Impact of digi-physical healthcare

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DIVISION OF INNOVATION ENGINEERING | DEPARTMENT OF DESIGN SCIENCES
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MASTER THESIS

Impact of digi-physical healthcare

A case study of the value-impact of digi-physical healthcare at three primary care centres in Sweden

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Abstract

In the early days of digitalisation of Swedish healthcare, eDoctors, such as Kry, operated in parallel with traditional primary care. With the rising popularity and benefits of digital services, traditional healthcare is looking into digitalisation options. Digi-physical healthcare, the integration between digital and traditional physical care, is suggested as a potential future for Swedish healthcare. However, the impact of digi-physical healthcare is fairly unknown, and there is no performance evaluation process in place to facilitate necessary analyses. Therefore, this thesis develops, and uses, an evaluation framework to study the impact of digi-physical healthcare on quality, efficiency, and patient and healthcare provider satisfaction.

The study uses a mixed methodology: a qualitative approach is used for a descriptive study as well as for an exploratory study, while a quantitative approach is used for a case study. The exploratory study consists of a literature study as well as an interview study and develops the evaluation framework. In the case study, the framework as well as primary care centre and survey data, is used to evaluate the impact of digi-physical healthcare at three primary care centres.

The exploratory study suggests using availability, triage, continuity, use of resources, productivity, work environment, medical quality and patient experience as quality, efficiency and satisfaction performance indicators of digi-physical care. The case study finds that satisfaction is positively impacted by digi-physical care, while the impact on quality and efficiency is uncertain. Ways of working seem to influence what impact centres realise from digi-physical care and needs to be further studied. The thesis finds no impact on profits from digi-physical care, yet findings imply that they are to expect in the future. Determine successful ways of working and realising business value would decrease the distance between digital and physical healthcare, which potentially could improve Swedish healthcare in general.

Keywords: digi-physical healthcare, Swedish primary care, digital healthcare platform, performance evaluation

Sammanfattning

I ett tidigt skede av digitalisering av svensk sjukvård, verkade nätdoktorer, likt Kry, parallellt med traditionell primärvård. Då populariteten och fördelarna med digitala tjänster har ökat, undersöker nu traditionell sjukvård alltmer digitaliseringsalternativ. Digifysisk vård, integrationen mellan digital och traditionell fysisk vård, ses som en potentiell framtid för svensk sjukvård. Effekten av digifysisk vård är emellertid relativt okänd, och det finns ingen utvärderingsprocess som kan facilitera nödvändiga analyser. Därför utvecklar, och använder, denna uppsats ett utvärderingsramverk för att studera inverkan av digifysisk vård på kvalitet, effektivitet, och patient- och vårdgivarnöjdhet.

Studien använder en blandad metodik: ett kvalitativt tillvägagångssätt används för en beskrivande studie såväl som för en undersökande studie, medan en kvantitativ metod används för en fallstudie. Den undersökande studien består av en litteraturstudie samt en intervjustudie och utvecklar utvärderingsramverket. I fallstudien används ramverket, såväl som primärvårds- och enkätdata för att utvärdera effekten av digifysisk vård vid tre vårdcentraler.

Den undersökande studien föreslår att tillgänglighet, triagering, kontinuitet, resursanvändning, produktivitet, arbetsmiljö, medicinsk kvalitet och patientupplevelse ska användas som kvalitets-, effektivitets- och nöjdhetsindikatorer för digifysisk vård. Fallstudien konstaterar att nöjdhet påverkas positivt av digifysisk vård, medan påverkan på kvalitet och effektivitet är osäker. Arbetssätt tycks påverka vilken effekt vårdcentraler ser från digifysisk vård och bör studeras vidare. Uppsatsen finner ingen direkt påverkan på vinst, men resultaten indikerar en framtida positiv påverkan. Genom att hitta framgångsrika arbetssätt och realisera affärsvärde skulle avståndet mellan digital och fysisk vård minska, vilket potentiellt kan förbättra svensk sjukvård.

Nyckelord: digifysisk vård, svensk primärvård, digital vårdplattform, effektutvärdering

Acknowledgments

We would first like to thank Doctrin and Praktikertjänst for making this thesis possible. Their willingness to share knowledge and understandings has truly aided our work and been key for us in our data gathering. Additionally, their passion for improving healthcare has also been very inspiring and has motivated us to excel in our work. We look forward to following how they together will develop primary care in Sweden over the coming years.

Secondly, we would like to express our deep gratitude to Brahehälsan Löberöd, Herkules Vårdcentral and Ekerö Vårdcentral for taking part in this study. The kind way in which they have shared their data and insights has been humbling. Knowing that primary care centres in Sweden are run by such professional and inspiring individuals feels very uplifting.

Lastly, we would like to thank our supervisors, Lars Bengtsson and Unn Hellberg, for their guidance throughout the work with this thesis. Their feedback has been immensely valuable and has improved the quality of the thesis.

