Implementation of eHealth in the breast cancer care pathway

A roadmap to guarantee a successful implementation of eHealth at ZGT

Master Thesis

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Preface

For my graduation of the study Health Sciences at the University of Twente, I investigated the implementation of eHealth in the breast cancer care pathway. This thesis, called "Implementation of eHealth in the breast cancer care pathway", is the outcome of my research conducted at the Borstkliniek Oost-Nederland (BON) of Ziekenhuisgroep Twente (ZGT) during the period from September 2019 to March 2020.

"*Everyone thinks change is important, unless they have to change themselves*". This quote was mentioned by one of the study participants. It has stayed with me throughout the thesis period. People see the value of change, but changing their own care pathway and their own work… that is still a bridge too far. With this thesis, I hope to contribute to this process of change, so that we can continue improving and personalizing healthcare in the Netherlands.

I would like to thank my supervisors, Miriam Vollenbroek, Annemieke Witteveen and Josien Timmerman, who repeatedly provided me with good and critical feedback. Furthermore, I would like to thank the organizational stakeholders and (former) breast cancer patients, for their enthusiastic cooperation in this study. Besides, I want to express my gratitude for my thesis-colleague Ester, with whom I could always discuss about my thesis and who made the early morning train journeys to ZGT more enjoyable. Last but not least, I want to thank my parents, brother and Jorn, who always have managed to motivate and support me.

I hope you will enjoy reading this thesis!

Lauren Kerkhof

Enschede, 17 March 2020

Abstract

Background: In order to meet the growing demand for healthcare, while at the same time keeping healthcare accessible, affordable and of high quality, the hospital ZGT is interested in the implementation of supportive consumer eHealth in the breast cancer care pathway. A successful implementation depends on various factors, but is also dependent on their interaction with each other. At the moment, the implementation and use of eHealth in clinical practice is only taking place to a limited extent, since there is a lack of attention for this interaction. A readiness assessment on the different domains of ZGT can give insight in the current situation and the needs and requirements of the end users of an eHealth application. This information could be used to improve the chances of a successful implementation.

Methodology: A mixed method study was performed by conducting interviews with organizational stakeholders (OSs) and questionnaires with breast cancer patients and OSs. Interviews with healthcare professionals (HCPs) were already conducted in earlier research, but analysed again for the purpose of this study. Interviews were coded with support of constructs of the Consolidated Framework for Implementation Research. The questionnaires measured the individual readiness by using the Technology Readiness Index and the digital literacy by using the Pharos Quickscan. The questionnaires of the OSs also measured the organizational readiness of ZGT by using a statement list of the Nonadoption, Abandonment, Scale-up, Spread, and Sustainability framework.

Results: Seven OSs, seven HCPs and thirty patients participated in this study. The OS readiness was perceived as ready (4 out of 5). The patient readiness was perceived as neutral (3 out of 5). The HCP- and organization readiness were not perceived as ready. The added value of eHealth regarding the breast cancer care pathway was recognized by the stakeholders. Cost were mentioned as the main barrier for the implementation of eHealth. HCPs and patients identify eHealth as a supplement to the existing care. OSs have the opinion that eHealth should be implemented as a combination between a supplement and a replacement.

Conclusion: It appeared that effort is required for a successful implementation of eHealth in the breast cancer care pathway. When focussing on the implementation readiness, the organizational readiness and HCP readiness require most attention, followed by the patient readiness. Steps recommended to ZGT to increase the chance of a successful implementation are (1) prioritize the different eHealth applications, (2) inform patients and HCPs about eHealth possibilities, (3) identify champions and sceptics, (4) design educational materials, (5) construct a business case, (6) investigate a suitable way of financing and (7) adjust existing breast cancer care pathway according to the new processes.

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Abbreviation list

Abbreviation	Explanation
BON	Borstkliniek Oost-Nederland
CFIR	Consolidated Framework for Implementation Research
DIS	Discomfort
ETUM	Effective Technology Use Model
HCP(s)	Healthcare professional(s)
INN	Innovativeness
INS	Insecurity
NASSS	Nonadoption, Abandonment, Scale-up, Spread, and Sustainability
OPT	Optimism
OS(s)	Organizational stakeholder(s)
RIVM	Rijksinstituut voor Volksgezondheid en Milieu
TRI	Technology Readiness Index
UTAUT	Unified Theory of Acceptance and Use of Technology
ZGT	Ziekenhuisgroep Twente

1. Introduction

1.1 Background

In the Netherlands, 100 billion euros were spent on care and welfare in 2018 [1]. According to forecasts from the *Rijksinstituut voor Volksgezondheid en Milieu* (RIVM), healthcare expenses will grow significantly to 174 billion euros in 2040 [2]. This growth in health expenses can be assigned to, among other things, the aging population in the Netherlands [2, 3]. The number of people over 65 years old will increase in the future, while at the same time the number of people between 20 and 65 years old will decrease [4]. Therefore, the RIVM predicts that a quarter of the working population have to work in the healthcare sector in 2040 to meet the growing demand for healthcare [5, 6]. Remarkably, there is already a threat of a shortage up until 100 to 125 thousand healthcare employees in 2022 [7].

In order to be able to meet the growing demand for care, while at the same time reducing the healthcare costs, it is likely that a greater appeal is made to the patients themselves [8]. The patients and their environment should play a more active role in the care pathway[1] to keep the healthcare system sustainable [9]. Expectations display that electronic health (eHealth) applications will make it easier for patients to play this more active role [10, 11]. eHealth can be defined as 'the use of technology to improve health, well-being and healthcare' [12]. Besides the fact that eHealth can support and empower patients in order to play a more active role in their care pathway, there are more arguments why eHealth has an added value to the status quo: eHealth ensures that healthcare becomes more accessible for patients and it can improve the quality of care [12].

The hospital *Ziekenhuisgroep Twente* (ZGT) is interested in significantly improving the care pathway by implementing eHealth at the *Borstkliniek Oost-Nederland* (BON), since breast cancer is the most common type of cancer among women [13] and expected to continue rising in the upcoming years [14, 15]. Literature shows that a substantial amount of women declared an unmet need for support [16]. 'Supportive consumer eHealth'-applications can help to solve this issue [12, 17, 18]. Supportive consumer eHealth is defined as 'eHealth applications that support care delivery and focuses on consumer- rather than professional-centred services'. Characteristics of supportive consumer eHealth are creating a routine-effect, tailoring the information and interaction of the eHealth with the needs of the individual, being independent from time or location, letting both patients and healthcare professionals (HCPs) in control of interventions, increasing self-management, increasing possible care options and promoting of therapy compliance [19-22]. An example of supportive consumer eHealth is the Pinktrainer application, which provides (former) breast cancer patients with a tailored and partially supervised physical activity training [23].

[1] The care pathway is the individual process of a patient. This includes referral, diagnostics, treatment and aftercare or palliative care [9]

1.2 Implementation

Currently, the implementation and use of eHealth in clinical practice is only taking place to a limited extent, also at the BON. A successful implementation is dependent of various factors such as the perceived usefulness of the innovation, available resources and financial status of the organization [24, 25]. However, Greenhalgh et al. [26] discuss that it is not one specific factor that influences the successfulness of a technology implementation, but the dynamic interaction between factors. Furthermore, there is an interaction between the complexity of an innovation or implementation context and the likelihood that the innovation is successfully adopted, scaled up, spread and sustained [26]. Greenhalgh et al. [27] define seven domains that influence the implementation of innovations in the Nonadoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS) framework: (1) condition, (2) technology, (3) value proposition, (4) adopter system, (5) healthcare organization, (6) wider system and (7) continuous embedding and adaptation over time. To facilitate a successful implementation of supportive consumer eHealth in ZGT, it should be identified on which domains barriers are located.

A first insight was given in a study by Kerklaan [23], from now on called the 'Pinktrainer feasibility study'. The feasibility of implementing and using the Pinktrainer as part of the treatment of breast cancer patients at ZGT was explored. Kerklaan found that both HCPs and breast cancer patients would accept the Pinktrainer during treatment. However, the number of patients that were subjected to this study was limited (n=3). In the Pinktrainer feasibility study, it was recommended to research the stakeholder and organizational readiness. Ross et al. [28] confirm the importance of this, by stating that ensuring that organizations are in a state of readiness is a critical step in planning an implementation process. Additionally, the Pinktrainer feasibility study recommended to investigate the use and implementation of the Pinktrainer in wider internal and external context as described in the NASSS framework [23].

This thesis will elaborate on previous recommendations by investigating the implementation readiness of the organization (ZGT) and stakeholders in the breast cancer care pathway. It has been chosen to include the primary stakeholders of eHealth in the breast cancer care pathway which are the breast cancer patients, the HCPs and the organizational stakeholders (OSs). Additionally, preconditions regarding use and implementation of eHealth on the different NASSS domains will be investigated to improve the chances of a successful implementation of eHealth. Implementation readiness and NASSS are related to each other on domain level, but implementation readiness also goes beyond the different domains of NASSS. Therefore, this thesis assesses the different domains of the NASSS framework, with a focus on the implementation readiness of ZGT and the primary stakeholders in the breast cancer care pathway.

1.3 Research aim and research questions

The aim of this study was to investigate the steps that need to be taken to guarantee a successful implementation of supportive consumer eHealth and to measure the implementation readiness of healthcare professionals, breast cancer patients, organizational stakeholders and ZGT. The results will contribute to implementing supportive consumer eHealth successfully in order to decrease the costs, meet the growing demand for care and increase the quality and accessibility of healthcare for breast cancer patients.

The following research question is defined:

> "Which steps have to be applied to guarantee a successful implementation of supportive consumer eHealth in the breast cancer pathway at ZGT with a focus on the implementation readiness of healthcare professionals, breast cancer patients, organizational stakeholders and ZGT?"

The following sub questions were designed in order to answer the research question:

1. What is the implementation readiness of the primary stakeholders (organizational stakeholders, healthcare professionals and breast cancer patients) and ZGT on the implementation of supportive consumer eHealth in the breast cancer care pathway?
2. Which steps need to be taken to guarantee a successful implementation?

The chapter written above presented the motivation and central problem of this research. In Chapter 2 the theoretical framework will be described. Thereafter, the methodology of this study is explained in Chapter 3. In Chapter 4, the results from this research will be analysed, followed by a discussion and conclusion of these results in Chapter 5. Concludingly, recommendations for future research will also be described in Chapter 5.

2. Theoretical framework

In this chapter, definitions and theoretical models that will be applied in this study are defined. First, eHealth (Chapter 2.1) and the breast cancer care pathway (Chapter 2.2) are explained. Furthermore, the used frameworks and theoretical models will be discussed (Chapter 2.3). Finally, implementation readiness is defined (Chapter 2.4).

2.1 eHealth

eHealth can be categorized in three different categories: (1) eHealth that supports care delivery e.g. diagnostics, therapy, treatment, (2) eHealth that can manage care e.g. personal health records, portals, or (3) eHealth that promotes prevention and education as part of public health self-management programmes [12, 17]. In this study, the first category of eHealth, *supportive eHealth*, is studied. eHealth that supports care delivery can for example be an application which helps the patients remember to take their medication, an application with different fitness exercises so that patients can train at home or an application with whom patients can do mindfulness to deal with their thoughts and emotions in a different way. The applications named are all examples of *consumer eHealth*: 'eHealth that focuses on consumer- rather than professional-centred services' [18, 29, 30]. According to literature regarding Consumer Health Informatics (CHI) [18], there are relations between the consumer, technology, provider and service. The consumer can choose, trust and use a service (e.g. eHealth). The technology (e.g. smartphone or web browser) is used to gain access to this service. A provider supplies, implements, maintains and controls the service that consumers have access to. In summary, in this study *supportive consumer eHealth* is the subject of investigation: 'eHealth that focuses on consumer services by supporting care delivery' [12, 18].

2.2 Breast cancer care pathway

eHealth can influence the care pathway of the patient and the interaction (e.g. frequency and manner) that the patient has with the HCP. It is important to study the impact that eHealth has on this care pathway and interaction to overcome unexpected changes in advance. Possible changes that might occur were identified based on literature, the breast cancer care pathway (Appendix 1) [31], conversations with HCPs and the characteristics of supportive consumer eHealth that were addressed in the introduction. These changes are addressed below.

When implementing eHealth in the breast cancer care pathway, the HCPs [32, 33]:

- have to know which eHealth applications are available and for whom.
- have to screen each patient on the possibility of using supportive consumer eHealth as an addition to treatment or aftercare.

- have to inform patients about the options of supportive consumer eHealth for their care pathway.
- have to refer the patient to the eHealth application(s) that fit the patient best.
- might have to add monitoring the results of the patient to their work activities. Planning time to monitor the patients' progression in a HCPs' daily work schedule is difficult since the HCP is mainly focussed on the patients they see and the calls they get [33].

In the interaction between the HCP and the patient changes can be defined compared to the status quo:

- See the patient as a partner: change from decision making to shared decision making [6].
- Take more time for a conversation about the needs of the patient: change from practitioner to coach or advisor [6].
- Patients will gather more information themselves: change from provider to intermediary between the patient and the field of knowledge [6].
- The patient has more autonomy and things that are important for the HCP might not be important for the patient: change from 'patient does everything the doctor says' to 'patient decides what (s)he thinks is best' [6].
- If applicable, it requires different conversation skills for the healthcare professionals and nurses to perform teleconsultations jointly since this is a different type of communication [6, 34].

However, it is important to take into account that each patient is different and a different approach might be needed per patient.

2.3 Implementation

Implementation can be defined as 'a process-based and planned production of innovations and/or improvements (of proven value) with the aim of giving them a structural place in (professional) action, in the operational base of organizations or in the healthcare structure' [35]. Various models and frameworks have emerged targeting to understand the processes and factors involved in implementation. Well-known examples are the RE-AIM Framework [36], the Diffusion of Innovation Theory [37], the Nonadoption, Abandonment, Scale-up, Spread, and Sustainability framework (NASSS) [27], the Consolidated Framework for Implementation Research (CFIR) [38] and Grol and Wensing's implementation model [39]. The implementation of healthcare innovations is broadly recognized as a remarkably complex process involving a collection of determinants on multiple levels [40]. Therefore, it requires an extensive approach to structure the implementation process. As described by Pieterse, et al. [40], the RE-AIM framework and the Diffusion of Innovation Theory are both useful tools regarding parts of the implementation process, but do not provide the comprehensive approach needed to guide

the implementation process. In 2009, the CFIR was developed [38]: a framework consisting out of 39 determinants organized in five domains (Box 1). Although this framework is more extensive than the frameworks named before, it lacks the dynamic interaction between determinants as described in Chapter 1.

Box 1: The Consolidated Framework for Implementation Research

The Consolidated Framework for Implementation Research (CFIR), designed by Damschroeder et al. [38], is a meta-theoretical framework which can be used in different phases of the implementation process. It aims to guide a systematic assessment of multilevel implementation contexts and produce actionable findings to improve implementation in a timely manner [38, 41]. The CFIR is broadly used and intended to be flexible in application so that it can be tailored to a specific intervention and context. It 'specifies a list of constructs within general domains that are believed to influence (positively or negatively) implementation' [38]. This framework is based on five domains: intervention characteristics, inner setting, outer setting, individual characteristics and process. A list of these domains and the CFIR constructs they contain can be found in Appendix 2.

An evidence-based framework that provides a comprehensive approach and does take the interaction between determinants into account is the NASSS framework [27] (Box 2 and Figure 1). This, in combination with the fact that the framework can be linked to a practical situation easily, makes the NASSS framework an appropriate framework to support the implementation research in this thesis. Therefore, the NASSS framework will be the supportive framework throughout the whole thesis. As can be read in Box 2, the NASSS framework does also provide a question list to assess the different domains. However, this question list was perceived as partly insufficient within this thesis, since the questions asked could be more specific and tailored to different stakeholders. Therefore, a question list derived from the CFIR toolbox [42] was used as a supplement to identify factors influencing the implementation process.

