to happen. So the….organization has to be take the lead. I mean, you don't just adapt to something you, you have to be and take part actively to implement something in a successful way. I think. It's that was answer to your question, I don't know.	DI, ES,

64.	JM	Okay..So when do you consider having the health service fully adopted?	
65.	R3	Let me think.... it's, I don't know…. I don't know whether it's actually ever fully adopted, because you develop a service continuously. But I mean, when you get to, when you want to have a proper use of a service, a certain amount of people that are meant to use it, use it, then I'd say its fully implemented, or adapted. I mean, like 1177, we have almost every grown up, every adult in the region, have an account or use 1177, which is a fact today. I'd say it's fully adopted and implemented. But that doesn't that everybody likes it. It means that you have to continuously develop the service to fit different groups of people..and…uh.. so I think it's well implemented, but it's a continuous process to make it better.	DT, ECS,
66.	JM	Hmm…So, when it comes to this, to make it the part of the everyday life of the citizens and like you make it a routine, is that something you try to achieve? And how do you achieve it? Like you don't just release in service in your hope for them to use it? How do you follow up but they actually use it?	
67.	R3	Well, when it comes to 1177 we follow the outcome, the statistics. We see.. how follow how people use the services what e-health services within 1777 they use. If they visit the open pages with articles and a lot of information about different diseases or… Do they login and use the services, we follow up that continuously…uh.. about two or three times a year. I report to the leaderboard, how the services are used, and then I think we can be really better about setting up goals. For example, we, the leaders, the management made a decision some years ago that all booked appointments should be able to be really canceled or re-booked by the citizens because that's…uh… to have a nurse to do that on phone..uh… takes a lot of.. It costs a lot of money and resources. So they made the decision that the citizens should be able to do this by themselves.Ah…then we have the issue that the resource planning, it's a…it's a challenge for the…. for the different units, because they don't have the say they don't have enough for doctors, they don't have enough for nurses. So they can't leave it to the citizen to do this…uh.to make the cancelled, of course, they can cancel , but they can't re-book but because there is not to re-book to but so I think that's…uh… to be able to change that…. I think we have to be more specific about what goals do we want to reach here? And that's something that…uh.. we have to work more with, to follow up decisions..uh… to follow up goals. We don't do that as much as we should, I think.	ECS, EC, ES, DT
68.	AD	And do you think there are any important factors... What are the most important factors which comes into picture when it is like e-health Adoption?	
69.	R3	Do you think? Do you mean by the citizens or the internal organizations? Can you...	

70.	AD	like for the citizens as well as for the professionals? What do you feel are the most important factors which influence the adoption?	
71.	R3	I think as I said before, I think…uh.. the goal making is very important. This is what the leaderboard, the management, sort of point out the direction, this is the way I want to go. And also, that..uh.. they offer…uh.. the personnel education and to be able to take part in the development. Not only a decision that comes from above, we got to do this. The decision making is very important..the part taking in the development is..is.. also very important to..uh.. what's in it for me, why should I do this? For a nurse or a doctor, I can... that they actually feel that this is good for somebody, this is good. For me, this is good for the citizen. It's good for the for the healthcare sector, it's good for society, it's good for the world. It's something that you can see the reason of why do we do this? I think that's very important that I can make my voice heard..uh…at the part of the projects and developments and the tests. I think that's all of the things that are important.	ES, DI, DC
72.	AD	So did you face any privacy related challenges when it comes to providing health services? And if so, how did you tackle them?	
73.	R3	Did I face?	
74.	AD	Privacy related challenges	
75.	R3	Privacy related challenges?. Well I'm not sure. I'm not sure what you mean.	
76.	AD	Like these e-health services have a lot of personal data being stored over the net. So do you feel like the people are…uh…have some privacy concerns when…?	
77.	R3	Alright, well I haven't... No, not really. Not any longer… because we're very good at telling people that this... It's always security issues with the…uh… the Internet. Everyone is quite well aware of that but I mean, we provide services where you identify yourself, you have your ID…uh… I don't think... it's not an issue that we address that much. I don't think so.	DC, DS
78.	AD	And what do you mean, takeaways from the pandemic and what have you learned that will be useful when it comes to a similar situations like the pandemic?	
79.	R3	Well, I think the main thing that we've learned is that you have to early stage organize yourself, organize around the issues at a very early stage. I think in the beginning, it was quite a shock what was developing and no one was prepared for it. But like for the rest of society, I think we have to be quicker mobilizing resources. And now we know how to do that. And…uh…we developed a special organization, sort of a SOS organization just to mobilize the right resources and the right time. So I think the whole society has learned a lot from that, actually. So Well, yes.	EP, ES, DS
80.	AD	Are you satisfied with the developments in e-health and which areas do you think needs more development?	

81.	R3	Well, I think a lot is happening now…uh... And I think there's a positive…a…approach in the whole of the healthcare sector to-wards e-health and on every level, people can see the usefulness and what's good in this department, in this area, but I think also we still, as I said before, I think we have to focus more on of or-ganizational issues, because I think that's the main problem. But we're getting there.	ECS, EC, ES
82.	AD	We are done with the interview, do you have any finishing thoughts?	
83.	R3	No, I think it was a challenge to me to talk in english.	
84.	JM	Hahaha.. You did well.	
85.	R3	It's interesting, because I was thinking before the interview, well, I'm good at English I know how to respond. Haha, but it's not so easy. I hope I was able to answer your questions. And it will be very interesting to read your thesis, which I hope I can do. Yeah, so I'm happy if you are happy	
86.	JM	We are. Thanks a lot	
87.	AD	Thank you. Thanks.	
88.	R3	Okay. Get back to me. If you want to sort of yeah, if you had any issues or you didn't understand something, you're welcome to contact me again of course.	
89.	AD	Anyone who can share you the transcript by tomorrow can read through it. Okay,	
90.	R3	Thank you very much!	
91.	JM	Have a good day. Bye bye!	

Appendix 7: Interview Transcript E1

Line	Per-son	Transcription	Code
1.	JM	Okay. So to begin with, can you introduce yourself what's your role and how long have you had it for?	
2.	E1	My name is X. So you see and and I have worked with it in healthcare since 1987. With lots of lots of years and and it's long before it's called e-health. It's called it in the healthcare and I have worked in the industry…uh…like a developer for care systems and I have been a senior management consult to….uh… like consult to SKR…what do you call it ? Swedish Municipalities and Regions. And …uh… I worked with quality registries in Sweden and now we call it investigator in Sweden on the e-health agency and like a senior adviser….hahaha..	
3.	JM	Okay. So, so you've been working with this since a lot very long time. And when did the e-health agency start? It was not so long ago, Right?	
4.	E1	Yeah, the first system in Sweden come out, it's…it's EPR systems for primary health care DPS. In the 80s, the first system and in the 90s it's with coming and going with the…uh…with the system in the primary health care in Sweden and the begins in the primary health care	
5.	JM	okay. So what are the main e-health services that you provide at the e-health agency?	
6.	E1	What I do or…?	
7.	JM	No, what are the services you provide to the public?	
8.	E1	In the…uh..in the we have the e-prescriptions in the whole Sweden. we have that like in the national…uh… services. So if you go out to the pharmacies, you get the prescription electronic and we handle it in our systems. We had some units come from the Apoteket to the pharmacy AB earlier. And then now we have the…uh..the you have the in the COVID passes, what to call it? COVID-bevis We have this service too we have take it...development it. And we have lots of innovations… in suggestion by the department, The Ministry of Social Affairs give us lots of work to do, to investigate and recognize lots of things.	ECS, EP, DI, DS
9.	JM	But the service are both for the public and for like medical personnel?	
10.	E1	For the public the most.	
11.	JM	Okay.	
12.	AD	So how well prepared were you to face the challenges of the pandemic? And how do you feel the development in e-health helped you in fighting the pandemic?	
13.	E1	Yeah we… we in the pandemic we have seen that….uh.... the meeting… digital meeting have explode! So, so in 1177, we have seen a dramatic grow of to using these services.	EP, ECS