Lund, May 2020

Ellen Peber & Erik Wästfelt

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1 Introduction

In this section, a background to the subject of the thesis will be given. The background will be followed by the purpose and delimitations of the study. Last, an overview of the structure of the thesis will be provided.

1.1 Background

Traditionally, healthcare has been a face-to-face industry, where the norm for consultations have been physical appointments. This has been true for both primary care and specialty care. However, as digitisation and digitalisation have become a larger part of our society, healthcare has started to transform.

Healthcare innovations, using modern technologies such as digital communication and artificial intelligence, are now greatly disrupting traditional healthcare. This is most clearly exemplified by the introduction of eDoctors in 2014, such as Kry (Stiernstedt, Zetterberg, Stjernquist & Elgán, 2019). These digital primary care centres offer digital appointments which are not geographically restricted. Although being highly popular among patients, they have faced wide criticism from healthcare professionals, e.g. for encouraging unnecessary care (Stiernstedt et al.) and for liberal prescription of antibiotics (Cederberg, 2017, May).

Swedish healthcare is now striving to achieve balance between digital and physical healthcare. The integration of digital and physical healthcare is denominated digi-physical healthcare. In 2019, Göran Stiernstedt delivered a public report to the Minister for Health and Social Affairs suggesting that digi-physical healthcare is the future for Swedish healthcare (Stiernstedt et al., 2019). However, the impact of digital and digi-physical healthcare is still fairly unknown (Ekman et al., 2019; Stiernstedt et al.). Additionally, there is no consistent performance evaluation process in place to facilitate necessary

national-level analyses. What value does digi-physical healthcare provide primary care, beside remote healthcare, and how do we evaluate it?

Thus, this thesis will develop, and use, an evaluation framework to study the impact of digi-physical healthcare on quality, efficiency, and patient and healthcare provider satisfaction. The impact will be determined by investigating how the implementation of a digital healthcare platform at physical primary care centres correlates with effects on the aforementioned evaluation areas.

1.2 Purpose of study

The thesis aims to advance knowledge of the value of digi-physical healthcare. More specifically, the thesis aims to:

- Develop a framework for evaluating digi-physical healthcare;
- Evaluate the impact of digi-physical healthcare by examining how the implementation of a digital healthcare platform correlates with quality, efficiency, or patient and healthcare provider satisfaction changes at primary care centres

1.3 Problem statements

The thesis aims to answer the following research question:

- What impact does digi-physical healthcare have on primary care centres in Sweden, in terms of quality, efficiency, and patient and healthcare provider satisfaction?

1.4 Delimitations and limitations

The scope of this thesis has been delimited in the following manner:

- The thesis evaluates digi-physical healthcare by considering the impact of implementing one type of digital healthcare platform only. Therefore, the thesis' findings might not apply to other platforms;
- The thesis evaluates the impact of digi-physical healthcare at three different primary care centres only. Thus, digi-physical healthcare is

only evaluated in a primary care context and the findings might therefore not apply to e.g. specialised healthcare. Moreover, even though the centres are different in terms of e.g. size, geographical location, they are too few for the results to generally apply to other primary care centres.

The scope of this thesis has also been limited by the pandemic caused by COVID-19:

- The possibility to acquire primary care data was limited mid-study as the pandemic considerably halted the access to the primary care centres. This led to data gathering requiring more time than initially intended and some data not being collected at all;
- The number of interviewees and survey respondents available at the primary care centres and their central organisation were limited as care providers had to focus on the pandemic. This impacted both the construction of the framework as well as the amount of survey data available on the impact of digi-physical healthcare from a care provider perspective;
- It was not possible to conduct a survey for patients. This due to the primary care centers need to focus on the pandemic. Therefore, the data regarding patient experience consists of data gathered prior to the pandemic, such as data from the digital platform, as well as how healthcare professionals interpret patient experience.

1.5 Report structure

Chapter 2 - Methodology
In this chapter, an overview of the methodology is presented along with detailed descriptions of the different approaches used.

Chapter 3 - Digitalisation and its implications for Swedish healthcare
In this chapter, an overview of digitalisation in Swedish healthcare is provided. The overview covers both healthcare in general, as well as primary care in particular. Further, reimbursement models for primary care are introduced along with a brief comparison between traditional and digital reimbursement.

Chapter 4 - The digital healthcare platform

In this chapter, the company Doctrin's digital healthcare platform, Flow, which is implemented at the primary care centres participating in the case study, is presented. The functions of the platform, and how they complement and alter traditional care, are described.

Chapter 5 - Construction of the evaluation framework
In this chapter, an evaluation framework, inspired by the goal-question-metrics framework, for digi-physical healthcare is developed. Performance indicators of the framework are elicited through a literature study and an interview study. The performance indicators are used as goals in the framework and supplemented with questions, hypotheses and metrics.