The NASSS framework and the implementation model of Wensing and Grol [39] are complementary, since the NASSS framework focusses more on the current status of the implementation environment and the implementation model focusses more on the process of implementation. Overall, the implementation process asks for an iterative process that can be adapted for each situation. According to Wensing and Grol [39], there is no single best method to implement an innovation, as different target audiences and different situations bring different problems with them. To guide ZGT through the implementation process, the implementation model of Wensing and Grol will be used (Box 3 and Figure 2) [39]. This model was selected because it provides clear steps that are specifically designed for healthcare and has been applied widely in other implementation studies.

Box 2: The Nonadoption, Abandonment, Scale-up, Spread, and Sustainability framework

Greenhalgh et al. [27] produced a framework that enables those seeking to design, develop, implement, scale up, spread and sustain eHealth to help address the key challenges in different domains and the interactions between them (Figure 1). The NASSS framework defines seven domains as barriers and/or facilitators for the implementation of innovations: (1) condition, (2) technology, (3) value proposition, (4) adopter system, (5) healthcare organization, (6) wider system and (7) continuous embedding and adaptation over time [27]. An explanation per domain of the NASSS framework can be found in Figure 1 and Appendix 3. Supported by the framework, Greenhalgh et al. [27] designed a question list which contains 19 questions that can be asked to address the organizational readiness by classifying a specific case as simple, complicated (difficult, but not impossible) or complex (mostly too difficult to become the standard) to implement.

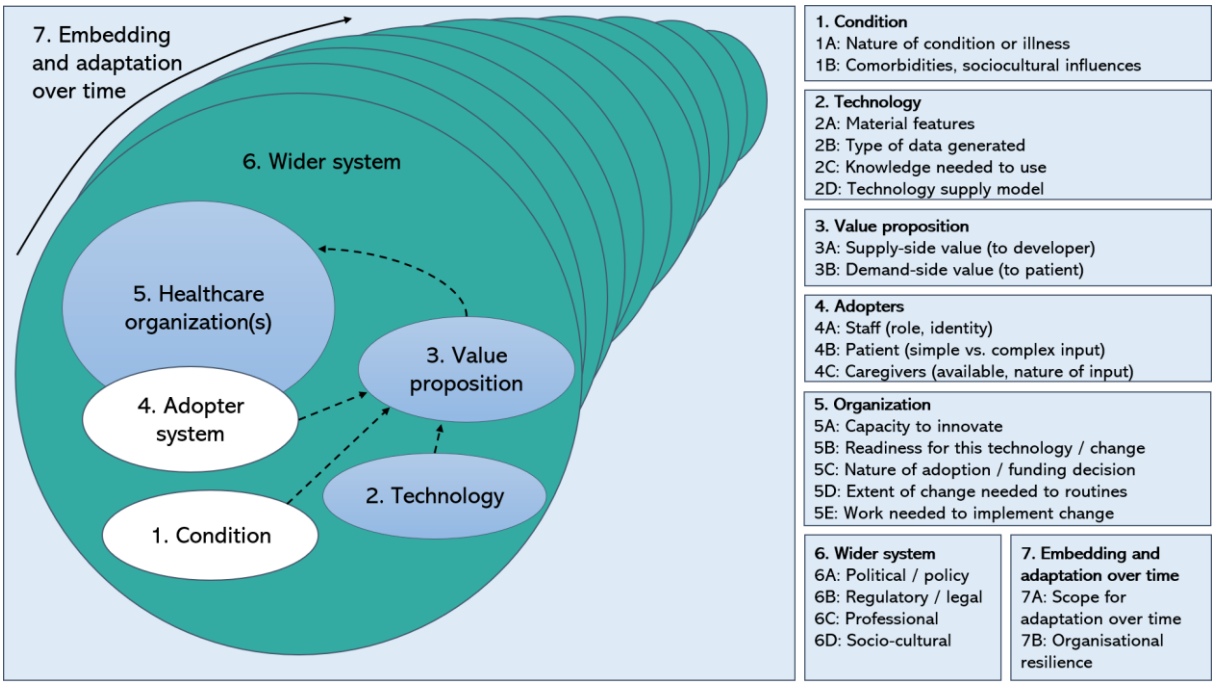

Figure 1: NASSS framework by Greenhalgh, et al. [27]

Box 3: The implementation model of Wensing and Grol

Wensing and Grol [39] define seven steps in the implementation process (Figure 2). The first step addresses formulating implementation goals. Thereafter, the current situation and performance should be mapped and targets for change should be defined, so it becomes clear where most change is needed. The third step includes an analysis of the target group, setting and factors that can influence the new way of working. It is important to distinguish different (sub)target groups [39]. Based on these finding, it can be determined what implementation strategies should be used (step 4). After that, an implementation plan should be developed, tested and executed. In step six, this implementation plan will be put into action by integrating the changes in the care pathway. Finally, it is important to keep evaluating and adapting the implementation plan when necessary.

Figure 2: Implementation model by Wensing and Grol [39]

The first step of the implementation model of Wensing and Grol, which is developing a proposal for change, is already addressed with the '*Zorg voor Morgen*'-programme that was launched by the ZGT. The aim of this programme, in which eHealth is used as a tool, is to increase the quality, accessibility and affordability of care. Next steps concern an analysis of the actual situation (step 2) and a problem analysis of the target group and setting (step 3). Assessing the current situation according to the NASSS framework, provided insight in whether or to what extent these steps are already addressed.

In summary, the NASSS framework will be used throughout this thesis to assess the current status of implementation at ZGT. The CFIR will supplement the NASSS framework by assessing factors that can influence the implementation process. The more process-based implementation model of Wensing and Grol will be used for the 'future' of implementation of eHealth at ZGT by prioritizing the steps derived from the results of this study.

2.4 Readiness

The implementation readiness regarding eHealth can be defined as 'the preparedness of healthcare institutions or communities for the anticipated change brought by programs related to Information and Communications Technology (ICT)' [43]. A lot of research has been done on the implementation readiness regarding eHealth, both on the organizational readiness and the perspective of the adopter (for example [44-49]). It appears that all studies use different instruments to measure eHealth readiness. This thesis aims to measure both organizational readiness and readiness from the perspective of the adopter (patients, healthcare professionals and organizational stakeholders). The organizational readiness was measured with an organizational readiness statement list provided from the NASSS framework [27]. This list was chosen, since it is evidence-based and it provides statements on the different domains and thus it provides readiness information per domain. The readiness from adopter perspective, was measured with Technology Readiness Index (TRI) [50]. This instrument was updated in 2015 to the TRI 2.0 [51]. The TRI 2.0 instrument was chosen for this study to measure the individual readiness of the patients and organizational stakeholders, because it has been rigorously tested for reliability and validity and has been widely used in more than 30 countries. The TRI includes two dimensions: motivators and inhibitors. The motivators are optimism and innovativeness and the inhibitors are discomfort and insecurity (Table 1). In Appendix 4, the statements per dimension can be found.

Table 1: Explanation of dimensions TRI 2.0 [51]

Dimensions	Explanation
Optimism	The belief that technology and innovation have positive benefits
Innovativeness	The tendency to want to experiment with, learn about and talk about technology
Discomfort	The perceived lack of control over technology
Insecurity	The belief that technology can result in adverse impacts on user and/or society

3. Methods

This study was approved by the Local Ethical Advisory Board of ZGT. To answer the research question, a mixed methods research was performed. In this chapter, the methodology used to examine the situation of the OSs (Chapter 3.1), the HCPs (Chapter 3.2) and the breast cancer patients (Chapter 3.3) is explained.

In Chapter 2 was explained that the NASSS framework is the supportive framework in this study. In Chapter 4 domain 3 to 6 of the NASSS framework were used to structure the results of this study. Domain 1 and 7 are not used to structure the result section, since these domains were not addressed in the interviews or questionnaires. Domain 2 is also not used to as a domain in the result section, since it focusses on a specific eHealth application (e.g. key features and generated knowledge) while this study aims at all applications that are covered by supportive consumer eHealth.

3.1 Organizational stakeholders

The readiness of the OSs was investigated with a mixed method approach using *questionnaires* and *semi-structured interviews*. Most interviews were conducted in ZGT Almelo and Hengelo, one interview was conducted at home. The interviews and questionnaires were conducted from November 2019 to January 2020.

Participant selection

Purposive sampling was used to select participants. The researcher performed this sampling in consultation with two experts of the ZGT. Inclusion criteria were that stakeholders were involved in the implementation processes (regarding eHealth or other innovations) and/or managing the BON and/or managing the (online environment of the) ZGT. All stakeholders named by the experts (n=7) were approached per email and included in the study. In the interviews respondents were asked if they could recommend other important stakeholders for this study. The suggested stakeholder (n=1) was also approached by the researcher, but refused to participate due to time constraints. In the end, seven participants were included in this study as OSs: a medical manager, a business manager, the chairman of the Board of Directors, a programme coordinator oncology, a manager from Smartup Innovation, an innovation manager from Information & Organization and the Chief Medical Information Officer. Each participant received a participant number to process the information gathered with the interviews and questionnaires anonymously.

Instruments and data collection

The questionnaire (Appendix 5) was developed to be able to assess the organizational and individual readiness. It was divided into three parts:

1. The first part included the profession of the participant was asked with an open question. The impact of this profession on the ZGT and BON was measured by a 5-point Likert scale, reaching from no impact (1) to much impact (5), to study the extent of influence each participant had in the ZGT and BON.
2. Secondly, the individual readiness was measured according to the TRI 2.0 statement list [51] to get insight in the preparedness of each OS regarding eHealth. This was done by scoring 16 statements on a 5-point Likert scale reaching from totally disagreeing (1) to totally agreeing (5).
3. In the last part, the organizational readiness was measured with support of fourteen statements of the NASSS framework [27] (domain 3, 4 and 5) to measure if the ZGT itself was prepared for implementation of eHealth. This was performed with multiple choice questions (yes/no/partially). After the organizational stakeholders answered the organization readiness questions, two experts, researchers at ZGT, ranked the fourteen statements independent from each other from most important to least important to structure the priority of the different statements.

Semi-structured interviews (Appendix 6) were held to understand the readiness that was addressed by the questionnaires, the rationale of the stakeholders and the preconditions for implementing eHealth. The interview scheme consisted of 15 topics that corresponded with constructs of the CFIR [38]. The total list of CFIR constructs and the corresponding questions were analysed and compared with the domains of the NASSS framework. A selection was made and verified with an expert, also a researcher from ZGT. The interviews were audio recorded and transcribed verbatim. The interviews were conducted face-to-face by the primary researcher. No more than seven participants were recruited since no new knowledge was being obtained. All seven participants also filled in the questionnaire.

Data analysis

The results of the data that was gathered with the questionnaires were analysed using Microsoft Excel 2010. The impact of the stakeholder on ZGT or the BON was counted per stakeholder. A score of 1 or 2 was perceived as ‘low impact’, a score of 3 as ‘average impact’ and a score of 4 or 5 as ‘much impact’. The individual readiness was calculated by drawing a mean per statement group (optimism, innovativeness, discomfort and insecurity). The overall TRI score was calculated with Formula 1. A score of 1 or 2 was perceived as ‘not ready’, a score of 3 as ‘neutral’ and a score of 4 or 5 as ‘ready’. The assessment of the organizational readiness was based on the sum of different answer options

(yes/no/partially) per statement of each OS. The totals per statement were converted with Formula 2. A score beneath -2 indicated a 'high urgency' , scores above 2 indicated a 'low urgency' and a score equal to or between -2 and 2 indicated a 'moderate urgency'. From the ranking of the two experts, a mean was drawn. The ranking scores and urgency scores were compared to address the statements that has to be dealt with first.

Formula 1: Calculating the TRI score [51]

$$TRI\ score = \frac{optimism + innovativeness + (6 - discomfort) + (6 - insecurity)}{4}$$

With optimism, innovativeness, discomfort and insecurity as the average scores from the four corresponding statements

Formula 2: Calculating the organizational readiness score

$$Organizational\ readiness\ score = \left(\left(\sum l\right) * 1\right) + \left(\left(\sum m\right) * -1\right) + \left(\left(\sum n\right) * 0\right)$$

With l = answer option 'yes', m = answer option 'no' and n = answer option 'partially'

The interviews were coded by the primary researcher with Atlas.ti. A codebook was designed prior to the data gathering with support of the CFIR [38]. While coding the first two interviews, additional codes were added to the codebook. Thereafter, no more codes had to be added to other interviews. After coding three interviews, the coding was validated by another researcher and an agreement percentage was calculated. The codebook and disparities in coding were discussed until consensus was reached. The final codebook consisted of six categories and 31 main codes (Appendix 7).

3.2 Healthcare professionals

The readiness of the HCP was investigated with the help *semi-structured interviews* (qualitative). These interviews were already conducted in the Pinktrainer feasibility study in February 2019 at ZGT Almelo or Hengelo by Kerklaan [23].

Participant selection

The selection of participants was based on a stakeholder identification [23]. The included HCPs worked at ZGT and were an HCP from one of the identified stakeholder groups, excluding the group of patients. The stakeholder groups were based on the care pathway phases. This inclusion was done selectively. HCPs from each stakeholder group were approached with an email until one participant per group was included. In total seven participants were included: a surgical oncologist, a mamma care nurse, a medical oncologist, a nurse specialist, an oncology nurse, a (oncological) physical therapist, and a patient

advocate. Further information on recruitment and inclusion can be read in the Pinktrainer feasibility study [23].

Instruments and data collection

The interviews that were conducted in the Pinktrainer feasibility study focused on the level of acceptance of HCPs towards Pinktrainer [23]. The interview scheme consisted of nine topics that were supported by the constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Effective Technology Use Model (ETUM) [52, 53]. It was tested during a test-interview with a nurse specialist and finalised afterwards. The interviews were conducted face-to-face by one researcher. The interviews were audio recorded and transcribed verbatim.

Data analysis

For this study, the interviews were reread and recoded by the primary researcher to study the individual readiness of the HCPs. The same method and codebook as with the OSs (Chapter 3.1) was used to evaluate the data.

3.3 Breast cancer patients

The readiness of the breast cancer patients was investigated with the help of questionnaires (quantitative). The questionnaires were administered in December 2019 in ZGT Hengelo.

Participant selection

The patients were approached during their regular outpatient visit at the BON (ZGT Hengelo). The HCPs asked the patients at the end of the consultation if they would like to participate in this study. Inclusion criteria were as follows: (1) participants were (former) breast cancer patients and (2) participants were competent in reading and writing Dutch. If patients agreed to take part in the study, they were referred to the researcher where they received an information letter (Appendix 8), informed consent, oral explanation and were allowed to ask questions. After providing informed consent, patients could fill in the questionnaire on paper or online. In total, 30 participants were included in the study. None of the participants dropped out during filling in the questionnaire. However, four patients refused to fill in the questionnaire; two due to time restrictions, one was not interested in participating and one was working for the same institution (University of Twente) as the one in whose name the research is conducted.

Instruments and data collection

The questionnaire (Appendix 9) aimed at receiving insight in the patients' needs, preferences, digital literacy and individual readiness and was composed of five separate parts:

1. To describe the participant group, sample characteristics of the patients (age, gender, phase in care pathway) were gathered by asking multiple choice questions.
2. Digital literacy was measured to study if the patients were competent in using eHealth. This was done by asking six multiple choice questions (yes/no/only with help) derived from the Digital Literacy scan from Pharos [54].
3. The individual readiness was measured according to the TRI 2.0 statement list [51] to get insight in the preparedness of the patients regarding eHealth. This was done by scoring 16 statements on a 5-point Likert scale.
4. The preferences of the patients regarding the type eHealth and its implementation were measured with multiple choice questions. A number of eHealth applications were presented to the patients: an application that provides information, for example about treatment, diagnosis and possible symptoms; an application that helps with fatigue; an application that reminds someone to take medication; an application that helps with mental health; an application that shows which (fitness) exercises can be done; an application that helps with making treatment-related choices in nutrition and keeping track of nutrition. The respondents could choose more than one option. The patients were also asked how often they wanted to see their HCP after implementing eHealth compared to the current frequency (the same amount of times/fewer times/I am willing to give up my face-to-face contact/I am also willing to see my HCP via a Skype-conversation/no preference).