14.	JM	Medical appointments, you mean?	
15.	E1	Yeah, and all the services we're having in health information, in-formations that 1177 have. And we have a report for. We have a report and now so we I can share with you what's happened un-der the pandemic?	EP, ECS
16.	JM	That would be really nice.	
17.	E1	Yeah. It's Swedish. So I can send it to you. So you can read about what what? What's happened on the, we see Yes. "the pan-demic has affected the digital development in different ways" that's the report describes in that report.	EP
18.	JM	So, how did the pandemic affect the way you work with provid-ing new e-health services?	
19.	E1	Can you explain in Swedish?	
20.	JM	***TRANSLATED*** How do you work? Are you working faster, are there less obstacles? Did you get bigger opportunities to develop new services?	
21.	E1	If we see the pan... COVID passes which take so short of time to take it to the public, I never experienced this before. Often we have we will take to get to new services it takes years. No, they take took months to get this up to the public...world record.	EP
22.	AD	So somehow you can say that pandemic accelerated the develop-ment in the e-health sector?	
23.	E1	In the e-health sector there was was the uh.. digital meeting with with, with the doctors in the healthcare...have the most that you see that it's a pandemic get to that turbo speed.	EP, DT
24.	JM	But you already have that in place before the pandemic?	
25.	E1	Yes, we have some private healthcare providers, you have this...but when when the pandemic came we saw the other re-gions also get these services to the public really rapidly	EP, DT
26.	JM	So many of these services you created during the pandemic can be used after the pandemic also?	
27.	E1	Yeah, yes, yes. And that we see oh the whole Sweden for the re-gions.	EP
28.	JM	So, I guess you have to call up collaborate a lot with the regions from them municipalities?	
29.	E1	Yeah, we are doing it this time but more more and more Swedish SKR do this.	DC
30.	AD	And did the challenges during pandemic differ, while imple-menting the e-health adoption strategies?	
31.	E1	Sorry, take it again.	
32.	JM	Okay. So, I just.. Did the challenge differ during COVID when it comes to e-health adoption compared to before the pandemic?	
33.	E1	I think the pandemic get so to say fuel to uh.. to get speed on lots of things. But we have some problem in you see we have a 21 regions in Sweden and two of the biggest regions Skåne and Västra Götaland are changing their systems now. And, and nine	EP, EC

		others other region also changes their systems. So, we have the pandemic or in the same time we have there are changes all the systems so in the same time we have must get up to speed we develop new or new services. And we have a break, too, because they are changing systems in the same time.	
34.	JM	Okay. It's like the medical records system?	
35.	E1	Yes, medical care information system, they call it.	
36.	AD	Like, is there any particular modification you had to do to the existing system to adapt to the pandemic?	
37.	E1	Sorry, take it again.	
38.	AD	Is there any particular changes you had to do in the existing system to adapt it to the pandemic?	
39.	E1	Yeah, they must…uh… the region must adjust the digital meetings services they must develop. And a lot of system regions had buy the new platforms. So platform 24, for example, have grown in Sweden, buy it up so they can have these services. So yeah, that type of other things. It's going in the only slow way. They all add up. You see, a region is a very big organization. I live in Uppsala, and they have 30 000s people working in the system says, so it's going very slow to change things there. But yes, yes, this electronic meetings, services, they have grown grown, on the pandemic, more than they have done before. And I think the pandemic have uh...forced the healthcare systems to do this developing.	EP, EC
40.	AD	How do you feel is the reach of the current e-health systems as compared to the traditional old ones?	
41.	E1	The uh... Comparing to? Take it again.	
42.	AD	Comparing to the old systems, how do you feel the present e-health changes... What is the reach of them among the public or professionals?	
43.	E1	I don't think they have changed so much under the pandemic. I think they have their plans. Two thirds of the regions are shift.. are changing system now. So I don't think it's have changed so much in this services.	EP, ECS
44.	JM	And how do you ensure that the benefits of using new e-health services outweigh the challenges of adopting it? And how do you make sure the users realize the benefits of using them?	
45.	E1	Hmm..Take it in Swedish.	
46.	JM	***TRANSLATED*** How do you ensure that the benefits of using new e-health services outweigh the challenges of adopting it? And how do you make sure the users actually realize the benefits of using them?	
47.	E1	Its a difficult question we in our e-health Agency and we are not taking this because that's an uh... They are taking…taking this in the regions, we have the local government of the municipalities in Sweden. So, so everything is developed and use in taking	DS

		development in out in regions in and the municipalites. So so it's I think it's difficult to answer that question from my point of view.	
48.	JM	I guess most of your services you kind of have to use you have no choice not to use the medical prescription service online right?	
49.	E1	We have these medical prescription services and that's a national services and we must have it and that's the only one in Sweden.	ECS
50.	JM	So what are the key decisions you make when you release new health services to the public and medical personnel?	
51.	E1	We've from from our side, we don't do anything about this. That's the responsibility in the regions to take.. Can I answer this question okay and it's it's different about region to region and if you see a Can Can I share a picture? I will see here... Okay we have... I will show you a picture over the services we have in Sweden and of difference.... there we have it. ***SHARES PICTURE ON SCREEN*** You see this picture?	
52.	JM	I think so Yes it's loading but yeah.	
53.	E1	That and you see here all the regions in Sweden. And the services for information in the health record, you see one is the diagnosis in there we have the pharmacy and the drugs and there we have the X-rays and you see is so different between the all regions how this is showing for for the public. Some of the region Uppsala for example, have lots of services up here but you see Skåne have not so lots of them. So we see it's the this e-services is different where you live in Sweden. Is it the answer on the question?	ECS
54.	JM	I kind of don't remember which question I asked. This one.. Okay, what are the key decisions you take before launching new health services for the citizens and the e-health care....	
55.	E1	The key decisions? Okay. The key decision for new services... For our uh.. for the e-health agency is we the key decision is that what the government say to us to do.	DS, DI
56.	JM	Okay.	
57.	E1	If you get that. Yeah. And for region is often... the people out there, how they can what they can do, and what do they not can do in a technical way. And the informatic way. And often they have to say as a private care provider, often go forward to develop services and the region coming after because... it's ...they have feel the fire in the bottom to that to take… take it to the public because the private healthcare is going forward.	DT
58.	JM	Okay. But what is like, what's the implementation process like from idea to launched service?	
59.	E1	It can take five years, often. If you see for example, for Region Uppsala we have... It's taken a long time to get the idea and get get it forward and testing it and getting deliverance from the developers and the industry. I think it's five years.	DT
60.	JM	Okay.	

61.	E1	As I said the COVID passes was over sound speed. Don't have to do with with the usual do.	DT
62.	JM	So what do you need? What do you feel needs to change to make more regions adopt these health services? Like is there a need for like laws and stuff like that to? You have to have this or what to say?	
63.	E1	We cannot say so in Sweden because we have what we call it the local government in the municipalities. How do you say it in English?	EC
64.	JM	Local government, governance or something?	
65.	E1	Yes we have it. That's the way Sweden do it, we cannot break it. And every decision to manage this question is our flair. We cannot do it from the….from the state or from the government or from us or our side.	
66.	JM	But isn't there also like a rule that says everyone should have access to the same kind of care? Equally good care?	
67.	E1	Yes, and in reality, it's not, it's not so. It's different to Sweden. And and that's we have the discussion in Sweden, to sound with some say, take let the state have the health care. Some people are doing they see from some political parties. So we have this discussion in Sweden. This is the holy thing for everyone. Don't touch this	EC
68.	AD	A sort of resistance? So how do you align your organization's competency with the people's need? When you are like developing a new system? Do you conduct some training among the developers professionals or public to use the system?	
69.	E1	That's also a question outside in the region, how they learning it and how they are doing it. We cannot doing it from… the government's place.	
70.	AD	Okay. But do you like see public opinion that they need a particular system? And how do you align the developers who are developing those systems to meet the public goal? Are the public involved in within the development? Or it's like are you have only the set of requirements given a new start?	
71.	E1	That's a political question. And and... all the political will be the power. So they, they do what the public will and what and what they think they will to be reelected. And that's..some... I think that's one of the things they are thinking we take this because we take a political decision to take this you know, all of this thing will healthcare is in the top of the head of the political and how they are managing it and how they will prioritize things	EC
72.	JM	Okay.	
73.	AD	How are the e-health systems tested before being released for actual use?	
74.	E1	Oh, the systems first you you will have the order from from the customer, we will have these functions and and the developer and the industry say okay and take a *unhearable* take this will cost so much to have this function. And the industry testing it's	DI, DT

		the function before this going out and when going out to the customers to the region they are testing it and when they are testing it and see it okay this is work. And after that they can put it out out in in the in the in the healthcare and this process can take one or two years.	
75.	AD	So like is like the industry people testiing it or even a set of public test it?	
76.	E1	Sorry	
77.	AD	Is it like the developers who are developing it within the organization? The testers are testing it on the public? Are you.. give that application to the public to a small segment to test it?	
78.	E1	No, I think the industry testing first and the customer testing it after, and they are testing it so hard. So when they put it out, they put it out to everyone. They cannot use it for some people, some piece of the healthcare, you must have it for everyone use it in the same time.	DI
79.	JM	These services you create further regions, do you have to adapt to the regions or do they adapt to you, like the integration between systems?	
80.	E1	We have one services the e-prescriptions. And we have the pharmacy lists now, so going out and we must collaborate with the regions. To have an interoperability for the EPR system and our services to work. And often we have gets a lot of criticism for we don't, and they say you don't hear us, see our problems out there. In in a region, and so on. But naturally, that's the type of issue you must take.	EC, DI
81.	JM	But do like, for example, the region Skåne involve you in the process of getting a new medical record system?	
82.	E1	Nope. We have nothing to do with that.	
83.	JM	Okay. But I mean, aren't those systems connected with the medic with the prescription system somehow or not? Not at all?	
84.	E1	Yes. But it's connected with application interface. API. That's our our...interface.	
85.	AD	Okay. And what are the factors do you keep in mind while designing e-health services to make it user friendly?	
86.	E1	Which factors?	
87.	AD	What do you keep in mind to make it user-friendly?	
88.	E1	User-friendly. Our services in for the e-health agency we have a no user interface for users. We have a user interface on the pharmacy. And we have some some services. Yes. That's that's service for the pharmacy to see if some drugs have problem with each other. And there we have an interface to the pharmacy, but we have no interface to the health sector. So it's only technical interface.	
89.	JM	So you don't have to think about accessibility and stuff like that?	
90.	E1	No, not for our services. For the COVID passes we have we have UX experts, user experience experts to get the good interface to the public.	DI

91.	JM	And the do you feel like the public and the professionals are self motivated to use new e-health technology or do they need to be persuaded?	
92.	E1	When everyone is complaining on the systems but when you are shifting system the old system is the best one ever, haha. So, it's always take time for for the people out in the regions, users to get used with the interfaces and how they work. And the interfaces in the healthcare system is very complex. And and it's complex, you will see lots of things and at the same time they will don't. You don't want to see all and find the middlemidway in how they will see it and how they will experience the interface for is taking time. And that whole change small and they are fixing, fixing and fixing to get better and better and better. And someday they are changing system and in square one again. We see Region Skåne and Västra Götalandsregionen are changing system now for an American system from Cerner. And they have a huge problem. Huge of a problem for now there are Swedish care to use American system and we see they're having lots of problems.	EC, DT, DI
93.	JM	Isn't it legal problems also because they have to share it with American governments?	
94.	E1	Yeah, they have a lot of legal problems. With our laws in Sweden, compared to the US laws. And were in US they have insurance care, and we have not. So So you see, when you're coming out with with our outabroads, systems, that's lots of problems. Lots of challenge to do that.	EC
95.	JM	So there's usually a lot of challenges when it comes to like transitioning from an old system to a new system, you would say?	
96.	E1	Also that, yes. And this system, so we're coming out now to Sweden and the system in the in the in from Cerner, or from Capio, you like a Swedish developer. That's a very huge system with very, very, lots of functions, to do the whole to take care of the whole process for for patients in primary health care and in the hospital care. So so they're very advanced. And there were a lot of data in their systems.	EC
97.	AD	So when you are dealing with data, do you face some challenges with it, like are people find to give the data to you?	
98.	E1	To handle the data in the systems, yeah. We have the laws, how we can manage data, or how the care can manage the data, and what are the limits are to see things and how the patients allow the care to see our patient data. And so we have about 40 laws in Sweden, how you manage and how you provide and how you handle the data in h.. and in healthcare. So the were the very lots of roles of that, regulated, We have lots of regulation, how they manage, and it's ... yeah that's the case.	EC, ES, DS
99.	AD	When do you feel any of your e-health service is fully adopted?	
100.	E1	Fully adopted?	
101.	AD	Yeah, when do you reach to that stage when you feel it?	

102.	E1	Oh, it never gets fully adopted.	DT
103.	AD	Ok	
104.	E1	Sorry. It's not ... when they can ask you when is Uppsala is finished now it's enough to finish. It's always in development. And so is the health care systems a the whole time it's a little bit development, development, development. Coming new things the whole time. In the beginning, the first system right after the prescription and the paper is begin there. And so how the growth, growth, growth, growth, growth and have the politics, everything to i.	DT, DI, DS
105.	JM	But how do you know that you succeeded with a project so to say?	
106	E1	When they have an acceptance out there. And they say, okay, now it's working for this one, and they're coming, but it's not work there, haha. This is a how long is *unhearable*?	ES
107.	AD	Okay, so what strategies do you use to promote and ensure the adoption of your other technologies? You have technologies and how do you reach to the heart to get groups?	
108.	E1	Hard to get?	
109.	AD	Groups.	
110.	E1	Groups for for what?	
111.	JM	I guess for like COVID passes, I wouldn't say old people and people not so tech-savvy.	
112.	E1	okay, We see that is depend on what you're seeing on. If you see the public, when the public using e-health what do we call it services in 1177, we see we see that the people, most woman in 20 to 35 using it most, and we are so busy that people now over 100 years beginning to use this E-services for public. So so that's that's interesting. Internetstiftelsen have reports every year. So you is yes, you can see how the Swedish people using internet and as in some kind the e-health services for the public. In the in the healthcare users groups in the health of user you people is out there in the healthcare. You see, I think that older doctors have the most problems. But that's group is decreasing. So we have we see, every every new people is going from education out in the healthcare. It's natural. Yeah. And but you have the people over 60 They have more problems to handle it. But it was worse for for 10 years ago, but it's now everyone everyone is think yes, it's...naturally, we do it with IT. And we have seen it. That's the problem we have in Uppsala, we have a breakdown in the system for five years, five days. And we see the old people in the healthcare, say, Okay, we deal with on the old way. And the new ones, what will doing, we cannot work now. And the old people say okay, we can we can go back to what we did did before. So we have that issue. We will must take what if you don't have this, e-systems, and it's breaking down for for something. How will we care the patients? And one example, we have no paper to write the prescription. Well, how will we get out the	EC, DS, ECS