Data analysis

The data that was gathered with the questionnaires was analysed using Microsoft Excel 2010. Sample characteristics were described using descriptive statistics. A digital literacy score was calculated per person by counting the times that one person answered 'yes' on the six items of the checklist. Scores where defined as follows: a score of 1-2 times 'yes' indicates low digital literacy, a score of 3-4 times 'yes' indicates moderate digital literacy and a score of 5-6 times 'yes' indicates high digital literacy. The times that a person answered 'only with help' where also counted, to give insight in the (in)dependency of the patients. The individual readiness was calculated by drawing a mean per statement group. With Formula 1 the overall TRI score was calculated. The preferences of the patients regarding the eHealth applications and way of implementing were analysed by counting the amount of times an answer option was ticked. Open questions were analysed and described. An overview of the methodology used in this study can be seen in Table 2.

Table 2: Overview methodology per stakeholdergroup

Stakeholder group	Sample	Method	Data retrieved	Theoretical support
Organizational stakeholders	Medical manager, business manager, board of directors, programme coordinator oncology, Smartup Innovation manager, innovation manager I&O, Chief Medical Information Officer	Interviews	Rationale of the stakeholders, preconditions for implementing eHealth, information NASSS domains	NASSS, CFIR
		Questionnaires	Stakeholder readiness, organizational readiness	TRI 2.0, NASSS
Healthcare professionals (data from Pinktrainer feasibility study)	Mamma care nurse, medical oncologist, nurse specialist, nurse oncology, (oncological) physical therapist, patient advocate*	Interviews	Stakeholder readiness, preconditions for implementing eHealth, information NASSS domains	ETUM, UTAUT
Breast cancer patients	(former) breast cancer patients competent in reading and writing Dutch	Questionnaires	Digital literacy, stakeholder readiness, preferences regarding eHealth applications and their implementation	Pharos Digital Literacy, TRI 2.0

** In the Pinktrainer feasibility study the patient advocate was seen as HCP*

4. Results

This chapter first addresses the stakeholder samples (Chapter 4.1). In Chapter 4.2, domain 3 of the NASSS framework describes the expected added value of eHealth and the cost. Chapter 4.3 (domain 4) includes the patient and HCP readiness, the type of eHealth that is most favourable to adopt, the way of implementing eHealth in the system (service configuration) and the adaptability. Chapter 4.4 (domain 5) focusses on the organizational readiness, OS readiness, ICT infrastructure, culture and implementation climate. Finally, Chapter 4.5 (domain 6) addresses the economic regulations.

4.1 Stakeholder samples

In total seven OSs, seven HCPs and 30 patients were included in this study. The OS participants consisted of two men and five women. Two OSs stated that they had average impact within ZGT. The five other OSs stated that they had much impact. Within BON, three OSs stated that they had average impact and four OSs stated that they had much impact. All HCPs were female with an average age of 46 years old. Most of the HCPs (6 out of 7) did have two or more moments with patient contact in a week. The other HCP did not have any contact with patients. All thirty patients were female. Most patients (37%) were 45 to 65 years old (Table 3). The majority of the respondents (73%) was in the aftercare phase of their care pathway. Most respondents had a high digital literacy (70%). Nine respondents (30%) stated that they need help with certain technology-focussed things. This help is mostly needed when downloading an application (60%).

Table 3: Characteristics of the patient respondents

Characteristics		Frequency (%)
Age (years)	< 25	0 (0%)
	25 to 45	4 (13%)
	45 to 65	14 (37%)
	65 to 75	10 (33%)
	> 75	2 (7%)
Phase of care pathway	Diagnostic	0 (0%)
	Treatment	22 (73%)
	Aftercare	8 (27%)
	Palliative	0 (0%)
Digital literacy	Low	1 (3%)
	Moderate	8 (27%)
	High	21 (70%)

4.2 NASSS Domain 3: Value Proposition

In this domain is studied whether supportive consumer eHealth is worthy to implement and for whom it creates value. First, the expected added value to the current healthcare processes is discussed. After that, the cost of implementing eHealth are examined.

Expected added value

All OSs and HCPs believed that eHealth will be a valuable addition to the current breast cancer care pathway. Various reasons were given for this:

- Optimizing information flow towards the patient
- Less second and third line care
- Reducing the number of hospital visits
- Reducing the number of telephone calls
- Stimulating the restriction of stronger healthcare growth
- More focus on people instead of on their treatment
- More quality of life
- More customized care
- More efficient time scheduling for the HCP
- Making healthcare accessible everywhere
- Contributing to the 'right care at the right place'-movement
- Empowering patients to be in control of their own care
- Help meeting the increasing demand for care
- Data management and research will help making more informed choices.

Cost

Most OSs (5 out of 7) stated that the cost of eHealth will be a barrier for implementing eHealth. Different cost items were addressed including one-off costs (e.g. purchase of the app), annual costs (e.g. subscription fee and integration costs of ICT) and costs related to the time of the HCPs (e.g. education and informing patients).

The ideas of the HCPs were more variable: two HCPs stated that they did not know anything about this topic, one HCP thought that the costs would not be a problem, two HCPs mentioned that the costs of the application could form the bottleneck for implementing eHealth and, finally, the last two HCPs mentioned that the costs might be a problem now, but eventually the implementation could possibly be cost saving. HCP 5 explained this as follows:

> "I think […] the less side effects patients experience, the less medication they need. And there are less visits to the hospital, less phone contact… So, the patient can go through a process more focused. The same applies to the follow-up [..], the quicker a patient recovers, the less hospital visitations […] and people can return earlier in their work process." (HCP 5)

4.3 NASSS Domain 4: Adopter System

Domain 4 is about the adopters of eHealth and the adopter system itself. First, the readiness of the adopters of eHealth, the HCPs and patients, is studied. Thereafter, the type of eHealth that is most favourable to adopt is discussed. Finally, the way of implementing eHealth in the system (service configuration) and the adaptability of the applications are examined.

Readiness breast cancer patients

In Table 4, the readiness scores of the patients and the OSs can be seen. The scores of the OSs will be addressed at domain 5. The overall readiness score of the patients was perceived as neutral (3 out of 5). On the four dimensions, optimism had the highest score and innovativeness the lowest. In addition, for the dimension of innovativeness, the values differ from 1.9 to 2.9, which indicates that the opinions of the respondents are more variable than in the other domains.

Table 4: Average OS and patient readiness score per statement of TRI 2.0 [51]

Dimension	Average scores		Dimension	Average scores	
	OSs	Patients		OSs	Patients
Optimism	**4.1**	**4.0**	**Innovativeness**	**3.8**	**2.5**
OPT1*	4.1	4.3	INN1	3.9	2.5
OPT2	4.4	4.1	INN2	3.1	1.9
OPT3	3.9	4.0	INN3	3.7	2.8
OPT4	4.1	3.6	INN4	4.3	2.9
Discomfort	**2.4**	**2.8**	**Insecurity**	**2.0**	**3.2**
DIS1	2.4	2.4	INS1	2.4	3.0
DIS2	2.3	2.8	INS2	1.9	3.3
DIS3	2.4	2.9	INS3	1.9	3.4
DIS4	2.6	3.0	INS4	1.9	3.0

** The numbers indicate which statement is applicable, e.g. OPT1 is statement 1 from the optimism statements*

At the moment, 13 patients (43%) are already using some sort of eHealth, for example a pedometer, vitality app, mindfulness app or food tracker (Table 5).

Table 5: Distribution of eHealth usage and age of the patients

Age (years)	Yes, I already use eHealth	No, and I am not interested	No, but I would like to use it	I do not know	Total
25-45	2 (50%)	-	2 (50%)	-	4
45-65	6 (43%)	2 (14%)	3 (21%)	3 (21%)	14
65-75	4 (40%)	3 (30%)	2 (20%)	1 (10%)	10
>75	1 (50%)	-	1 (50%)	-	2
Total	13	5	8	3	30 (100%)

Readiness healthcare professionals

The opinions on the readiness of the HCPs were very diffuse. Four HCPs saw the mamma care team as a positive team that is motivated and willing to be the driving force. In addition, one HCP stated that everyone is moving in the same direction. However, another HCP said that some HCPs withdraw if extra work needs to be done. Finally, one HCP mentioned that, since the patients see the nurses the most often, the focus should be on convincing them of the added value of eHealth.

Three of the HCPs indicate that they first need an explanation about the eHealth possibilities themselves, before they can explain it to the patients and answer the patient's questions. Questions remaining among the HCPs were "How much information should we give? What is manageable for the patient and when? How much time will this take?". Three HCPs saw the commitment of the patients as a barrier for implementing eHealth:

> "I think motivating the patient might be the biggest challenge […] You know, when you have an appointment with someone, physically… you know: 'I have to go there: shoes on, clothes on and I go'. But, uh, when an application rings and you think: "Pff, I do not feel like it", well, how strong are you?" (HCP 3)

Four OSs emphasized that a training for HCPs will be necessary to increase knowledge about the eHealth possibilities. Besides, the time of the HCPs was mentioned as a barrier by 5 OSs:

> "People think that eHealth should be supportive. So, you should not have to invest time, but it should save you time. A pitfall will be that people will feel that they have to do 'another extra thing'. And then, uh, you are immediately in a resistance mode. I hope that people will get the feeling… will see that it will be supportive, but that takes some time." (OS 3)

The HCPs were also asked about the urgency of implementing eHealth. None of them perceived a high tension for change. One HCP mentioned that, since eHealth is becoming more popular, she noticed that the hospital is willing to make changes in the care processes. Another HCP declared that the supportive base will increase when more research is done regarding the effects of eHealth:

> "I think the supportive base is already there, but when, later on, it turns out in a study that, uh, eHealth gives positive results, that support will only increase" (HCP 5).

Type of eHealth

The OSs had ideas about the different kinds of eHealth that should be implemented. They mentioned an app that hands out information and guides the patient through the care pathway (3/7), a chatbot

that can answer basic questions (1/7) and an app that gives attention to the '12 habitats-care platform (a platform that supports patients with more aspects than just their illness, e.g. emotions, work and sport) (2/7).

Five patients stated that they were not interested in using eHealth. Of the other patients, more than half (53%) were interested in an application that gives them information (Figure 3). One respondent supplemented that she would like to have an application in which she could post questions or chat with a mamma care nurse or a doctor. A medication application was least popular among the respondents (14%).

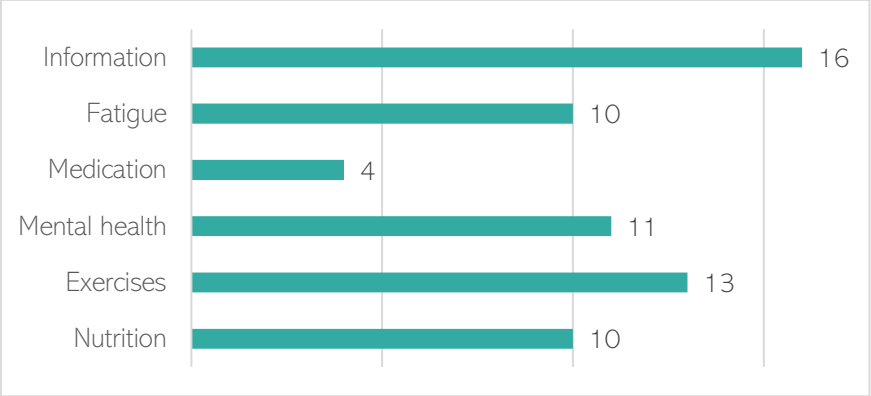

Figure 3: Preferences of patients on type of eHealth application

Service configuration

Two of the OSs stated that eHealth should be seen as a supplement to the current care, since the conversation with the HCP still is important. The other OSs all thought that it is a combination between a supplement and a replacement, with a focus on supplementing the current care. On the contrary, all HCPs think that eHealth should only supplement the current care process. They mentioned several reasons: there will be a group of patients that need personal contact, it is not patient-friendly to have psychosocial conversations and result conversations through an application and, finally, you cannot see how a patient is really doing via an application.

Most of the patients (n=11) see eHealth as a supplementation to their current care pathway and would like to see their HCP[2] as often as they did or currently do (Figure 4). This was quickly followed by eight patients who still want to see their HCP, but at fewer moments than before. Giving up the face-to-face contact with the HCP was least favourable with only two respondents.

[2] No difference was made between the kind of HCP that the patient would have a consultation with

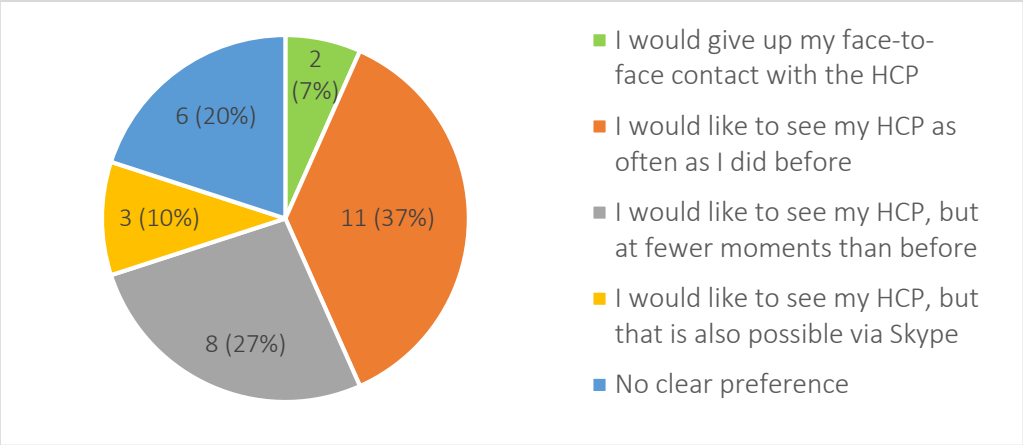

Figure 4: Preferences of patients on implementation of eHealth in the current care pathway

Adaptability

From the interviews it became clear that most HCPs think that eHealth has to be tailored for the specific patient using it. Three HCPs mentioned age as an important factor to which the app should be tailored. One HCP mentioned that the implementation of eHealth among older people might be difficult. Another HCP thinks that the group from 55 till 60 years will make most use of eHealth:

> "Yes, I think that the group of patients that will make the most use of it and also benefits from it, that is the group that, uhm, from 55 till 60 years, that are active themselves." (HCP 7)

The age difficulty mentioned by the HCPs was also mentioned by one of the Oss. Only she stated that we this group of patients might be underestimated:

> "Vulnerable elderly, another big group […] people who are not familiar with that technology, so they cannot handle it at all. However, we sometimes underestimate this category in what they really can and want and what is possible." (OS 7)

4.4 NASSS Domain 5: Healthcare Organization

This domain discusses the readiness of the organizational stakeholders and the ZGT itself. Besides, the ICT infrastructure in relation to embedding the eHealth applications is discussed. Finally, domain 5 concerns the culture and implementation climate in ZGT.

Readiness organizational stakeholders

The overall readiness score of the OSs indicated a high readiness for implementing eHealth (four out of five – Table 4). On the four dimensions, optimism had the highest score and discomfort and insecurity had the lowest. Among the innovativeness statements, statement 2 (INN2) showed a difference of

almost one point in comparison with the other innovativeness statements, which indicates that OSs are familiar with technological products and developments, but are not the first one to acquire them. These kind of differences were not visible in the other dimensions. In contrast to the patients, OSs see themselves more as technology pioneers, with an innovativeness score of 3.8 in comparison with a score of 2.5 of the patients.