		prescription to the patients? We have no paper is good. We have taken the word away. That's an example.	
113.	JM	Yeah But like, as you said, you've been working with this for quite a long time, like 20 years ago. Twenty years ago, if you looked 20 years into the future, do you think you would have come further than we have today? Or?	
114.	E1	Yeah, I think I think the host I think you see we have we have taxis with taxi company without taxes. As a Uber, we have hosted hospital, hotels without hotels. And I think we can we will, in the future, in the future have hospital without hospitals, haha. So we take taken care of people at their home with all the equipment and have equipment home and people and the doctors and nurses going around, perhaps. So people will care at the home. And we have some cases in Australia where they are tested hospital without hospitals. The buildings and the buildings are how they only do surgery there and this experts but you have the patient at their home. I think probably it can go in that way. You have Internet of Things and all measurements seen in in the patient care in they have in this home and then you can have it in the cloud. And you can have the experts sitting and see on the screens and how the patients are living. I think that's.	DI
115.	AD	Do you think these developments are beneficial in a way?	
116.	E1	It's going on now, in this moment people working on it and develop now.	
117.	JM	Do you think it is important to have people within your organization that drives and pushes for more innovation when it comes to the health?	
118.	E1	Yeah, we must, we must, and we must have a how we can. However, the regulation and all these things are safely and at all things we have in the healthcare is safe to use and safe for the people. So we have in Europe we have in AI, for example, AI coming in, in the healthcare more and more and more. And in Europe, EU, we have a statement that must that must be be safe, and they didn't they cannot do harm for the people. So, for example, we are looking for what, what, how can we handle apps? That people using it in the cell phones and all how they will the apps working on the safe way? And how will apps integrate to the health care systems. So the healthcare system can trust on the data. People are put in in their app. So all these things. That's the problem now, people measure all things and blood pressure and other things or they go to the healthcare say, Oh, my doctor, see her my blood pressures. Okay. Okay. The doctor say, I don't trust this. I will take it again. So we must go from it. Okay, this app is so see you how is it certificated? I trust analysis? That's good enough. We're not there yet.	DI, EC, ES
119.	JM	But is that something you're working on at the e-health agency?	
120.	E1	We are looking how we will certify it with apps. We are coming out with a PM now about that.	ECS

121.	JM	Okay, how do you ensure that new e-health services get routinized and continues to get used after implementation?	
122.	E1	That's not our issue. That's regional issues.	
123.	AD	Like, how do you communicate the news services to the people? Do you have some sort of do you use some sort of social media platform? Or do you utilize some change leaders to reach out to the people?	
123.	E1	For our sake, we have a we have a website to inform the people. So how we get out in social media, we have LinkedIn, we have the *unhearable* channel in Facebook, some some some social services like Facebook and LinkedIn. We go out to see what now we have the service. But we are ... don't we are not so close to the public. The region or the municipalites is more near the public than we are.	DC, ES
124.	AD	So what factors do you feel is most important when it comes to adoption of new e-health services?	
125.	E1	That it work that it work. If it didn't work, people don't use it. They must be simple. You see when iPhone when iPhone came and Ericsson was the biggest in cellphones for 400 years ago, and some people say Oh, can you get an an Apple come with a smartphone and Ericsson said "Oh, that's idiotic. There is no button there". Every, noone would use a telephone without buttons. But but, you know, everyone using this now, Ericsson is not there with a cell phone, it's gone. And and it's because what so simple use, it's so simple, you can put your finger, take it down, swipe, swipe, swipe, it's so simple, that a child can do it. And it works. That's with using it if it hadn't been difficult, we wouldn't have used this. But I think the clue is simple.	ES, DI
126.	AD	Do you feel like you have a particular digital infrastructure to implement new services? Like especially when it like during, for example, take up a COVID pass? So, do you feel you have the adequate digital infrastructure to make such services?	
127.	E1	The structure?	
128.	AD	Infrastructure.	
129.	E1	infrastructure, okay. Yeah, we have, we are looking on new now on the national digital infrastructure and how it would work and we are not there in Sweden yet. With digitally structure for Sweden. And we are looking for what have we we have some some of them for for you see in 1177. Some national infrastructure first is not really a national because the private health care is not there. So it's only for regional facility. And we have lots of things we need a national digital infrastructure to get forward and the government has given us to see how we will, how will we do it now. And we have authorities DIGG the DIGG is looking also. So we are all looking at that we are not there. But we have we have we have the other problem we have.....how we are changes information interoperability. And that's a problem. It's lots of levels. We have a level four for the for the law, we have	EC, ES

		the level for the technical, technical interoperate interoperability, and we have the semantic and the big clue is the semantic interoperability for we are using different words(?) in in Sweden, for any... What *unhearable* and we must come up with standards and using standards and get we cannot use free text in our system. So we cannot change data on the way we will. We are on the way but we have the big issue is the semantic interoperability too we must do that. And that's the way to do it. It's a long way. And we are not there.	
130.	JM	But do you feel like the public sector is falling behind their private sector when it comes to your e-health?	
131.	E1	The private private sector is always forward. Because they are smaller and and they are closer to the wallet to the money than the regions for example. So they are are speeding up and they have the not the same legacy to to have they must take care of. So they are going forward. And they have always been that when we are when we put the IT in the healthcare. This was a little private private sector that was forward. And that was before the region's.	DT, DS
132.	AD	So do you take inspiration from the private sector?	
133.	E1	Well, yeah, I think the private sector is important. They can go forward.	DT
134.	AD	Did you face any sort of privacy concerns while implementing e-health services and how did you counter them?	
135.	E1	Sorry, I must...	
136.	AD	Privacy related issues while implementing. Because e-heatlh services deal a lot with personal data.	
137.	E1	Yeah	
138.	AD	So did you face any privacy concerns by the people?	
139.	E1	I think our laws in what in EU and Sweden are good enough and if we are extremely in Sweden to how we looking at this in this laws. More extremely than Norway or Denmark so, so I think that's a good protection but the there are some of actors that don't don't follow this, but we have authorities like EMY(?) looking on that in, in Sweden, I think we can be safe relatively in our system and we have a high level of trust for this in Sweden for public to compared to other countries.	EC, ES, ECS
140.	AD	What are your main takeaways from the pandemic? And what have you learned? Which would be useful for similar situation in e-health development in the future?	
141.	E1	In the future, yes. I think we have learned we can do things faster than we used before? That's the experience. We can, we can go faster to development and put it out in the public and we had it before. That have the pandemic showed us. We can do that.	EP
142.	JM	But what are the bottlenecks so to say? What? What are the bottlenecks?	

143.	E1	Oh, the bottlenecks, yes. Oh, people, haha. The bottleneck I think that's a difficult question either how........resources and money probably if we see the development of AI and artificial intelligence we have a bottleneck in resources and knowledge just now and that things use very lots of resources in Sweden overall.	EC, ES
144.	AD	Okay. So are you satisfied with the development done in e-health as of now and in which areas do you feel there is a need of specific more development?	
145.	E1	Hard question... it can always be better. It can always be better. We have we have some problems with lots of systems in Sweden, and we have a problem with over administration. Because we have our IT system and we have double documentation. We document the same things in more than one system and that's take time for for people who's working in the care so we must.... That's a big issue. We are taking too much of time for people who work in care who will work in with with patients now sitting in register these things more than one time. That's a big issue. So so the...If I will dream the future will we have one one registration is enough. We'll have the quality registries we have other registries and so on. So we one registration and it's enough. We're not there. Oh, no.	EC, ES
146.	JM	Okay. I think that is kind of it. Do you have any finishing thoughts?	
147.	E1	Ok, haha..... I don't know. I will send you the PM.	
148.	AD	Yeah.	
149.	JM	Yeah.	
150.	E1	And and if I find this other interesting things for you, I can send it for you.	
151.	JM	Can we use the image to show maybe also? Okay, yeah. Is it in the PM?	
152.	E1	Yeah, yeah.	
153.	JM	Okay, perfect!	
154.	E1	I can send it to to you so you can use this and you see the source is our report. Okay, great.Thanks a lot.	
155.	AD	Thank you.	
156.	E1	Thank you. And good luck!	

Appendix 8: Interview Transcript E2

Line	Person	Transcription	Code
1.	JM	Okay, so then let's begin. So to begin with, can you introduce yourself? What's your role? And how long have you had it for?	
2.	E2	I have been working at the Swedish e-health agency for about three years now. My title in Swedish is "utredare". And if you translate it, it's like investigator it doesn't say anything to any-body. I'm working mainly with different projects, you can call them a tasks that we are given from, mainly from the Ministry of Health and Social Affairs (socialdepartementet). Now I don't know the English word for that. Maybe you know that?	
3.	JM	I'm not sure. Maybe social department? I don't know....	
4.	E2	I don't know either, I'm not sure. But we get.. We have, what to say…uh.. we have an instruction of what we should do in this..uh…in our agency and then yearly. And then we also get other projects during the years and more money for that then of course also. So I'm mainly working with those projects that are coming up, now and then from the Ministry of Health and Social Affairs. And before that..uh…I mean, this is three years now be-fore that, I have been working in Swedish municipalities with e-health and digital transformation in different ways. I've been working at…uh…also at regional level at something called Storstockholm, I'm not sure how much you know about the or-ganization of the Swedish healthcare sector. But, and then I've also been at the SKR, The Swedish Association of Local Author-ities and Regions, I worked there for two years almost. And all the time with with digital transformation in the sector of the mu-nicipalities then not so much to regional. And as you…uh.. I have a master's degree in computer science and technology, as my background, which is a little bit different from most people, because they come from the healthcare sector, usually.	DT
5.	JM	So you get assigned projects, so you don't like come up...Can you…uh..Do you also like come up with your own ideas that we want to do this project or that you can pitch...	
6.	E2	Yes, we can but we don't have so much money for it. So we have smaller projects, also we have some motive, write reports and try to, in different subjects that we find interesting for the Ministry of Health and Social Affairs to read, that maybe they can give us more projects in the area. But we are..uh...what you say we we have to follow what the Ministry of Health and Social Affairs says to us in what to do all the time. We don't have so much freedom of doing what we want, actually.	EC, DS, DT
7.	JM	Maybe you can describe some of the e-health services that you provide?	
8.	E2	I am not working so much with the e-health services that we have in the health agency. As you know, we have the COVID-	ECS

		beviset, the certificate, COVID certificate. I don't know what to call it in English. And then we also have quite a lot of services when it comes to, to recipes and pharmacies but I'm not working with them so that that's something we are doing on this regular basis. As I said it's in our instruction that we should handle those system, improve them and make them run all the year around.	
9.	JM	Okay, So what would you say are like the main benefits of using e-health services?	
10.	E2	It depends a little bit on what you mean with the e-health services. If you mean like... E-health is a quite wide concept...uh... You can...uh... when you say e-health, everybody has their own definition of what e-health is, actually. And when you're talking about e-health services, then maybe you're talking about the things like the COVID certificate. But when you're talking about the e-health, for me, it could also be like digital meeting, having a GPS alarm when you're walking around so people can find you if you get lost, for example. It could be having those robots for medications at home, that's also e-health it depends on what you mean with the health. Actually, it's very wide. When you talk about e-health and many people also say that e-health that's..uh..that you are doing documentation in a structured way. That's what e-health means to a lot of people.	ECS, EB
11.	JM	Okay....but how would you how would you describe it, like from your from the e-health agency's perspective.	
12.	E2	it's to use the digital transformation for improving the healthcare sector.	EB
13.	AD	Can you see any visible...uh...what are the like visible improvements...uh... you've seen with the with the coming of digitalization in e-healthcare sector?	
14.	E2	You for the first, you have the possibility to choose, I mean, there, there will be another way of implementing and perform health care. I mean, it's not everybody who likes to go and visit a doctor or being ..uh.. many older people wants to stay at home, they don't want to go to this care center someday and that. They want to stay…stay home as long as they can. So it gives you a choice between what you can do, how you want to have your health care, and your care when you're older, for example, and it helps you to manage on your own quite a lot also. It also gives more quality in both healthcare and in the care. Because they get much more data. When you're using a e-health services, if you know how to use data, you can benefit a lot. Unfortunately, it's like we have not learned yet how to use all the data that are given from all those kind of different e-health services or products or whatever it is. But if you use it the right way, it can help you a lot in your care.	EB, EC
15.	JM	Is the problem that it's there's too much data available or what is it?	
16.	E2	Actually, I don't know where the problem is. I think there is what to say the sector is not so mature. So, some people that are	EC, ECS