In the interviews, all stakeholders indicated to feel an urgency to implement eHealth, which shows that a 'tension for change' is certainly felt. Reasons mentioned for this reported tension for change were that there is an increasing demand for care, that the quality of care should be increased and that it is a modern way of communicating. The OSs were also asked if they thought the HCPs felt a tension for change. Only one OS stated that the doctors felt a certain urgency, but she was not sure about the nurses. All other OSs mentioned that the tension for change is much lower among the HCPs.

Organizational readiness according to the NASSS framework

The fourteen NASSS statements were scored quite variable (Appendix 10). Combining the organizational readiness scores with their priority clarified that the ZGT is not yet completely ready for the implementation of eHealth (Table 5). Only four of the fourteen statements were perceived as (almost) ready, the others still need attention. The highest urgency lays with the construction of a business case which can support the technology. Besides that, the skills from the HCPs and patients regarding eHealth are also not unimportant to focus on. According to the experts, the availability of resources and the acceptability regarding technology according to patients also have a high priority, but the OSs stated that this requirements are already (mostly) satisfied.

Table 6: NASSS priority statements with their organizational readiness score

NASSS statement	Organizational readiness score	Priority ranking
The technology rests on a plausible business case including up-front investment, a well-defined customer base and market drivers, consideration of competing products and realistic assessment of the challenges of implementing at scale in a public-sector health or care environment.	High urgency (-3)	1
Patients will find the technology acceptable (e.g. appropriate for them, non-stigmatising).	Low urgency (3)	2
Resources (people, funding) are available to channel into new projects and products.	Low urgency (4)	3
Staff could learn to use the technology easily and require minimal support.	Moderate urgency (2)	4 or 5
Most patients could learn to use the technology easily and require minimal support.	Moderate urgency (1)	4 or 5

ICT infrastructure

When looking at the ICT infrastructure, several things are already in order, e.g. a research domain is created to conduct targeted evaluations of eHealth. However, barriers regarding the ICT infrastructure were also addressed by the OSs. The transition to another electronic patient file (from the customized content HiX to the standard content HiX) means that there will be a two-year freeze of HiX. In this period applications can no longer be linked to HiX. Two respondents see this as a barrier and think this will take a lot of time and money, but OS 6 stated the following:

> "[…] I do not see that as a barrier, but rather as an opportunity. Because there… there are so many people who say: "It must really be linked to HiX!". So, in the period that nothing can be linked in HiX, we can look at, well, yes, if we do not do that now [link apps to HiX, red.], can we also achieve things? So should we indeed link everything to HiX?" (OS 6)

Besides, two respondents stated that ZGT is very dependent on the ICT infrastructure. When a problem occurs, consequences are big. The respondents state that eHealth results in an extra technical management burden:

> "The impact on the ICT infrastructure is enormous. So, when we want to link fancy apps that do not meet our standards, we have to compartmentalize and isolate them, which creates an extra technical management burden". (OS 1)

Culture

All OSs were asked on their opinion on the current culture of ZGT and the mamma-team (Table 7). The explanation per culture type can be found in Appendix 6, Figure A2. As can be seen in the table most respondents mentioned more than one culture type. For ZGT, the hierarchic culture was chosen most among the OSs, quickly followed by team culture and dynamic culture. On the contrary, most of the respondents stated that in the mamma-team a dynamic culture is clearly visible.

Table 7: Number of times a culture type was chosen for ZGT and the mamma-team

Culture type	ZGT	Mamma-team
Team	4	2
Dynamic	4	5
Hierarchic	5	-
Rational	2	-

Two OSs mentioned that a culture change remains to be made over the hospital, but emphasized that hospitals are inert structures where implementing changes occur slowly. This is related to the restricted

time that different stakeholders (project leaders, initiators, et cetera) have, but also to the available budgets and the implementation readiness that prevails in an organization. One respondent stated that ownership is an important aspect, related to the culture, or changing the culture, in the organization:

> "People look and think from their own, uh, gaze. Everyone is busy. This kind of thing is nobody… for nobody this is the main task. You need people, driven people, who hold the energy and can, therefore, make progress. So, you need an owner… Who does this belong to now? Who owns this problem? […] And that currently is one person, and she is really good for this project, but a little more support in that […], that could be handy. It cannot depend on three people. I think that is still a, uh, piece, uh, of awareness in the workplace." (OS 6)

Implementation climate

The OSs experienced diversity within implementation climates in the different departments of ZGT and within the departments (sub-departments). They stated that they receive many ideas and that those ideas are embraced. However, within other (sub-)departments of ZGT this implementation climate does not prevail or is dependent on some enthusiastic individuals. One OS mentioned that eHealth is not a ZGT-wide idea and that some people do not understand why ZGT is working on innovation:

> "I believe that in every team there are one or two people who are 'changers'. But we still get to hear: 'Do you have to work on innovation one day each week? What a shame!'." (OS 6)

These 'changers', also called 'champions[3]' [55], were mentioned as very important by five OSs. Four of the OSs believed that this should be an enthusiastic doctor. Two respondents mentioned the Smartup Innovation team as champion.

> "When I start a project, I prefer to have a doctor next to me who can, uh, inspire others and, especially, can include the other doctors. I cannot do that as well as they can, uh, doctors are speaking each other's language more." (OS 5)

Two stakeholders mentioned that it is difficult to deal with all those ideas unambiguously since there are limited resources. They said that too many projects linked to eHealth are done concurrently, causing difficulties in time management.

> "All these kinds of projects have started, but you can notice: it is a lot. The challenge is to lead this in the right direction and not start new projects right away. Uh, we cannot invest unlimited. It is a challenge to make the right choices and decide, uh, what to do first and what to do last." (OS 5)

[3] Champions can be defined as "Individuals who dedicate themselves to supporting, marketing and 'driving through' an implementation, overcoming indifference or resistance that the intervention may provoke in an organization" [55]

4.5 NASSS Domain 6: Wider system

Domain 6 relates to the wider institutional context. This includes the economic regulations regarding eHealth.

Economic regulations

Based on the interviews, it is unclear who will pay the costs that will be made when implementing eHealth. Different ideas exist among the OSs, dependent of who benefits from the eHealth application: ZGT in combination with health insurance companies (5/7), the patients themselves (2/7) and an employers' association (1/7)[4]. Two OSs proposed to map the social impact of eHealth to make sure that the outcomes of eHealth are quantitatively measured:

> "The difficulty is that we know that it will yield a lot afterwards, but we will not see that back, directly, in the wallet of the health insurer or hospital". (OS 3)

The information on the four domains of the NASSS framework outlines the preconditions for the use and implementation of supportive consumer eHealth in the breast cancer care pathway. The following chapter elaborates on how these preconditions can be shaped into steps to guarantee a successful implementation of eHealth.

[4] One OS mentioned two parties that benefit from eHealth

5. Conclusion and discussion

In this chapter, the most important results of this study are discussed. In Chapter 5.1, the main conclusion of this study is given. Furthermore, the results are discussed and interpreted (Chapter 5.2). The strengths and limitations of this study will also be addressed (Chapter 5.3). Finally, in Chapter 5.4, the results of this study are compared to the implementation model of Wensing and Grol. Additionally, the steps derived from the results are prioritized and recommendations for practice and future research are done.

5.1 Conclusion

The aim of this study was to investigate the steps that need to be taken to guarantee a successful implementation of supportive consumer eHealth and to measure the implementation readiness of healthcare professionals, breast cancer patients, organizational stakeholders and ZGT.

The results of this study show that the OS readiness can be perceived as ready, the patient readiness as neutral and the HCP- and ZGT readiness as not ready. Steps recommended to ZGT to increase the chance of a successful implementation are (1) prioritizing the different eHealth applications, (2) inform patients and HCPs about eHealth possibilities, (3) identify champions and sceptics, (4) design educational materials, (5) construct a business case, (6) investigate a suitable way of financing and (7) adjust existing breast cancer care pathway according to the new processes. An overview of these steps per domain can be seen in Figure 5. The steps will be further explained in Chapter 5.2.

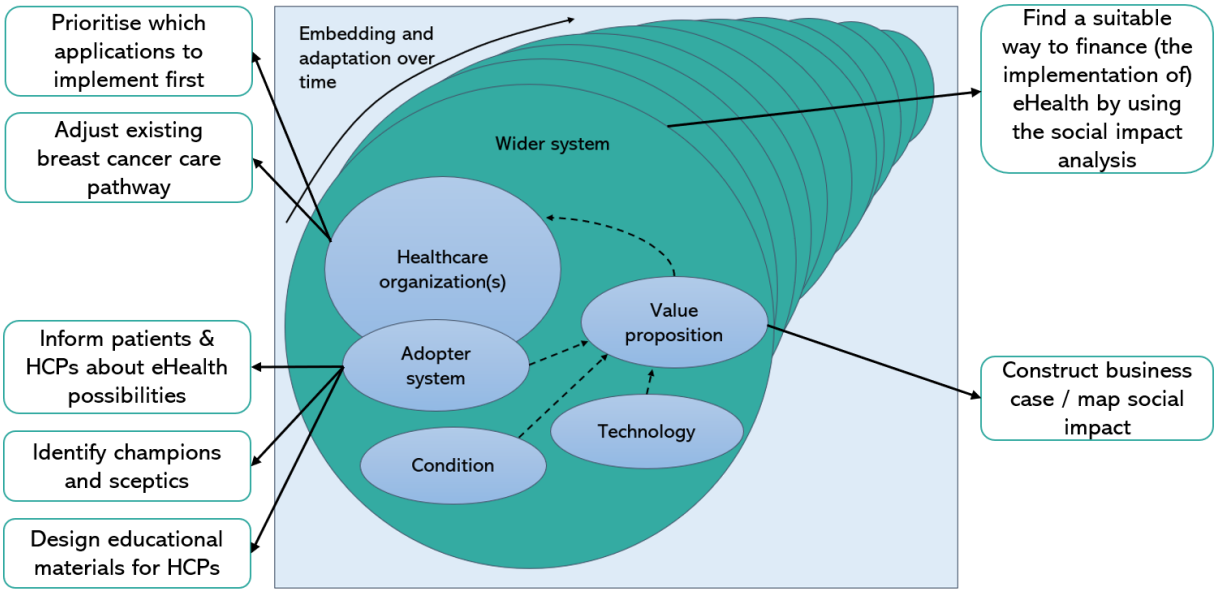

Figure 5: Steps recommended to increase the chance of a successful implementation of eHealth

5.2 Discussion

Implementation readiness

The breast cancer patients have a neutral implementation readiness score. They are optimistic about the freedom that technology can create and believe that technology also contributes to better quality of life, but they are not the first to acquire new technologies, can mostly not figure new high-tech services out without help from others and cannot keep up with new technological developments. This was implied from the high optimism scores, but low innovativeness scores. The low innovativeness scores can be explained by the fact that most patients who filled in the questionnaire had an age above 45 years old, and age is found to have a moderating effect on attitude towards technology [56, 57]. However, the innovativeness aspect is important, since it has a positive relationship with the perceived ease of use and the perceived usefulness of an innovation [49, 58]. This results in the fact that ZGT has to pay attention to patient readiness within the implementation process. The focus should be on the user-friendliness of applications to mitigate as much as possible of the barrier of low innovativeness, for example by designing step-by-step plans to help them using the application.

Additionally, it was interesting to experience that almost all patients that completed the questionnaire stated on forehand that they did not know what eHealth was. After an explanation about (the types of) eHealth and its possibilities, some found out that they were already using it and some became enthusiastic. This indicates that there is a lot of ignorance among patients regarding eHealth possibilities. If patients already knew what eHealth contained or when they had experience with eHealth, the results may have become significantly higher, since literature found that former users of eHealth were more positive about the use of it [59]. Since patients should know that eHealth exists and should be getting interested in eHealth in order to improve their own care, an informing implementation strategy in combination with a motivating strategy is appropriate to use [60]. These strategies aim to inform patients about (the existence of) eHealth and interest patients e.g. by handing out flyers and telling patients about the features and benefits of eHealth [39].

The implementation readiness of the OSs was above average and is thus classified as ready. The OSs had a sufficient score on all statements, which means that they are optimistic about and can keep up with new technologies, trust technologies and have the feeling that they can control new technologies as well. Thus, no implementation strategies are necessary for this stakeholder group.

On the contrary, the HCPs cannot be perceived as ready. Even though the implementation readiness of the HCPs was not quantitatively measured, the interviews indicated that the readiness was conflicting within the stakeholder group. The HCPs are able to identify the added value of eHealth, but they do not see the urgency of implementing it directly in the care pathway. According to the HCPs, the nurses should have to transfer the knowledge to the patients and encourage them to use eHealth, most of the times. Therefore, it is of great importance that they are well educated and motivated. Moreover,

a lot of uncertainty prevails among the HCPs. It appeared that they do not know what the possibilities of eHealth are, so they do not know how to explain it to patients. A combination of motivational and educational implementation strategies might increase the readiness of the HCPs [60]. By organizing internal trainings or workshops where HCPs could see and test the eHealth applications, a supportive base might be created and new skills might be learned so that the HCPs could use the new knowledge in practice and educate the patients. It is stated that the effects of most types of education are small, but valuable in clinical practice [39]. The effectiveness of education increases when a needs assessment was done on forehand, when there is a possibility of active participation and when opinion leaders are deployed [39].

Finally, the organizational readiness was rather variable, but also not perceived as ready. The results from the questionnaire and ranking of the fourteen statements show that emphasis here, lays on (1) constructing a plausible business case, (2) increasing the skills of the HCPs regarding eHealth and (3) increasing the skills of the patients. The last two points, increasing the skills of the HCPs and patients, are in line with earlier stated results and thus do not require a different strategy than the ones already named. The construction of a business case does require a different implementation strategy, namely an organizational strategy, for example by monitoring results and performing a Social Return On Investment analysis [61]. This is aimed at streamlining processes and solving barriers in order to successfully implementing eHealth.

NASSS Domain 3: Value proposition

Mapping the long term benefits of eHealth by studying the social impact will give more insight in which stakeholders benefit from eHealth. The OSs and HCPs recognized the added value of eHealth. However, this added value is not yet visible in the form of costs. The OSs stated that since it is unclear what eHealth yields and for who, it is still unclear who is going to pay for eHealth. From literature can be derived that eHealth delivers benefits on multiple areas: patient (e.g. changing quality-adjusted life years, shorter travel distance), provider (e.g. avoided inpatient visits, reduced length of stay), other (e.g. avoided missed employment time) [62]. When mapping the social impact of the implementation of eHealth, the long term benefits will become transparent. Therefore, further research should focus on performing a Social Return On Investment analysis and constructing a business case as corresponds with the results from the organizational readiness assessment [61, 63].

NASSS Domain 4: Adopter system

When implementing eHealth, the focus should be on patient-centredness and tailored information as confirmed by the implementation readiness described before. Besides, it is important to concentrate on informing patients and HCPs on eHealth possibilities and to identify champions and sceptics in the mamma care team.

Most patients (53%) were interested in an application that provides them with information about e.g. their treatment. In a survey from 2018 about provision of information by the hospital among 488 (former) breast cancer patients was stated that almost 70% of respondents would like to receive a personalized information folder tailored to their situation [64]. Additionally, 60% of the respondents was interested in having access to a personalized online patient file. This indicates that when providing an information-application, tailoring is an important aspect. In the same study, it became clear that most patients (97%) still prefer a conversation with the HCP as a way of providing information. This supports the opinion of the HCPs, who stated that patients will need personal interaction. Based on this information can be concluded that an informational eHealth application is only suitable as an addition to personal contact between the patient and HCP.