		keen on new things and so on, they can understand many people that don't understand how they can use all the data they just feel like they drown in the data instead. So, so it's about how mature your organization is when it's coming to data.	
17.	AD	So...uh..How prepared are you to face the challenges of the pandemic and do you think the development in e-health helped in combating the pandemic?	
18.	E2	Yes, it did. The pandemic forced many organization to use digital...uh.. what to say...uh... services. For example, when it comes to digital meeting, you can have digital meetings in many many ways. If you look at the municipalities, because I'm..uh... I know most about the municipalities, they...uh...they had the digital meetings before but they didn't really know how to use it. They prefer to meet people in real life and so on. But suddenly they were forced to have this distance meeting. And then they could, I mean, it's sort of exploded with digital meetings in different ways, both for the....say.... For the staff, they had digital meetings, but also when meeting with the clients. So the... it was like, what you say, a kick, from the pandemic to start us digital meeting. And now I really hope that they don't fall back again after the pandemic, that they still go on with this. Because as you know, there are so many regulations in Sweden around how to use somebody's integrity and so on. Maybe it was not according to the laws all the time, because it was necessary to use the meetings. So that was one thing that I know, is used a lot. Just a moment...... Sorry...uh... Then I have to think there were more more things that was very good with the pandemic, also. Some municipalities they already had..uh.... Yes, now I remember. We, we wrote some case success stories, from my, on the health agency....uh..agency during the pandemic, and we have them documented on our webpage, so I will send you the link. But there were from see, it was like having distance...distance monitoring, that was something that was useful for those who already had it. When the pandemic started, it has been difficult during the pandemic to introduce new products, but they have already had invested and implemented....uh... monitor distance....monitor at a distance. They had to...what do you say.... they had a good health from that because they didn't have to go in... go into the room of the the clients all the time to check that they are alive or check that everything is okay, and so on. They can use these cameras instead to watch that everything is okay. That was something that was used. And they also started to use the what do you call them? "Padda" we say in Swedish, what do you say in...	EC, EP, EB
19.	JM	Tablets or iPads?	
20.	E2	Tablets! Yes, we started to use tablets a lot to having contact with the relatives and so on. But that's also kind of digital meeting. So that was something that...uh... You also got more transparency, we have one example from a municipality, that before	EB, EP, EB

		they didn't have any... Every what do you say? Every care home was like their own unit. They had their own staff, they had their own masks and so on. When...when the pandemic came, it...uh... in the beginning, it was very difficult because they didn't have all the material that they needed that to have a safe care. And then they suddenly had to work together to make sure that everybody in the municipality had everything they needed. So it meant that it...uh...they made a solution that made it more transparent to see where do we have the masks or gloves or whatever it is...where are they? And then they are needed here the most!. Then we move them, and also with the staff, where do we have stuff because people when they were ill they couldn't be at work. So they also started to help each other with the with the staff. And that transparency they didn't have before. I don't know much about the Swedish care sector, but it's not so mature, i can say they're working very much in closed units.	
21.	AD	Is there a specific service or technology you like...uh...made for the COVID situation or for the pandemic or did you like modify any existing technology to be used for the pandemic?	
22.	E2	Last thing I told you about was for the pandemic, but they will have use of it also afterwards. I'm not....I can't see...that was something new. But I can't see anything actually that was modified. It's more like using what already existed, not modifying so much the for pandemic ...	EP
23.	AD	Okay. How did the pandemic affect the way you were providing e-health services to the people? Did it affect in some way?	
24.	E2	Hmm...The COVID....now we're back at the e-health agency then and the COVID certificates as an example, we had to do everything so much quicker than before. Before maybe you had years to develop something. And now we have months to produce. So we had to speed up really.	EP, DI, DT
25.	JM	And how did you do that? Did you like look at other countries and see what they did? Or was there like collaboration between countries? Or how did it work the process?	
26.	E2	I think this was not collaboration between authorities(myndigheter) in Sweden. That didn't exist so much before. We are working very much in silos(stuprör), I don't know what to say what to say in English in Sweden. But during the pandemic, you had to step out of this silo and work together. So that was something that happened	EC, DC
27.	AD	So you collaborated a lot with municipalities as well as regions?	
28.	E2	And other authorities like...uh..I have to see if I can check and see if I can find the English word for it. They have it on their homepage. Agency for digital government for example, "myndigheten för digital förvaltning" was somebody we collaborated with a lot. And we do that all the time around health services, but it was improved a lot during the pandemic.	EP, DC
29.	AD	So the services which you created, like you said, you created few new services for the pandemic, and you've used the existing	

		services, so do you think they will be used...uh... the similar way even after the pandemic ends?	
30.	E2	Hmm...I think it was not just for the pandemic, it will go on. The COVID certificate, we don't know about of course. But when the other solution I told you about that are used in municipalities and the regions they will...they will live for a long time.	DI, ECS, EP
31.	JM	Okay, and he you said it like the process accelerated during the pandemic, do you think this will continue after the pandemic? Like now you've seen we can do this, this fast? Or you cut some corners because of the pandemic? Or?	
32.	E2	Yes, of course, you have learned from the pandemic and ways to work but also what happened during the pandemic is that you... there were...uh....there were, what you say, a lot of things but it couldn't do. So they have been waiting for the pandemic to end. So this will take time now. So I'm not sure that it will continue in the same speed, I think it will slow down but ...uh...for sure, we have got....we have gone a few steps of cost the numbers showed without without the pandemic.	EC, EP
33.	AD	So, did like the challenges during the pandemic. How were the challenges during the pandemic as opposed to during the traditional time?	
34.	E2	It was the meet, I mean, it was this that you couldn't meet people. You couldn't see people in real life. That was one challenge and the biggest challenge I think and then I will start to have all this kind of material and people at the right place at the right time.	EP, EC
35.	AD	So mobilizing the resources...	
36.	E2	That was more necessary than before. Yes.	EP, ES
37.	AD	How much do you feel is the current reach of e-health services as compared to the old traditional services?	
38.	E2	Not sure if I understand.	
39.	JM	Like how much do you think the health services are used compared to the see similar services that are not e-health services so to say?	
40.	E2	You mean like, percent wise...or?	
41.	JM	Yeah.	
42.	E2	I can't answer that.	
43.	JM	I guess it's different, it differs a lot	
44.	E2	Yes.	
45.	JM	Okay, so how do you ensure that the benefits of using the new e-health services outweigh the challenges of adopting it? And how do you make sure the users realize the challenges...uh....realize the benefits?	
46.	E2	And when you're talking about users, are you talking about end users or staff?	
47.	JM	The public, I guess it's in your case, Mostly?	

48.	E2	That's interesting. Interesting. I don't not know if.. I think we have produced a report about how people adapt to e-health services from our agency that maybe you should have a look at that one, because we have made.. I have to check, I will check if we have. If it's not published, it will be quite soon. My colleague, maybe we should talk with her. also. Because she has been doing this we have sent out a questionnaire to 15,000 people I think...uh... with questions around e-health services and what they think about them. I shall see if I can find it here... ***LOOKS FOR REPORT ON HER COMPUTER*** ... at our website looking at the different reports.	
49.	JM	Maybe we can try to find it after.	
50.	E2	There is one report, but I'm not sure if that's the one I'm talking about. But I will send this links anyway, after the interview with this success stories I told you about and I can also give you a link to this report and the name of the person who has been doing this report, I'm not sure that it is done, and then it's not published because I can't find it here.	
51.	AD	So in a way, you can say that public opinion matter a lot when it comes to the e-health services which you develop.	
52.	E2	Yes, I mean...uh...I'm not just working at the agency myself, I mean, I'm also a patient or a client. I'm not so happy about the health services we have. Because they can be quite clumsy. And when they are that then you are not positive to using e-health services. So you have, it's always like that when you're doing a digital transformation, you have to see what's in it for me. What's the benefits for me here? And if you can't find them, or if you think that this is really stupid solution, then you don't use them and then you'll get also negative to e-health solutions. But it's very important to , what to say? ...uh..to think about how you introduce new e-health services. And also how you implement them. I mean, you are working with implementation. And you have to start with end user, you will do something and I think that we often think out from an organizational view, when we are introducing e-health services. And then they are not useful for the public.	ES, DI, EC, DS, DT
53.	JM	They're not user friendly enough, or what's the problem?	
54.	E2	Some of them are not. I mean, if they are user-friendly than people, they don't even recognize that this is an e-health service, because it's good. But when they are not, then they complain a lot about them. During one of my projects, we you use service design. Probably you have been working a lot with service design during your education. But service design is not so often used in the public sector, unfortunately.	EC, ECS
55.	AD	What are the like, things to keep in mind when you're developing e-health services to make it user-friendly?	
56.	E2	What do you mean? And once again, please,	