Since there was a lot of uncertainty on what eHealth entails, it is important to continuously inform patients and HCPs on the possibilities, as was confirmed in the implementation readiness section. For future research it is recommended to focus more on instructing the HCPs about the possibilities of eHealth, the eHealth applications that ZGT can offer to the patient and the added value of eHealth. Educational programmes and materials can be designed to instruct them in a way that is suitable for the knowledge they already have.

Furthermore, the champions and sceptics from the mamma care team should be identified [28, 55]. As OS 6 already stated: *"In a team there are often a few enthusiasts, a number of people who will follow, a larger number of people who first look in which way the wind blows and a number of people with resistance. The pioneers should take the followers with them and let the 'see where the wind blows'-people hitch on"*. When identified, the champions should be instructed on how to motivate the other people. The sceptics should also be identified, since sceptics require another implementation strategy than champions [39]. Where champions have an intrinsic motivation to change and require information and reliable sources, sceptics need an extrinsic motivation and require rules, rewards and clear leadership [39]. Further steps consist of gradually exposing the HCPs to eHealth, while keeping an eye on their wishes and adapting eHealth according to these. In literature was recommended to accommodate a transition period in which the primary adopters can become well-known with and learn how to use the new eHealth applications [65, 66].

NASSS Domain 5: Healthcare organization

The breast cancer pathway should be adjusted in such a way that eHealth gets embedded. Processes should be streamlined in such a way that it is clear for all relevant stakeholders (1) who instructs the patients about their eHealth possibilities, (2) who facilitates the patients in their needs for an effective use of eHealth, (3) who answers questions that patients can have when using the applications and (4) who monitors the data that is gathered from the applications.

In the interviews with the OSs it became clear that, at the moment, there are a lot of eHealth projects running concurrently. This results in a lack of focus due to time constraints. By prioritizing the eHealth projects, related budgets and their deadlines, a proper eHealth innovation plan will be generated which mitigates uncertainties for many stakeholders. The preferences of the stakeholder groups can be of guidance in the prioritizing process. Most patients and OSs were interested in an eHealth application that could provide (tailored) information on, for example, their treatment. Yet, from literature can be derived that the highest need for eHealth was reported regarding physical care (66%) [67]. The Pinktrainer, which facilitates this need, has already started in a pilot version at ZGT. Thus, further evaluation and development should be executed regarding the Pinktrainer application and, additionally, an information application that guides the patients through their own, personal care pathway should be developed. Besides, the two-year freeze of HiX addressed in the results might be captured by linking the eHealth applications to a personal health environment.

By any means, when choosing eHealth applications, it is important to know if the application has the required quality for medical usage. A list of preconditions should be set up, to quickly scan if an eHealth application is suitable for the breast cancer care pathway. In the Netherlands, this was already done with an AppStore in which customers could choose from multiple eHealth applications focussed on positive health selected by 25 municipal health services (GGDs) [68] and with an overview of online support by *Borstkankervereniging Nederland* for the different phases of the care pathway [69]. Further research should focus on creating a (comparable) accessible overview of all eHealth applications that are effective and reliable or using and presenting the overviews that were already set up like the ones named before. It might be more efficient to organize this on a national scale instead of the organizational level of ZGT.

NASSS Domain 6: Wider system

Different ideas about the economic regulations were mentioned in Chapter 4. Besides, the cost aspect of eHealth was mostly mentioned by the OSs and HCPs as a barrier for implementation. The cost aspect was also reported as an important barrier by the majority of eHealth implementation literature. Some studies described cost-related aspects as the central barrier for implementation [70, 71]. On the other hand, a more recent study from ZonMw on implementing predictive tests [72] stated that barriers related to funding play a very limited role in the extent of a successful implementation. They state that hybrid financing is required: a combination of care and research money. Further research should investigate which way of financing eHealth in the breast cancer care pathway is most suitable to mitigate the existing barrier. This can be related to the social impact analysis that was mentioned in the value proposition domain.

5.3 Strengths and limitations

The design used for this study was a mixed method. Combining the results from the questionnaires and interviews, to assess the readiness of the OSs, has led to an increase in the internal validity. Due to time restrictions, this combination of methods was not performed for the other stakeholder groups: the patients and the HCPs. However, the results from the interviews with the HCPs, the questionnaires from the patients and the interviews and questionnaires from the OSs were combined which resulted in an overlap, but also provided insight in contradicting views. The high agreement percentages (92% and 93%) indicated a consistency in the coding of the interviews.

This study focussed on supportive consumer eHealth in general. Therefore, the results of this study can also be generalized in further research on implementing applications in the breast cancer care pathway. However, when implementing a specific eHealth application, it should be taken into account that not all results are applicable for all applications. For example, the extra technical management burden of implementing the application into the electronic patient file was addressed as a barrier for implementing eHealth, but not all applications do have to be linked to this. For example, an application that only provides the patient with information can stand on its own. Thus, each implementation trajectory should be adjusted to the specific eHealth application in context of the domains of the NASSS framework [27].

Due to the fact that one of the OSs also fulfils a role as HCP in the ZGT, a bias of the results may have occurred for one of the respondents. On the other hand, the dual position of this OS has led to a broader view on the situation, by combining two perspectives. In this study, the dual position was not perceived as a limitation, since the OS knew about both the HCP- and OS-situation and therefore had valuable knowledge and experience in both fields.

Additionally, the interviews with HCPs were already conducted in the Pinktrainer feasibility study, which led to some irrelevant information, whilst information that would have been relevant was not mentioned. Besides, the interviews that were held with the HCPs were focussed on the Pinktrainer, whilst this study focusses on eHealth in general. The Pinktrainer application mainly impacts the care pathway of the physiotherapist. When focussing on eHealth in general, different opinions and requirements might have been stated by the HCPs (e.g. the nurses), because it would have had more impact on their own daily activities.

Finally, the questionnaires were mostly completed by patients that were in the aftercare phase of their care pathway. A limitation of this study is that only a few respondents were in the treatment phase and none were in in the diagnostic or palliative phase. Therefore, the patient sample is not representative for the Dutch population. Literature describes that the positive attitude towards eHealth is associated with the type of treatment a patient has [67]. However, because the number of respondents were limited, the positive attitude could not be addressed these patients. For the diagnosis

phase eHealth does probably not add much value, since the diagnosis phase of breast cancer passes fairly quickly. However, for the palliative phase it is expected that patients have a positive view regarding eHealth, since patients prefer to be at home for as long as they possibly can [73] and eHealth can facilitate this for them. Nonetheless, more research is needed regarding the evidence-based practice of palliative eHealth [74, 75].

5.4 Implications for practice and future research

As described in Chapter 2, the first step of the implementation model of Wensing and Grol [39] was already completed. The results in Chapter 4 and the discussion in Chapter 5.2 show that step 3 and 4, the problem analysis of the target group and the selection of strategies to change practice, were fulfilled in this study.

Step 5 is the next step of the implementation model: the development, testing and execution of an implementation plan. In this study, several strategies and steps towards a successful implementation are described. It is important that an implementation plan will be designed to structure all steps that need to be taken, the time that this will take and the stakeholders that will be involved.

In addition to that, an evaluation plan should be written, because it is important that the implementation of eHealth is an iterative process, in which progress and outcomes are evaluated continuously and the implementation plan is adapted if necessary [27, 28]. This corresponds with step 7 of the implementation model. Formulating goals and indicators to measure the success of the implementation is an important part of the implementation trajectory and the evaluation plan [39]. Further research should therefore focus on defining and validating measurable indicators.

However, in order to evaluate the impact of eHealth on the breast cancer care pathway, it is necessary to analyse the current performance of care as well. Wensing and Grol state this in step 2 of the implementation model, but this kind of analysis was not yet performed by ZGT. Thus, further research should also focus on an analysis of the current performance of the mamma care team. It is recommended to first construct the evaluation plan, so that it is clear which indicators are going to be measured after implementing eHealth.

The steps retrieved from the results of this study (Figure 5) and the steps that correspond with the implementation model of Wensing and Grol cannot be executed concurrently. Therefore, the steps were arranged in order of execution based on the implementation model of Wensing and Grol (Figure 6). It is recommended to expand these steps into an implementation plan. By following all steps recommended, supportive consumer eHealth will be implemented successfully in the breast cancer care pathway which will lead to a decrease of healthcare costs, an increase of the quality and accessibility of healthcare and, in addition, the growing demand for care will be met.

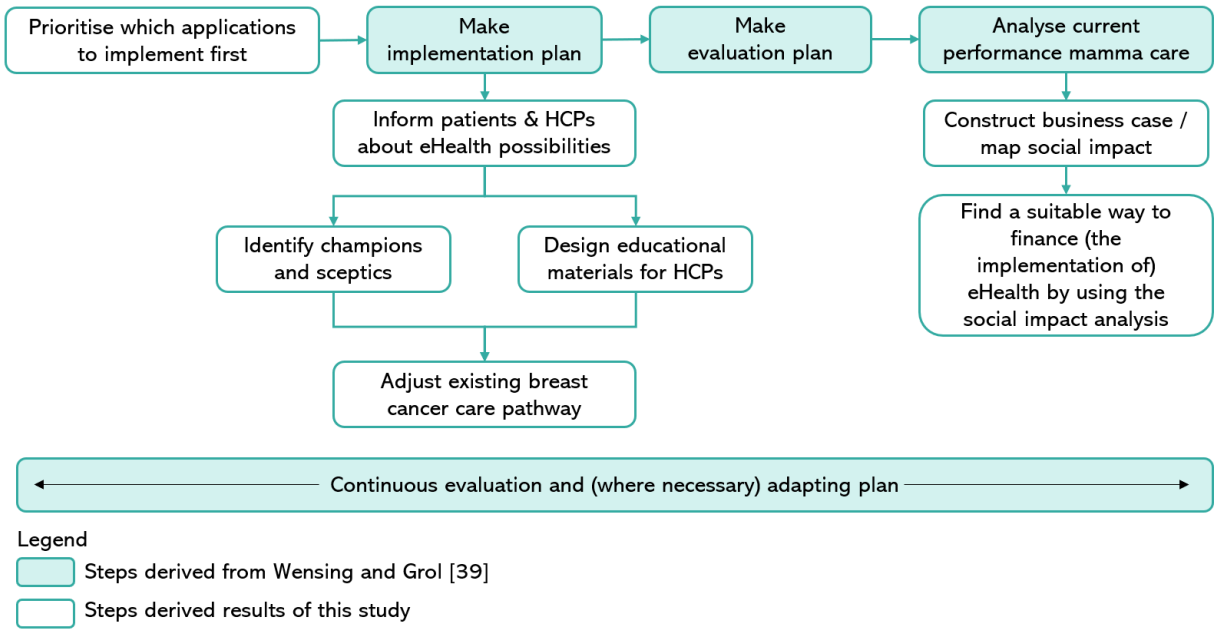

Figure 6: Prioritization of the steps recommended to increase the chance of a successful implementation of eHealth

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Appendices: Table of Contents

Appendix 1: Breast cancer care pathway [31]

Phase	Step	Stakeholder	Note
Referral	Anamnesis Physical examination	General practitioner (GP)	Referral: within 5 working days*
Diagnostics	Anamnesis Physical examination	Mamma care nurse Surgeon	
	Mammography Possibly: ultrasound and/or biopsy	Laboratory technician Radiotherapist Possibly: pathologist	Biopsy: result within 5 working days
	Possibly: MRI and/or stereotactic biopsy	Radiotherapist, pathologist	MRI: planned within 10 working days*
	Multidisciplinary consultation	Surgeon, radiotherapist, oncologist, pathologist, mamma care nurse, secretary, physician assistant, plastic surgeon	GP receives update within 2 days
	Result conversation** Guidance conversation**	Surgeon, mamma care nurse	
Treatment (combination of treatments is possible)	Surgery (within 5 weeks*)	Surgeon, mamma care nurse, pathologist Pre-operative and post-operative: physiotherapist, possibly dietitian	Pre-operative screening: risks for malnutrition → dietitian
	Radiotherapy	Radiotherapist, Physician Assistant (surgeon stays head practitioner)	
	Systemic treatment: chemotherapy or hormonal therapy (can be combined with immunotherapy)	Oncologist, oncology nurse	Neo-adjuvant chemotherapy starts within 5 weeks after diagnosis
	Possible patient-focussed treatment options	Dietitian (referral by mamma care nurse (when SNAQ-score >3) or by oncologist)	
		Physiotherapist (post-operative exercises)	
		Social worker (referral by mamma care nurse (based on 'Lastmeter')	Possibly referral to psychologist, psychiatrist, mental caregiver
		Revalidation doctor (referral by oncologist (based on 'VRA Lastmeter')	Referral to: 'terug naar evenwicht'-programme, psycho-social care, oncologic revalidation or first line care
	Multidisciplinary consultation	Surgeon, radiotherapist, oncologist, pathologist, mamma care nurse, secretary, physician assistant, plastic surgeon	

	Result conversation**	Head practitioner (surgeon or oncologist)	GP receives update
Aftercare	Aftercare**	Head practitioner, general practitioner, mamma care nurse, physiotherapist, revalidation doctor, dietitian	GP receives update
Palliative care	Multidisciplinary consultation palliative care	Surgeon, radiotherapist, oncologist, pathologist, mamma care nurse, secretary, physician assistant	80% of the cases has to start within one week with palliative care
	Result conversation**	Head practitioner Mamma care nurse	Policy dependent on residence patient
	Disease focussed treatment	Head practitioner, general practitioner, mamma care nurse, social worker, mental caretaker, psychologist, physiotherapist, occupational therapist, dietitian, specialist geriatric medicine, pain doctor, palliative care consultant, volunteer / caregiver	Dependent on status patient
	Symptom focussed treatment	Same stakeholders as disease focussed treatment	Management lays by general practitioner
	Dying phase	Head practitioner, general practitioner, mamma care nurse	
* In 90% of the cases ** The head practitioner can refer the patient to eHealth possibilities			

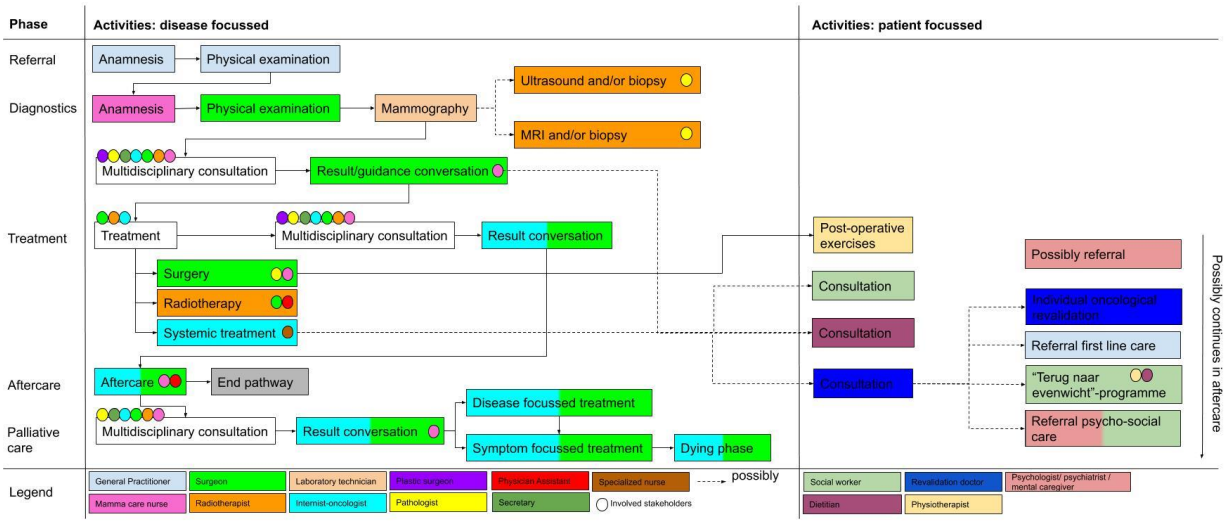


Figure A1: Breast cancer care pathway ZGT

Appendix 2: List of CFIR constructs [38]

Domain	Construct	Sub-construct
Innovation characteristics	Intervention source	
	Evidence strength and quality	
	Relative advantage	
	Adaptability	
	Trialability	
	Complexity	
	Design quality and packaging	
	Cost	
Outer setting	Patient needs and resources	
	Cosmopolitanism	
	Peer pressure	
	External policy and incentives	
Inner setting	Structural characteristics	
	Networks and communications	
	Culture	
	Implementation climate	Tension for change
		Compatibility
		Relative priority
		Organizational incentives and rewards
		Goals and feedback
		Learning climate
	Readiness for implementation	Leadership engagement
		Available resources
		Access to knowledge and information
Characteristics of individuals	Knowledge and beliefs about the intervention	
	Self-efficacy	
	Individual stage of change	
	Individual identification with organization	
	Other personal attributes	
Process	Planning	
	Engaging	Opinion leaders
		Formally appointed internal implementation leaders
		Champions
		External change agents
		Key stakeholders
		Innovation participants
	Executing	
	Reflecting and evaluating	

Appendix 3: NASSS framework [27]

Domain	Explanation	Questions
1: Condition	Research should be done on the predictability and risks of the illness. Besides, the sociocultural factors and comorbidities of patients should be investigated: What is, for example, their cognitive ability, mental health status, IT literacy and health literacy? And are they likely to affect the care significantly?	1A: What is the nature of the condition or illness? 1B: What are the relevant sociocultural factors and comorbidities?
2: Technology	The key features of the eHealth applications should be researched, but it is also important to understand what knowledge and/or support is required to use the technology.	2A: What are the key features of the technology? 2B: What kind of knowledge does the technology bring into play? 2C: What knowledge and/or support is required to use the technology? 2D: What is the technology supply model?
3: Value proposition	Different questions can be raised on the supply-side and the demand-side: 'What is the developer's business case for the technology? And what is its desirability, efficacy, safety and cost effectiveness?'.	3A: What is the developer's business case for the technology (supply-side value)? 3B: What is its desirability, efficacy, safety and cost effectiveness (demand-side value)?
4: Adopter system	The adopters of eHealth in the breast cancer care are visible: breast cancer patients and healthcare professionals working in the breast cancer care pathway. Their vision on the implementation of eHealth should be examined. What is their perception of the implementation of eHealth? To what extent will they use eHealth when it is implemented?	4A: What changes in staff roles, practices and identities are implied? 4B: What is expected of the patient (and/or immediate caregiver) – and is this achievable by, and acceptable to, them? 4C: What is assumed about the extended network of lay caregivers?
5: Healthcare organization	Research should be done at whether there is enough time and money to research and implement eHealth: 'What is the organization's capacity to innovate?'. Besides, we should identify which changes and adjustments will be needed in team interactions and routines, which work is involved in implementation and, not unimportant: 'Who will do it?'.	5A: What is the organization's capacity to innovate? 5B: How ready is the organization for this technology-supported change? 5C: How easy will the adoption and funding decision be? 5D: What changes will be needed in team interactions and routines? 5E: What work is involved in implementation and who will do it?
6: Wider context	At this level, mostly the political, economic and regulatory context are visible: 'Who is going to pay for the eHealth applications? The patient	6A: What is the political, economic, regulatory, professional (eg. Medicolegal) and

	themselves? The hospital? Or is the healthcare insurance willing to make contracts?'.	sociocultural context for program rollout?
7: Continuous embedding and adaptation over time	The continuous embedding and adaptation over time of an innovation such as eHealth, is usually not fulfilled spontaneously due to the multi-level aspect of eHealth and the process that is needed to embed it [39]. Questions like: 'How much scope is there for adapting the technology over time?' and 'How resilient is the organization to handling critical events?' should be asked.	7A: How much scope is there for adapting and coevolving the technology and the service over time? 7B: How resilient is the organization to handling critical events and adapting to unforeseen eventualities?

Appendix 4: Statement list TRI 2.0 [51]

Optimism	
OPT1	New technologies contribute to better quality of life
OPT2	Technology gives me more freedom of mobility
OPT3	Technology gives people more control over their daily lives
OPT4	Technology makes me more productive in my personal life
Innovativeness	
INN1	Other people come to me for advice on new technologies
INN2	In general, I am among the first in my circle of friends to acquire new technology when it appears
INN3	I can usually figure out new high-tech products and services without help from others
INN4	I keep up with the latest technological developments in my area of interest
Discomfort	
DIS1	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do
DIS2	Technical support lines are not helpful because they do not explain things in terms I understand
DIS3	Sometimes, I think that technology systems are not designed for use by ordinary people
DIS4	There is no such thing as a manual for high-tech product or service that's written in plain language
Insecurity	
INS1	People are too dependent on technology to do things for them
INS2	Too much technology distracts people to a point that is harmful
INS3	Technology lowers the quality of relationships by reducing personal interaction
INS4	I do not feel confident doing business with a place that can only be reached online

Appendix 5: Questionnaire organizational stakeholders

Introductie

Hartelijk dank voor uw deelname aan deze vragenlijst!

Deze vragenlijst zal uw voorkeuren betreffende eHealth en andere technologieën uitvragen. eHealth is het verbeteren van de gezondheid, het welzijn en de zorg door middel van bijvoorbeeld een app op de mobiele telefoon, zoals de Pinktrainer-app, IVY-app, een app die de patiënt kan helpen herinneren aan het innemen van medicijnen, een app waar gezien kan worden welke sportoefeningen gedaan moeten worden of een andere app die de patiënt helpt met zijn of haar mentale of fysieke gezondheid.

Ondanks de veelbelovende resultaten van eHealth wordt het nog maar beperkt in de praktijk gebruikt. Dit onderzoek richt zich op het bepalen van de implementatie bereidheid van diverse stakeholders van de borstkankerzorg, om zo te beoordelen hoe een implementatie van eHealth in het borstkankerzorgpad zo succesvol mogelijk kan verlopen.

Het invullen van deze vragenlijst zal maximaal 15 minuten van uw tijd in beslag nemen. Uw gegevens worden anoniem verwerkt. Mocht u vragen of opmerkingen hebben over dit onderzoek, dan kunt u contact opnemen met Lauren Kerkhof via l.kerkhof@zgt.nl.

Algemeen

1. Wat voor beroep beoefent u uit binnen het ZGT?
   ……

2. In hoeverre hebt u invloed op de implementatie van eHealth binnen het ZGT of binnen de Borstkliniek Oost-Nederland (BON)?
   ZGT: *Weinig invloed* o o o o o *Veel invloed*
   BON: *Weinig invloed* o o o o o *Veel invloed*

3. Wat is uw rol of zou uw rol kunnen zijn bij het implementeren van eHealth?
   ……

4. Wanneer eHealth een rol gaat spelen in het zorgpad van borstkanker, zie ik dit als volgt voor me:
   a. De behandelaar legt uit hoe de patiënt de eHealth-applicatie moet gebruiken. Vervolgens grijpt de behandelaar alleen nog in als hij/zij tijdens het monitoren van de patiënt opvallendheden ziet, maar heeft daarnaast geen afspraken of face-to-face contact meer met de patiënt.
   b. De behandelaar heeft nog wel face-to-face contact met de patiënt, maar minder dan voorheen.
   c. Er verandert niets aan het aantal contactmomenten die de behandelaar face-to-face met de patiënt heeft.
   d. De behandelaar heeft contact met de patiënt in de vorm van e-consultaties (bijv. via Skype)
   e. Anders, namelijk ……

Technologieën

U ziet een aantal stellingen over technologieën. Onder technologieën verstaan we bijvoorbeeld televisie-, computer- en communicatieproducten, maar ook elektrische apparaten. Geef per stelling aan in hoeverre u het met deze stelling eens bent.

Stelling	Helemaal mee eens	Mee eens	Neutraal	Mee oneens	Helemaal mee oneens
Nieuwe technologieën dragen bij aan een betere kwaliteit van leven					
Technologieën geven mij meer bewegingsvrijheid					
Technologieën geven mensen meer controle over hun dagelijks leven					
Technologieën maken mij productiever in mijn persoonlijke leven					
Andere mensen komen naar mij voor advies over nieuwe technologieën					
Over het algemeen ben ik de eerste in mijn vriendenkring die een nieuwe technologie koopt/in bezit heeft wanneer deze verschijnt					
Meestal weet ik hoe ik nieuwe technologieën moet gebruiken zonder dat ik daar hulp van anderen voor nodig heb					
Ik blijf op de hoogte van de laatste technologische ontwikkelingen in mijn interessegebied					
Wanneer ik technische ondersteuning krijg van een leverancier van een hightech product of dienst, heb ik soms het gevoel dat iemand van mij profiteert die meer weet dan ik					
Technische hulplijnen zijn niet behulpzaam omdat ze de dingen niet uitleggen in termen die ik begrijp					
Op sommige momenten denk ik dat technologische systemen niet gemaakt zijn voor gebruik door gewone mensen					
Er bestaat niet zoiets als een handleiding voor een hightech product of dienst die in duidelijke taal geschreven is					
Mensen zijn te afhankelijk van technologie om dingen voor hun te doen					
Te veel technologie leidt mensen dermate af dat het schadelijk is					
Technologie verlaagt de kwaliteit van relaties door persoonlijke interactie te verminderen					
Ik heb er geen vertrouwen in om zaken te doen met een plek die alleen online bereikt kan worden					

Ziekenhuisgroep Twente

De volgende stellingen gaan over de gang van zaken en de aanwezige middelen in uw organisatie: het ZGT. Geef per stelling aan of hier sprake van is.

1. Er is sprake van een plausibele business case waar een mogelijk te implementeren eHealth applicatie kan berusten. Deze business case includeert investeringen vooraf, een welomschreven klantenbestand en marktfactoren, de overweging van concurrerende producten en een realistische inschatting van de uitdagingen van implementatie op grote schaal in een gezondheids- of zorgomgeving van de publieke sector.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

2. Relevante goedkeuringen en veiligheidsstandaarden voor de implementatie van eHealth zijn al aanwezig.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

3. Alle stakeholders in de waardeketen van de technologie zullen waarde halen uit de implementatie van eHealth.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

4. Het gebruik van eHealth wordt positief bekeken door het personeel dat het gaat gebruiken (ze denken bijvoorbeeld dat het hen zal helpen hun werk beter te doen en / of tijd te besparen).
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

5. Het gebruik van eHealth vereist niet dat het personeelslid op een manier werkt die hij/zij als ongepast, onprofessioneel beschouwt of de veiligheid van de patiënt in gevaar brengt.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

6. Het personeel zou een eHealth applicatie gemakkelijk kunnen leren gebruiken en minimale ondersteuning nodig hebben.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

7. De meeste patiënten zouden een eHealth applicatie gemakkelijk kunnen leren gebruiken en minimale ondersteuning nodig hebben.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

8. Patiënten zullen een eHealth applicatie acceptabel vinden (bijvoorbeeld geschikt voor hen, niet-stigmatiserend).
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

9. Anderen die mogelijk worden beïnvloed door de technologie (bijv. verzorgers, familieleden, ondersteunend personeel, budgethouders) zullen een eHealth applicatie acceptabel vinden en (waar relevant) kunnen leren deze te gebruiken.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

10. Het ZGT heeft sterk leiderschap, een duidelijke missie en goede interne relaties (vooral tussen clinici en managers).
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

11. Het ZGT is innovatief (d.w.z. afdelingen worden aangemoedigd om te scannen op nieuwe ideeën en producten en deze waar nodig over te nemen zonder toestemming van het topmanagement te vragen).
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

12. Het ZGT is een lerende organisatie (medewerkers worden aangemoedigd om nieuwe ideeën en projecten te ontmoeten en erover te praten; er zijn maatregelen om gegevens vast te leggen en de voortgang te bewaken; en het nemen van risico's wordt aangemoedigd).
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

13. Er zijn middelen (mensen, financiering) beschikbaar om nieuwe projecten en producten in goede banen te leiden.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

14. De implementatie van eHealth bij het ZGT kan gezien worden als een strategische prioriteit.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

15. eHealth zal geen (of minimale) verstoring veroorzaken van bestaande organisatorische routines.
    a. Ja
    b. Nee
    c. Een beetje, namelijk ……

16. Heeft u zelf nog opmerkingen over dit onderwerp?
    ……..

U bent aan het einde van deze vragenlijst gekomen. Als u nog vragen en/of opmerkingen heeft, kan u contact opnemen via l.kerkhof@zgt.nl. Hartelijk dank voor uw medewerking!

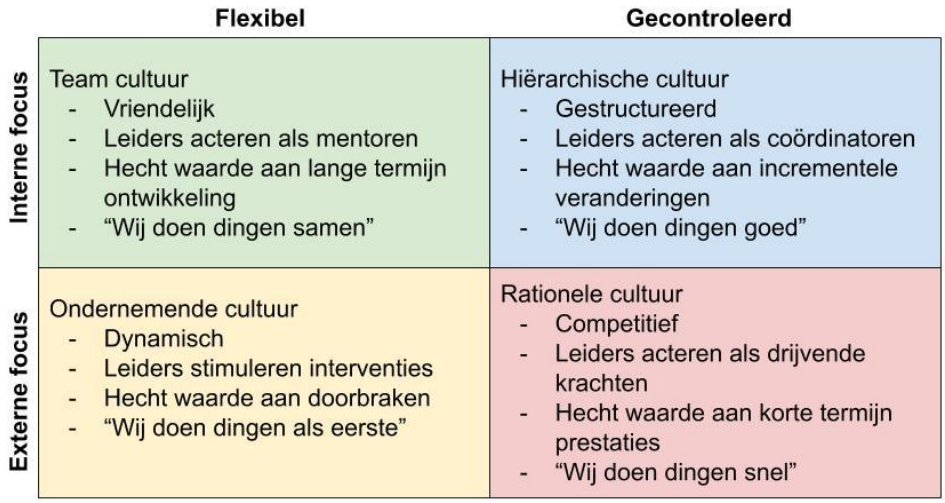
Appendix 6: Interview scheme organizational stakeholders

Inleiding: Ondanks de veelbelovende resultaten van eHealth wordt het nog maar beperkt toegepast in de praktijk, zo ook in de Borstkliniek Oost-Nederland. Dit onderzoek richt zich daarom op het bepalen van de implementatie bereidheid van diverse stakeholders van de borstkankerzorg, om zo te beoordelen hoe een implementatie van eHealth zo succesvol mogelijk kan verlopen. Op basis van deze resultaten wordt een implementatieplan opgesteld.

Checken: Mag ik een audio-opname maken van dit interview? Heeft u nog vragen voorafgaand aan het interview?