57.	AD	What are the key steps you keep in mind while developing a service for the user to make it user-friendly?	
58.	E2	It's to..uh...to work in close connection with users. With the end-users thats....uh...oh...do you say so in English? ...uh...o...to work with the people who are going to use it otherwise, we will not succeed.	DI, ES, DC
59.	JM	So they are involved in the whole process, like testing and everything?	
60.	E2	Hmm....Yes, for sure. And also that you are doing it in a more agile way. Not I mean, when I started to work, we have those big projects that take took years. But I believe much more in working in closer steps or testing all the time to say that you are in the right...uh...right direction. So you don't develop something from....haha... many years. And you spend a lot of money and then we see that maybe you're too late with your solution when you have finished with it or maybe that you didn't solve the right problem. I mean, this is issue i would say but, it happens often.	DI, DT, EC
61.	AD	So like finding the right problem, and then going ahead that is like a.. the main thing about implementing a particular e-health solution?	
62.	E2	Yes. It's very important. Very, very important....like that	DI, ES
63.	JM	How do you know you that you have reached like the end goal, that service is fully adopted so to say?	
64.	E2	I'm not sure if you..uh.. It depends, of course of what's the magnitude of the e-health service you are doing. But I think that you have to develop it all the time. And I mean, change also all the time.	DT, DI
65.	AD	Like, how do you align your organization's competency with the people's need? Like do you give the developers or the public or the professionals using those e-health services, some sort of education, training, to use those e-health services?	
66.	E2	Now you're talking about the staff aren't you? We have people employed with different competencies, we work together. Every project that I told you about they are contained....contained there are people with your work in like in teams, and you have different competencies to learn from each other, but also to help each other to find the solution. People can be from the from the start there are some people in it or maybe they will change because then the next phase do need some other competency so very much to work in teams. That's also a clue for everything to work in teams and understand each other.	DI, DC, ES
67.	AD	Okay, how are the e-health services systems be tested before being released for the actual use? Do you test them?	
68.	E2	I'm sorry, but I don't know so much about the testing, how we test it, I don't know.	
69.	AD	Okay, do you feel the public and the professionals are self-motivated to use the e-health technologies? Or does it require persuasion through government rules, regulations?	

70.	E2	I'm not sure if I got it. But they are....some of them are forced to. I mean there are those system you have to give use them, even if you not like them.	DI, DS, ECS
71.	AD	So do you feel like government policies and rules are the biggest persuasion for, when it comes to e-health adoption?	
72.	E2	I think that... We have had those discussions, if you should have regulations for introducing e-health services, but we... don't have that in Sweden. They will have this asked...is this the way for-ward? And....uh... of course, it will be the way forward if you're forced to do something. But the...uh...the way to really introduce something and to continue to use it use it is to have good ser-vices as services that you benefit from in the daily work. If you have those solutions then, you will will go for further *unheara-ble* I think. It's, it's the benefits again, what's in it for me, so im-portant. You should also remember that this area, the people there are are not so mature in digital products. But it's also that there are not so much time, I mean time, is also necessary when you are changing. But they don't have so much time because they have a very tough situation, but they're working. So...so many things they should do every day and then putting the digi-tal transformation upon, because that's what's happening upon everything, else they should do they or they take it away. So you're sort of fighting with the traditional way of doing things, because they are sort of stuck into old ways of working. Because they don't have energy or time to...uh...to start new ways of working, the services has to be really good.	ES, DI, EC, DT, DS
73.	JM	So how do you feel the transition period when switching from old ways to new e-health services is like, is it a smooth process to integrate this into systems or new ways of working? I guess it kind of just mentioned that	
74.	E2	It's not so smooth. Because ..uh...what is very important is that you have management with you, they should be the one that takes decisions that this is something we're going to do. Usually they have people...you have people in the organization that like different kinds of digital solution. And then they will get the dig-ital solutions in small parts of the organizations but to implement it in the broad way you need to have management decisions, they know the whole organization will do this not only a part of it. And then we are coming back to this that management, they are not so mature, it's digital transformation. Maybe it will be better in a couple of years. But today you have a lot of different managers out there.	EC, ECS, ES, DS, DC
75.	JM	Are like these managers not inno ...uh..innovative enough, you feel?	
76.	E2	Not innovative enough, they don't see the benefits. And they have so many other things they have think about. I think the main focus is always money. And when introducing digital ser-vice, I mean it costs money, it costs in the beginning, that you will gain maybe you will gain something after a few years. But	DT, EC, DS

		in the public sector, you need to... What to say..oh, what is it called...return on investment you will need to have that quite quickly. Otherwise you don't do that investment. And the digitalization the transformation, it takes time. So it's not just quick solutions you have to work with you have to work with long term solutions also. And you can see that... the in the infrastructure we have right now in the digital infrastructure. It's not so very good, in Sweden. Because this is the work you have to don't see so much of as the end-user. And you.. It costs a lot to have a common infrastructure in the whole country. And everything is, as you probably have seen, everything is ...uh... it's the poli...politicans and political. They are the ones who decide what to do and what to invest money in. And they want to be elected. So they want to do things that people really see. And then it's tough because, as I said, this is the things that you don't see. From the beginning, it takes a couple of years, but maybe the politicians they have ended then or they are not elected or something like that. So then they can't say that this was I decided about this. So then they don't do it. That's also a problem.	
77.	JM	So it seems like important to have, you talked about success stories before. It's important to have these success stories that other municipalities can look at?	
78.	E2	Yes, that's very important to have. And if you look at those success stories, usually municipalities with a high degree of digitalization, they have brave politicians, and brave managers.	ES, DI, DC
79.	JM	Okay, so what strategies do you use to promote and assure adoption of e-health technologies? And how do you...	
80.	E2	*Coughs*.. Sorry!	
81.	JM	No worries!	
82.	E2	Once again please	
83.	JM	Okay, what strategies do you use to promote and ensure adoption of e-health technologies? And how do you reach hard to get groups?	
84.	E2	Oh....It's also depends on the use of it. I mean, and it depends on where you're doing it. If you do those success stories, there is a part of how how they have worked to succeed with implementing it. ...*short break*... Sorry...uh..implementing or change in this...uh..this is really difficult task to do. And there are so many people working with different methods and so on to do it. So I'm..uh..I can't answer your question, actually how we are doing or how you were doing in different organizations because there are many different ways of doing it. And it's not easy. For sure. It's not easy. Maybe it was not such a good answer, but...	EC, DI
85.	JM	It's fine! But through which channels, do you communicate your message? Do you use any specific service or social media platform or something to reach out to citizens and personnel? And whoever uses the service?	