Construct CFIR	Questions
Algemene informatie	Welk beroep oefent u uit binnen het borstkanker zorgpad?
	In hoeverre heeft u invloed op de implementatie van eHealth binnen dit zorgpad en wat zou hierin uw functie zijn?
Structurele karakteristieken	Welke veranderingen in de infrastructuur van het ZGT zijn nodig om de implementatie te kunnen faciliteren? (technisch: kunnen we het realiseren, is het financieel haalbaar / sociaal: hoe is de cultuur voor implementatie?)
Cultuur	Hoe zou u de cultuur in het ZGT beschrijven? En binnen de mamma care? (Voor classificatie culturen zie Figuur 1)
	Hoe denkt u dat de cultuur binnen het ZGT (algemene overtuigingen, waarden, veronderstellingen die mensen omarmen) de implementatie van eHealth kunnen beïnvloeden?
	In hoeverre worden nieuwe ideeën omarmd binnen het ZGT? En binnen de mamma care?
Betrokkenheid leiderschap	In hoeverre is het management tot nu toe betrokken geweest bij eHealth en de implementatie hiervan?
	Welke niveau van goedkeuring/steun heeft u gezien of gehoord van de leiders in uw organisatie?
	Welke ondersteuning of acties kunt u verwachten van leiders in uw organisatie om de implementatie succesvol te maken?
Toegang tot kennis en informatie	Hebt u of de betrokken implementatieleider voldoende kennis en vaardigheden voor de implementatierol?
	Is er op de werkvloer voldoende kennis om met eHealth te werken?
Beschikbare middelen	(Doorgaan op vorige vraag) Wat verwacht u dat er nog nodig is? Wat is de haalbaarheid om dat aan te bieden?
	Hoe verwacht u de benodigde middelen te werven?
Groepsdruk	Voelt u de urgentie om eHealth te implementeren? Hoe is dit op de werkvloer? Waarom? (voorlopen op andere ziekenhuizen, andere afdelingen, klinische relevantie)
Druk voor verandering	Is er een sterke behoefte voor de implementatie van eHealth?
	Hoe essentieel is deze interventie om te voldoen aan de behoeften van de patiënten of aan andere organisatiedoelen en -doelstellingen?
	Hoe denkt u over huidige programma's / praktijken / processen die beschikbaar en gerelateerd aan eHealth zijn? En hoe is dit binnen de mamma care?

Verenigbaarheid	Zal eHealth het huidige zorgproces gaan aanvullen of vervangen?
Relatieve prioriteit	Hoe belangrijk is de implementatie van eHealth? Is dit zichtbaar voor anderen? (visie)
	Zijn er andere grote initiatieven die momenteel ook een rol spelen en de implementatie van eHealth in de weg kunnen staan?
Doelen en feedback	Heeft u of het ZGT doelen voor ogen die gerelateerd zijn aan de implementatie van eHealth?
	In hoeverre stelt het ZGT doelen voor huidige programma's/ initiatieven?
	In hoeverre worden organisatiedoelen gemonitord met oog op vooruitgang?
	Hoe sluit de implementatie van de interventie aan op andere organisatiedoelen?
Planning	Zijn er al stappen genomen voor de implementatie van eHealth? Welke?
Formele implementatie leiders	Wie zal de implementatie van eHealth in het borstkanker zorgpad gaan leiden?
	Wie zijn er nog meer betrokken bij deze implementatie?
Opinion leaders / key stakeholders	Wat zijn de meest belangrijke mensen om te benaderen om deze implementatie tot een succes te maken? (in de kliniek / daarbuiten (dan key stakeholder))
	Wie is bepalend voor wat er gebeurt binnen de afdeling?
Champions	Welke mensen kunnen goed met deze implementatie aan de slag?
	Welke mensen hebben veel invloed (formeel / informeel)
Reflecteren en evalueren	Stel we gaan implementeren, wanneer zou het dan een succes zijn? Welke informatie hebt u nodig om dit te kunnen beoordelen?
	Wat voor soort informatie wilt u verzamelen als u de interventie uitvoert?
	Hoe beoordeelt u de voortgang bij de implementatie of interventiedoelen?
	Krijgt u feedback van medewerkers? Of van patiënten?
Kosten	Welke kostenposten voorziet u wanneer we het hebben over de implementatie van eHealth en hoe kijkt u hier tegenaan? (haalbaar/wenselijk/veel/weinig)
	Verwacht u dat de kosten een barrière kunnen worden voor de implementatie?
	Wie zou volgens u deze kosten moeten betalen?
Afsluiting	Heeft u nog aanvullingen die nog niet genoemd zijn? Wilt u nog dingen benadrukken?



Figuur A2: Classificatie culturen volgens CFIR [43]

Appendix 7: Codebook

Intervention Characteristics		
A	Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs
B	Complexity	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement
C	Cost	Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs
D	Evidence strength & quality	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes
E	Relative advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution
Outer Setting		
A	Cosmopolitanism	The degree to which an organization is networked with other external organizations
B	External policy & incentives	A broad construct that includes external strategies to spread interventions, including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting
Inner Setting		
A	Available resources	The level of resources dedicated for implementation and on-going operations, including money, training, education, physical space, and time
B	Culture	Norms, values, and basic assumptions of a given organization
C	Goals and feedback	The degree to which goals are clearly communicated, acted upon, and fed back to staff, and alignment of that feedback with goals
D	Implementation climate	The absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization
E	Leadership engagement	Commitment, involvement, and accountability of leaders and managers with the implementation
F	Readiness for implementation	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention
G	Tension for change	The degree to which stakeholders perceive the current situation as intolerable or needing change
Process		
A	Champions	Individuals who dedicate themselves to supporting, marketing, and 'driving through' an implementation, overcoming indifference or resistance that the intervention may provoke in an organization
B	External change agents	Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction

C	Formally appointed internal implementation leaders	Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role
D	Key stakeholders	Individuals who must be involved in the implementation process and aftercare
eHealth, implementation and requirements		
A	Barriers for implementation	Obstacles that prevent implementation
B	Example eHealth	Examples given of currently existing eHealth innovations
C	Government requirements	Requirements the implementation have to meet set by the government
D	Indicators successfulness	Measurement of the state of successfulness of the implementation of eHealth
E	Open questions	A matter that is not yet decided or is unable to be decided
F	Relation HCP and patient	The relationship between the healthcare professional and the breast cancer patient
G	Results eHealth	The outcomes that eHealth will deliver
H	Risks	Risks that eHealth might bring
I	Role eHealth	The role that eHealth will fulfil
J	Way of implementing	The process of implementing eHealth
Descriptive variables		
A	Infrastructure ICT	The physical and organizational structures and facilities of ICT
B	Infrastructure ZGT	The physical and organizational structures and facilities of ZGT
C	Profession	Type of work

Appendix 8: Information letter patients

Personeninformatie voor deelname aan medisch-wetenschappelijk onderzoek

De implementatie van eHealth in het borstkanker zorgpad

Inleiding

Geachte heer/mevrouw,

Wij vragen u om mee te doen aan een medisch-wetenschappelijk onderzoek.

Meedoen is vrijwillig. Om mee te doen is wel uw schriftelijke toestemming nodig. U ontvangt deze brief omdat bij u de diagnose borstkanker heeft gekregen of omdat u hiervoor bent behandeld.
Voordat u beslist of u wilt meedoen aan dit onderzoek, krijgt u uitleg over wat het onderzoek inhoudt. Lees deze informatie rustig door en vraag de onderzoeker uitleg als u vragen heeft. U kunt er ook over praten met uw partner, vrienden of familie.

1. Algemene informatie

Dit onderzoek wordt gedaan door Ziekenhuisgroep Twente (ZGT). Dit onderzoek is beoordeeld door de de Adviescommissie lokale uitvoerbaarheid van ZGT.

2. Doel en achtergrond van het onderzoek

In dit onderzoek wordt onderzocht hoe borstkankerpatiënten over het gebruik van eHealth denken tijdens en na hun behandeling. eHealth is het verbeteren van uw gezondheid, welzijn en zorg door middel van bijvoorbeeld een app op uw mobiele telefoon. Voorbeelden van eHealth zijn bijvoorbeeld een app die u helpt herinneren aan het innemen van uw medicijnen, een app waarin u uw voeding kan bijhouden, een app waar u kunt zien welk soort oefeningen u kan doen of een andere app die u helpt met uw mentale of fysieke gezondheid. Daarnaast kan eHealth ook inhouden dat uw afspraak met de arts bijvoorbeeld via een Skype-gesprek plaatsvindt of dat de arts uw resultaten kan monitoren terwijl u thuis bent.

Het is belangrijk dat de zorg wordt afgestemd op de wensen en voorkeuren van de patiënt. Het doel van dit onderzoek is om uit te zoeken wat borstkankerpatiënten vinden van eHealth en of zij bereid zijn om dit te gebruiken in hun zorgpad en zo ja, op welke manier. Uiteindelijk wordt gekeken welke stappen er ondernomen moeten worden om tot een succesvolle implementatie te komen van eHealth in het borstkankerzorgpad om hiermee de kwaliteit van de zorg te verhogen.

De uitvoerend onderzoeker van deze studie is Lauren Kerkhof (Health Sciences Masterstudent Universiteit Twente). De hoofdonderzoeker is Ester Siemerink (internist-oncoloog ZGT). Andere betrokkenen zijn Miriam Vollenbroek-Hutten (wetenschapscoördinator ZGT), Annemieke Witteveen (onderzoeker Universiteit Twente), Josien Timmerman (coördinator kwaliteit wetenschappelijk onderzoek ZGT) en Annelies Nagtegaal-Bloemers (Smartup Innovation Manager).

3. Wat meedoen inhoudt

Als u meedoet met dit onderzoek, dan dient u een vragenlijst in te vullen. Het invullen van deze vragenlijst zal ongeveer 15 minuten duren. U vult een aantal vragen in over uzelf en daarna over uw voorkeuren ten opzichte van technologieën en eHealth. Deze vragenlijst kunt u invullen op een manier die voor u voorkeur heeft: op papier of digitaal. De vragenlijst wordt afgenomen tijdens een regulier bezoek aan het ZGT.

4. Wat wordt er van u verwacht

Om het onderzoek goed te laten verlopen, is het belangrijk dat u de vragen naar waarheid invult.

5. Mogelijke voor- en nadelen

Bij dit onderzoek zijn de risico's die u loopt bij deelname nagenoeg nihil. Het is wel belangrijk dat u de mogelijke voor- en nadelen goed afweegt voordat u besluit mee te doen.

U haalt geen direct voordeel uit het meedoen met dit onderzoek. Wel draagt u bij aan het verbeteren van de kwaliteit van borstkankerzorg voor patiënten binnen het ZGT. De uitkomsten van dit onderzoek zullen bijdragen aan verdere ontwikkeling en verbetering van dit proces.

Deelname aan het onderzoek betekent echter wel dat u extra tijd kwijt bent aan het invullen van de vragenlijst en dat u zich aan bepaalde afspraken moet houden. Deze zaken zijn onder punt 4, 5 en 6 beschreven.

6. Als u niet wilt meedoen of wilt stoppen met het onderzoek

U beslist zelf of u meedoet aan het onderzoek. Deelname is vrijwillig. Als u besluit niet mee te doen, hoeft u verder niets te doen. U hoeft niets te tekenen. U hoeft ook niet te zeggen waarom u niet wilt meedoen. Als u patiënt bent wordt u op de gebruikelijke manier behandeld.

Als u wel meedoet, kunt u zich altijd bedenken en toch stoppen, ook tijdens het onderzoek. Dit heeft geen enkele invloed op uw behandeling. U hoeft niet te zeggen waarom u stopt. De gegevens die tot dat moment zijn verzameld, worden gebruikt voor het onderzoek.

7. Einde van het onderzoek

Uw deelname aan het onderzoek stopt als

- de vragenlijst is ingevuld
- u zelf kiest om te stoppen
- de onderzoeker het beter voor u vindt om te stoppen
- het ZGT, de overheid of de beoordelende medisch-ethische toetsingscommissie, besluit om het onderzoek te stoppen.

Het hele onderzoek is afgelopen als alle deelnemers klaar zijn.

8. Gebruik en bewaren van uw gegevens

Voor dit onderzoek worden geen persoonsgegevens van u verzameld, gebruikt en bewaard. Uw naam en andere gegevens die u direct kunnen identificeren worden niet verzameld of bewaard. De gegevens van de vragenlijst zijn dus niet tot u te herleiden. Ook in rapporten en publicaties over het onderzoek zijn de gegevens niet tot u te herleiden. Verschillende mensen kunnen de resultaten van

de vragenlijsten inzien, maar hier staan geen persoonsgegevens van u in. De ingevulde vragenlijsten worden bewaard op de afdeling Research Oncologie. Dit betekent dat de research verpleegkundigen (Monique Kuipers en Jessica Schoenmaker-Coes) toegang hebben tot uw antwoordgegevens. Wanneer iemand uw antwoordgegevens wil inzien voor een ander onderzoek, moet hij/zij eerst toestemming vragen aan de research verpleegkundigen.

Bewaartermijn gegevens

Uw antwoordgegevens moeten 15 jaar worden bewaard op de onderzoekslocatie.

Meer informatie over uw rechten bij verwerking van gegevens

Voor algemene informatie over uw rechten bij verwerking van uw persoonsgegevens kunt u de website van de Autoriteit Persoonsgegevens raadplegen.

Bij vragen of klachten over de verwerking van uw persoonsgegevens raden we u aan eerst contact op te nemen met de onderzoekslocatie. U kunt ook contact opnemen met de Functionaris voor de Gegevensbescherming van de instelling (Bijlage A) of de Autoriteit Persoonsgegevens.

9. Geen vergoeding voor meedoen

De deelname aan dit onderzoek kost u niets. U wordt niet betaald voor het meedoen aan dit onderzoek. Wel levert uw deelname aan dit onderzoek een bijdrage aan het borstkankerzorgproces in het ZGT.

10. Heeft u vragen?

Bij vragen kunt u contact opnemen met Lauren Kerkhof. Indien u klachten heeft over het onderzoek, kunt u dit bespreken met de onderzoeker of uw behandelend arts. Wilt u dit liever niet, dan kunt u zich wenden tot de klachtenfunctionaris van uw ziekenhuis. Alle gegevens vindt u in **bijlage A**: Contactgegevens.

11. Ondertekening toestemmingsformulier

Wanneer u voldoende bedenktijd heeft gehad, wordt u gevraagd te beslissen over deelname aan dit onderzoek. Indien u toestemming geeft, zullen wij u vragen deze op de bijbehorende toestemmingsverklaring schriftelijk te bevestigen. Door uw schriftelijke toestemming geeft u aan dat u de informatie heeft begrepen en instemt met deelname aan het onderzoek. Zowel uzelf als de onderzoeker ontvangt een getekende versie van deze toestemmingsverklaring.

Dank voor uw aandacht.

12. Bijlagen bij deze informatie

A. Contactgegevens

B. Toestemmingsformulier proefpersoon

C. Brochure ‘Medisch-wetenschappelijk onderzoek. Algemene informatie voor de proefpersoon’

Bijlage A: contactgegevens voor ZGT

Hoofdonderzoeker ZGT

Ester Siemerink

E-mailadres: e.siemerink@zgt.nl

Uitvoerend onderzoeker ZGT

Lauren Kerkhof (Health Sciences Masterstudent Universiteit Twente)

E-mailadres: l.kerkhof@zgt.nl

Klachtenfunctionaris ZGT

Mevrouw M. Stegeman

E-mailadres: mar.stegeman@zgt.nl

Functionaris voor de Gegevensbescherming ZGT:

Mevrouw D. Oldenkotte

E-mailadres: gegevensbescherming@zgt.nl

Bijlage B: toestemmingsformulier proefpersoon

De implementatie van eHealth in het borstkanker zorgpad

- Ik heb de informatiebrief gelezen. Ook kon ik vragen stellen. Mijn vragen zijn voldoende beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.
- Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen of te stoppen met het onderzoek. Daarvoor hoef ik geen reden te geven.
- Ik weet dat voor de controle van het onderzoek sommige mensen toegang tot mijn onderzoeksgegevens kunnen krijgen. Die mensen staan vermeld in deze informatiebrief onder punt 8. Ik geef toestemming voor die inzage door deze personen.
- Ik geef toestemming voor het verzamelen en gebruiken van mijn antwoordgegevens voor de beantwoording van de onderzoeksvraag in dit onderzoek
- Ik geef □ **wel**

  □ **geen**

  toestemming om mijn antwoorden langer te bewaren en te gebruiken voor toekomstig onderzoek op het gebied van borstkanker of op het gebruik van eHealth.
- Ik geef □ **wel**

  □ **geen**

  toestemming om mij na dit onderzoek opnieuw te benaderen voor een vervolgonderzoek.
- Ik wil meedoen aan dit onderzoek.

Naam proefpersoon:

Handtekening: Datum : __ / __ / __

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de proefpersoon zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte.

Naam onderzoeker (of diens vertegenwoordiger):

Handtekening: Datum: __ / __ / __

De proefpersoon krijgt een volledige informatiebrief mee, samen met een getekende versie van het toestemmingsformulier.

Appendix 9: Questionnaire breast cancer patients

Introductie

Hartelijk dank voor uw medewerking aan deze vragenlijst. U werkt hierdoor mee aan een onderzoek van Ziekenhuisgroep Twente en de Universiteit Twente. In dit onderzoek wordt onderzocht hoe borstkankerpatiënten over het gebruik van eHealth denken tijdens en na hun behandeling. eHealth is het verbeteren van uw gezondheid, welzijn en zorg door middel van bijvoorbeeld een app op uw mobiele telefoon, zoals de Pinktrainer-app, IVY-app, een app die u helpt herinneren aan het innemen van uw medicijnen, een app waar u kan zien welke sportoefeningen u moet doen of een andere app die u helpt met uw mentale of fysieke gezondheid. Daarnaast kan eHealth ook inhouden dat uw afspraak met de arts of fysiotherapeut bijvoorbeeld via een Skype-gesprek plaatsvindt of dat de arts uw resultaten kan monitoren terwijl u thuis bent.

Door mee te doen aan dit onderzoek helpt u mee met de verbetering van de zorg voor borstkankerpatiënten. Het invullen van deze vragenlijst zal maximaal 15 minuten van uw tijd in beslag nemen. Uw gegevens worden anoniem verwerkt. Mocht u vragen of opmerkingen hebben over dit onderzoek, dan kunt u contact opnemen met Lauren Kerkhof via l.kerkhof@zgt.nl.

Patiënt karakteristieken

De volgende vragen gaan over uzelf en uw behandelvoorkeuren.

1. Wat is uw leeftijd?
   - ☐ Jonger dan 25 jaar
   - ☐ 25 tot 45 jaar
   - ☐ 45 tot 65 jaar
   - ☐ 65 tot 75 jaar
   - ☐ Ouder dan 75 jaar

2. Wat is uw geslacht?
   - ☐ Man
   - ☐ Vrouw
   - ☐ Geef ik liever geen antwoord op

3. In welke fase van uw zorgpad bevindt u zich?
   - ☐ Diagnose
   - ☐ Behandeling
   - ☐ Nazorg
   - ☐ Palliatieve zorg

4. Als mijn arts mij vertelt dat er verschillende behandelingsmogelijkheden zijn, dan heb ik de volgende behoefte aan informatie:
   - ☐ Geen behoefte
   - ☐ Een korte uitleg
   - ☐ Een gemiddelde uitleg
   - ☐ Een lange uitleg

5. Als mijn arts mij vertelt dat er verschillende behandelingsmogelijkheden zijn, dan heb ik de volgende behoefte aan informatie die ik (bijvoorbeeld thuis) via internet of een app op mijn mobiele telefoon (eHealth tool) kan terug lezen:
   - ☐ geen behoefte
   - ☐ een korte uitleg
   - ☐ een gemiddelde uitleg
   - ☐ een lange uitleg

6. Heeft u een computer, telefoon of tablet met internet?
   - ☐ Ja
   - ☐ Nee (sla vraag 7 t/m 12 over)

7. Zoekt u wel eens informatie (over gezondheid en ziektes) op het internet?
   - ☐ Ja
   - ☐ Alleen als ik hierbij geholpen wordt
   - ☐ Nee

8. Als ik u een link stuur via e-mail, kan u deze dan openen/gebruiken?
   - ☐ Ja
   - ☐ Alleen als ik hierbij geholpen wordt
   - ☐ Nee

9. Gebruikt u wel eens een app?
   - ☐ Ja
   - ☐ Alleen als ik hierbij geholpen wordt
   - ☐ Nee

10. Kan u zelf een app downloaden?
    - ☐ Ja
    - ☐ Alleen als ik hierbij geholpen wordt
    - ☐ Nee

11. Gebruikt u uw DigiD om bijvoorbeeld uw patiëntgegevens te bekijken?
    - ☐ Ja
    - ☐ Alleen als ik hierbij geholpen wordt
    - ☐ Nee

12. Gebruikt u gezondheidsapplicaties op uw telefoon, zoals bijvoorbeeld een stappenteller, calorieënteller of fitness app?
    - ☐ Ja
    - ☐ Alleen als ik hierbij geholpen wordt
    - ☐ Nee

Technologieën

U ziet een aantal stellingen over technologieën. Onder technologieën verstaan we bijvoorbeeld televisie-, computer- en communicatieproducten, maar ook elektrische apparaten. Geef per stelling aan in hoeverre u het met deze stelling eens bent. Dit doet u door een kruisje te zetten in het bijbehorende vakje.

Stelling	Helemaal mee eens	Mee eens	Neutraal	Mee oneens	Helemaal mee oneens
Nieuwe technologieën dragen bij aan een betere kwaliteit van leven					
Technologieën geven mij meer bewegingsvrijheid					
Technologieën geven mensen meer controle over hun dagelijks leven					
Technologieën maken mij productiever in mijn persoonlijke leven					
Andere mensen komen naar mij voor advies over nieuwe technologieën					
Over het algemeen ben ik de eerste in mijn vriendenkring die een nieuwe technologie koopt/in bezit heeft wanneer deze verschijnt					
Meestal weet ik hoe ik nieuwe technologieën moet gebruiken zonder dat ik daar hulp van anderen voor nodig heb					
Ik blijf op de hoogte van de laatste technologische ontwikkelingen in mijn interessegebied					
Wanneer ik technische ondersteuning krijg van een leverancier van een hightech product of dienst, heb ik soms het gevoel dat iemand van mij profiteert die meer weet dan ik					
Technische hulplijnen zijn niet behulpzaam omdat ze de dingen niet uitleggen in termen die ik begrijp					
Op sommige momenten denk ik dat technologische systemen niet gemaakt zijn voor gebruik door gewone mensen					
Er bestaat niet zoiets als een handleiding voor een hightech product of dienst die in duidelijke taal geschreven is					
Mensen zijn te afhankelijk van technologie om dingen voor hun te doen					
Te veel technologie leidt mensen dermate af dat het schadelijk is					
Technologie verlaagt de kwaliteit van relaties door persoonlijke interactie te verminderen					
Ik heb er geen vertrouwen in om zaken te doen met een plek die alleen online bereikt kan worden					

eHealth

De volgende vragen gaan over eHealth. eHealth is het verbeteren van uw gezondheid, welzijn en zorg door middel van bijvoorbeeld een app op uw mobiele telefoon, zoals de Pinktrainer-app, IVY-app, een app die u helpt herinneren aan het innemen van uw medicijnen, een app waar u kan zien welke sportoefeningen u moet doen of een andere app die u helpt met uw mentale of fysieke gezondheid. eHealth kan op verschillende manieren in uw zorgpad worden verwerkt.

1. Gebruikt u al een vorm van eHealth in uw zorgpad?
   - ☐ Ja, ik gebruik

     ……
   - ☐ Nee, maar ik zou wel eHealth willen gebruiken, namelijk

     ……
   - ☐ Nee, en ik zou ook geen eHealth willen gebruiken, omdat

     ……

     …… (sla vraag 3 en 4 over)
   - ☐ Weet ik niet, want

     ……

2. Als mijn arts eHealth aanbeveelt dan heb ik hier vertrouwen in.
   - ☐ Ja
   - ☐ Nee
   - ☐ Een beetje
   - ☐ Weet ik niet

3. Er zijn verschillende mogelijkheden die eHealth kan bieden. Geef aan in welke applicaties u interesse zou hebben. U kan meerdere antwoorden kiezen.
   - ☐ Een app die mij helpt bij mijn voedingskeuzes en het bijhouden van mijn voeding
   - ☐ Een app die laat zien welke sportoefeningen ik kan doen
   - ☐ Een app die mij helpt met mijn mentale / geestelijke gezondheid
   - ☐ Een app die mij herinnert aan het innemen van mijn medicijnen
   - ☐ Een app die mij helpt met mijn vermoeidheid
   - ☐ Een app die mij van informatie voorziet over bijvoorbeeld mijn behandeling, diagnose en mogelijke symptomen die kunnen optreden
   - ☐ Een andere app, namelijk

     ……

Ga door op de volgende pagina.

4. Geef per stelling aan in hoeverre u het met deze stelling eens bent. Dit doet u door een kruisje te zetten in het bijbehorende vakje.

Stelling	Helemaal mee eens	Mee eens	Neutraal	Mee oneens	Helemaal mee oneens
Wanneer eHealth onderdeel wordt van mijn behandeling dan ben ik bereid om mijn face to face contact met de behandelaar (bijv. fysiotherapeut bij een fitness app) op te geven nadat de behandelaar mij de eHealth applicatie heeft uitgelegd en ik weet hoe het werkt.					
Wanneer eHealth onderdeel wordt van mijn behandeling dan zou ik de behandelaar net zo vaak willen zien als ik eerder deed.					
Wanneer eHealth onderdeel wordt van mijn behandeling dan zou ik de behandelaar wel willen zien, maar minder vaak dan voorheen.					
Wanneer eHealth onderdeel wordt van mijn behandeling dan zou ik de behandelaar wel willen zien, maar dat mag ook via een Skype-gesprek.					
Ik vind het prettig om bepaalde metingen thuis te doen door middel van eHealth in plaats van dat ik hiervoor naar het ziekenhuis moet.					
Ik vind het prettig dat mijn arts mijn status en vooruitgang kan monitoren door middel van eHealth.					

5. U bent aan het einde gekomen van deze vragenlijst. Heeft u zelf nog opmerkingen over dit onderwerp?

.....

.....

Afsluiting

Hartelijk dank voor uw medewerking! Mocht u nog vragen of andere opmerkingen hebben, neem dan contact op met Lauren Kerkhof via l.kerkhof@zgt.nl.

Appendix 10: Organizational readiness results

Nr.	Statement	Score	Comments OSs	Score	Ranking
1	The technology rests on a plausible business case including up-front investment, a well-defined customer base and market drivers, consideration of competing products and realistic assessment of the challenges of implementing at scale in a public-sector health or care environment.	Yes: 0 No: 3 Partially: 4	OS 1: "Depends on type eHealth application" OS 2: "Needs to be elaborated, work in progress" OS 5 & 7: "Business cases are developed, but not as complete as described"	-3	1
2	Relevant approvals are already in place.	Yes: 2 No: 1 Partially: 4	OS 2: "NELL and soon the MDR-regulations" OS 4: "Are in place, but is not always acted upon" OS 6: "There is a quantity of laws and regulations that implement eHealth. This is complex. What we want to develop together is a method in which we can use eHealth in a safe way so that patients and professionals can benefit from it. The question is where the implementation of eHealth should take place: Is that always at the hospital or is it also possible at other places?"	1	8 or 9
3	All stakeholders in the technology's value chain will gain some value.	Yes: 2 No: 3 Partially: 2	OS 4: "All stakeholders is a wide definition" OS 6: "You have to look at this per situation. It is very promising when you look at the chain instead of someone's own benefits."	-1	6
4	The technology is viewed positively by the staff who are intended to adopt it (e.g. they believe it will help them do their job better and/or save them time).	Yes: 2 No: 0 Partially: 5	OS 3: "Very dependent on the person, partly because of insufficient clarity / monitoring of the implementation and continuation process." OS 4: "Changes need time. Especially in the beginning this will cost time and space" OS 5 & 7: "I do not think this is true for all staff members"	2	7

			OS 6: "In a team there are often a few enthusiasts, a number of people who will follow, a larger number of people who first look in which way the wind blows and a number of people with resistance. It is the art that the pioneers take the followers with them and let the 'see where the wind blows'-people hitch on"		
5	The technology does not require the staff member to work in a way they would view as inappropriate, unprofessional or put patient safety at risk.	Yes: 3 No: 1 Partially: 3	OS 6: "No, but people can think that a consultation on distance decreases the quality, even though they did not try it. That is their perception of: what is good care" OS 7: "A staff member may never work in a way that he/she find inappropriate or unprofessional"	2	13
6	Staff could learn to use the technology easily and require minimal support.	Yes: 2 No: 0 Partially: 5	OS 2: "Good support is always important" OS 3: "Currently there is no standardized offer and pdca of the process" OS 5 & 7: "Depends, it varies" OS 6: "That depends on the application and digital skills of the end user. The extent to which this is the case should become clear in a quick scan that identifies the points requiring attention. Ideally, it would of course be true that an eHealth application is easy to use."	2	4 or 5
7	Most patients could learn to use the technology easily and require minimal support.	Yes: 2 No: 1 Partially: 4	OS 3: "More than 'partially', in theory for a large group a suitable instrument, but the correct selection method and explanation method are still lacking, with embedding in care pathways. Besides, some people are, for various reasons, not suitable for eHealth use" OS 5: "Only when the application is good" OS 6: ""That depends on the application and digital skills of the end user. The extent to which this is the case should become clear in a quick scan that identifies the points requiring attention. Ideally, it would of course be true that an eHealth application is easy to use." OS 7: "That varies"	1	4 or 5
8	Patients will find the technology	Yes: 3 No: 0	OS 2: "There are some digital illiterates"	3	2

	acceptable (e.g. appropriate for them, non-stigmatising).	Partially: 4	OS 5: "Only when the application is good" OS 6: "This seems like a precondition to start with. I do not think that this is applicable to all applications. It will be a criterium whether to select a technology or not." OS 7: "That varies"		
9	Others who may be impacted by the technology (e.g. carers, family members, support staff, budget holders) will find the technology acceptable and (where relevant) be able to learn to use it.	Yes: 2 No: 0 Partially: 5	OS 3: "More than 'partially', the limiting factor is no overall vision of the use of eHealth. Because of that, eHealth is not enough on the retina of the management and therefore there are no clear choices and no embedding" OS 6: "That may be relevant, but is not necessarily the case. Social support is important, so we have to pay attention to that too." OS 7: "That varies"	2	14
10	The organization has strong leadership, a clear mission and good internal relations (especially between clinicians and managers).	Yes: 2 No: 0 Partially: 5	OS 2: "CMIO function is now finally facilitated, which will increase interaction and mutual understanding" OS 3: "Work in progress, better than before, but still too many fictional walls and too little coordination between management and work floor. We should think across clusters and see coherence" OS 4: "In the area of R&D and IT there are still uncertainties about what is and what is not possible in technological developments." OS 6: "I think this is developing positively. There are good and less good relations."	2	11 or 12
11	The organization is innovative (i.e. departments are encouraged to horizon-scan for new ideas and products and adopt these where appropriate without seeking top management authorisation).	Yes: 3 No: 1 Partially: 3	OS 2 & 4: "ZGT is innovative and is stimulating this, but implementing products without permission is a no-go." OS 6: "Yes, but we are not there yet. We are taking steps in the right direction."	2	11 or 12
12	It is a learning organization (staff are encouraged to meet and talk about	Yes: 4 No: 0 Partially: 4	OS 2: "Learning organization: yes. But risks are not encouraged. A hospital needs to be a safe place for everyone"	3	10

	new ideas and projects; there are measures in place to capture data and monitor progress; and risk-taking is encouraged).		OS 6: "Yes, but we are not there yet. We are taking steps in the right direction."		
13	Resources (people, funding) are available to channel into new projects and products.	Yes: 4 No: 0 Partially: 3	OS 2: "The IT costs are getting out of hand. There is a budget for innovation, but we are running behind." OS 3: "Realization that prefinancing is now needed to benefit from eHealth deployment is not widely felt / supported. Also prompted by the financial crisis of recent years"	4	3
14	The fit between the technology and the organization is good; its adoption is a strategic priority.	Yes: 5 No: 1 Partially: 1	OS 7: "eHealth is not on the strategic agenda, but is part of the strategic priorities."	4	8 or 9