86.	E2	At the e-health agency we have, I mean, we have our web page, we have LinkedIn account and twitter we are using....uh...It's the agency....	DC,
87.	JM	Yeah. How do you ensure that the e-health services get routinized and continues to get used after implementation? That you just don't? This is the finished service, now use it! How do you make sure like, they actually put it to use and make it a thing in the day to day life, so to say?	
88.	E2	I mean, the system with having the agency people are forced to use the system, because some of the daily performance they can't stop using them. But...uh..actually I don't know. Because, I mean, we have so many I know in the municipalities again, we have so many projects, that the pilots that we start with something and when you when we have one or two pilots installations. And then we have some money just for the pilots, not for the whole implementation. And usually you don't get more money. So then it ends there. And that's a problem. Money is always a problem in this area because if you don't get the money, then it will just be a pilot problem and be nothing more. And if it would continue, then you have to have real benefits from it that you see immediately that we would benefit from using this service or product or whatever it is. Otherwise, you would put it in, in a cupboard somewhere and don't use it anymore. It's so much about money actually, all the time. In a municipality, you have the taxes, people pay taxes. And they would use those in the different areas in the municipality, and then the state some sometimes they add money. But that's for a short period, usually. And...uh.. when the money is....when you got the money, and it's you have spent them, and you don't have more money, so maybe you can't maintain what you have. This is a problem. Unfortunately, there are so many, what to say I don't know how much you have looked at it, but it has so much to do with the society and how the society is ground. Actually, if things happen or not. It's not so logical all the time I would say....hahaha..	DI, EC, DS, ES
89.	AD	Do you face any privacy concerns when it comes to e-health adoption? Because...	
90.	E2	What did you say? if we..?	
91.	AD	The e-health applications usually store a lot of personal data. So do you face any privacy concerns when it comes to people using those e-health services?	
92.	E2	There are man...I'm not sure if I understand the question. Please. Can you take it in Swedish?	
93.	JM	***TRANSLATED*** When you develop new e-health services do you have a lot of privacy problems? Or how to say it..	
94.	E2	Integrity?	
95.	JM	Yes, exactly	
96.	E2	Yes, a lot of problems with integrity...haha..would say or the privacy. Sometimes it takes over the whole solution. And we have	EC, ES

		many lawyers working at the agency. Because you have to...uh.. what to say... you have to...understand all the different views of a solution. Because as an agency, we can't stand behind something that is not following the legacy then we are down set...then we will not live anymore. So it's it's a big issue to look into all...We say regulations. Maybe you say privacy...i dont know... but regulations around integrity.	
97.	JM	Do you think there's a lot of mistrust against these services?	
98.	E2	No. Actually, I don't think it is. I think we have so much...what to say. Many services they are so like caps... capsulated. So you should benefit from be more...more open and share data in more ways than we are doing today. I mean, today, you can't, I don't know. But if you have been to a doctor, they always ask you. Will you admit that we share information with this and this because everything is also again, in just the organization. I went to a hospital a couple of years ago. At the urgency, it was an urgency and I think you have to answer these questions for or five times within two hours in the same hospital. Because they don't share data with each other. If you not say that it's okay from the beginning. It's little bit annoying.	EC, DS, ECS
99.	JM	Yeah. Okay, what are the design and development steps taken to overcome the challenges of e-health?	
100.	E2	Oh, haha. Well it's to showing the benefits. Again, sorry, I'm back to those same answers but to see what's the benefits with this.	ES, DI
101.	JM	Yeah	
102.	AD	What do you mean takeaways from the pandemic? And what have you learned during the pandemic which can be used in the similar situation when it comes to e-health adoption?	
103.	E2	I think we have all learned that you don't have to meet in real all the time, you can do a lot digitally actually. I hope that we have learned this because this will...uh..I mean from an environmental reasons, we will gain a lot if we stop flying. I mean, just from the agency, we have one office in Stockholm and one office in Kalmar and people were flying on a daily basis back and from back to Kalmar, and back to Stockholm. I mean it's good for that environment environment that you don't travel so much, for example.	DI, EB
104.	AD	Okay, so are you satisfied with the developments in e-health? As of now, and which areas do you feel need more development?	
105.	E2	Actually, when it comes to e-health, I think that we have to develop the organization much more. Because there are so many to say...what to say... there's so many people involved always, when you're doing something in a hospital or in the what to say, primary care or when you come to the different ways of elderly, retirement homes(äldreboende) always a lot of people around a patient or client. And we are not...we don't have a good organization for this today. This has nothing to do with e-health, nothing at all. Because we don't work around patient. We work in	ES, EC

		organizational areas right now. So we need to develop ways of working. And in those...uh..if we can develop new ways of working, you will gain from using digital solutions in collaborations, of course. But it's something wrong in the organization today, I will say this is my private experience during the last year.	
106.	AD	Do you think like the public sector have come a long way.. private sector have come a long way, as contrast to the public sector? And you can learn something from the private sector? When it comes to e-health technologies?	
107.	E2	I have been working in the private sector before not within the care or health or something like that, because I work with Ericsson for many, many years. But I think, in the Ericsson, when I worked there, we tried to learn from other companies, not telecom companies, but other companies from the solutions we had. And I think that if you in the public sector, try to look more at the private sector, you could learn a lot. But usually, you say that but that's private, that's something else. We can't look at them, we are public they are private, it's not the same. But you can benefit a lot from looking at the private sector, but we are not doing it. But then we have a lot of private..uh..private caregivers in Sweden. And I think they have improved the health care we have, because they are working in different ways with shorter ways from a decision to really implement something. So I think when it..uh...when we allowed private caregivers, it also was like a kick with public to improve.	ES, DT, EC
108.	JM	So it forced the..	
109.	E2	There are many discussion around private caregivers, but I think that it helped in improvement and to make improvements faster.	DT
110.	JM	So the public sector was forced to be more innovative, so to say?	
111.	E2	Yes.	DT
112.	AD	So do you feel like the private were more innovative mostly because of the management or there are other influential factors influencing there?	
113.	E2	There are many, many private caregivers. I mean, they have been working in the public sector. So they know what they wanted to do that they couldn't do when they were in the public sector. That's one reason, because then you are driven to some kind of that I want to do better. And I wanted to do with the way I see that we need to do it. But then you also have, of course, that when you're private, you need to earn money to make everything go around, otherwise you will not survive. I mean, the public sector it survives, as long as we have taxes, it survives in some way.	DT, DI, EC, DS
114.	JM	Okay, I think we're kind of done. Do you have any finishing thoughts to end the interview with?	
115.	E2	Hmm...No, not. I am just curious to see what's written. And also to see your final report, of course,	

116.	JM	We can send it to you when we are done.	
117.	E2	But maybe, I'm not sure of how much you have been looking. Because when you have chosen e-health, as your area to look into, as I've....it's not so much about technology and so as you can hear from the interview here, it's much more about money, organ...organization, politicians, and so on. And that's what we say when we are talking with people out in the municipalities that technology is a small part, when it comes to introducing e-health it's everything else around it. That's problems.	EC, DS, ES
118.	JM	That must be quite frustrating when you come from a technical background like you do?	
119.	E2	But I'm very fond of organizational problems I would say, haha. But...uh... but I think I agree I mean, working within Ericsson was much easier, haha. In that kind of way it was much easier to implement telecom or datacom than implementing some new products within a hospital or something like that, of course.	
120.	JM	But, do you feel like there is hope for the future or will these problems remain?	
121.	E2	Yes...yes..yes, there is hope for the future. It really is. And I think we will improve a lot but this is change and change takes a long time.	DT, DS
122.	JM	Okay, then thanks a lot. And have a good day!	
123.	AD	Thank you!	
124.	E2	Thanks Bye bye	
125.	JM	Bye, bye	

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