Chapter 6 - Evaluating the impact of digi-physical healthcare
In this chapter, the impact of digi-physical healthcare is evaluated through a case study. The case study includes three primary care centres which have implemented the platform. The data from the case study is analysed, and the impact of digi-physical healthcare is determined.

Chapter 7 - Discussion
In this chapter, the findings of the thesis are discussed. First, factors affecting the impact, relations between goals in the framework, as well as digi-physical healthcare's implication on business value, are discussed. Thereafter, the thesis methodology and its validity is discussed and further work is proposed.

Chapter 8 - Conclusion
In this chapter, the thesis' most important findings and takeaways are concluded.

1.6 Definitions

In this section, terms later used in the thesis, are described. Although some sources are used in this section, the definitions are to a great extent defined by the authors of this thesis.

Contact
Contacts are all interactions between primary care providers and patients. The term contact is used in a broader sense than the term visit. A visit is a type of contact, but not all contacts are visits. Contacts that occur early in the patient journey include e.g. chat sessions or telephone calls with triaging

nurses. Contacts that follow can occur via the digital platform, through phone or in the physical world.

Digi-physical healthcare
Digi-physical healthcare is care that can be delivered both through digital media as well as through physical appointments, depending on the patients' need. The purpose is to make use of advantages from digital healthcare, such as convenience and geographical freedom, as well as advantages from physical care, such as examinations and personal contact. Digi-physical healthcare may also potentially create new types of benefits.

Doctor continuity
Doctor continuity is achieved when patients are able to see the same doctor when seeking care. In this thesis, patients which have had more than three physical doctor visits over a 12-month period, and in the majority of those visits have seen the same doctor, are considered to have doctor continuity. Moreover, the share of patients with doctor continuity is calculated by dividing patients with doctor continuity by the number of unique patients with more than three physical doctor visits over the same 12-month period.

eDoctors and digital healthcare platform providers
There are different types of business models for providing digital consultations (Stiernstedt et al., 2019). In this thesis, the terms eDoctors and digital platform providers are used to separate these. eDoctors are defined as digital healthcare providers whose main offer is to provide digital consultations nationwide. These are normally able to provide digital care through cooperation deals with existing physical primary care centres (Stiernstedt et al., 2019). Digital platform providers do not directly deliver care to patients. Instead, they are healthtech-players which sell technical platforms to for example existing traditional care. Thereby, they aid traditional care providers to supply pure digital services to, mainly, their listed patients. Implementing a digital platform can also enable primary care centres to deliver digi-physical healthcare. eDoctors are now also starting to move towards digi-physical healthcare by starting physical primary care centres (Stiernstedt et al., 2019).

Frequent visitors
Patients visiting a certain primary care centre more than five times over a 12-month period are deemed frequent visitors at that centre. Only physical visits

to doctors, nurses or assistant nurses are included in the definition in this thesis.

Triage
Triage is the process of prioritising patients based on care need. Triage is usually done by nurses at primary care centres. Most commonly, triage is done via phone. However, triage can also occur digitally or physically.

Visit
A visit can occur digitally, via telephone or in person, i.e. physically. These can be scheduled in advance or occur on an unplanned basis. The term visit is used for the type of contact that traditionally would occur in person, e.g. it is used for doctor consultations and nurse appointments.

2 Methodology

The section begins with an overview of the methodology. Thereafter, main parts of the methodology are presented in more detail. First, the method used for a descriptive study of the digitalisation of Swedish healthcare is provided. Thereafter, the approach for designing and developing the digi-physical healthcare evaluation framework is presented. Subsequently, the case study approach used for evaluating digi-physical healthcare is described. Last, methods used for assuring credibility are presented.

2.1 Overview of research methodology

The research methodology is divided into five chronological stages, see figure 2.1. In the first stage, the thesis purpose and problem statements are developed and defined in collaboration with the supervisor at Doctrin. The required methodology to answer the research questions is also determined.

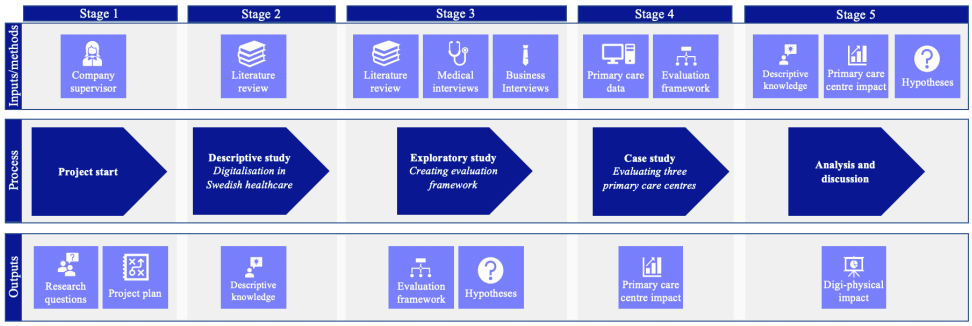

Figure 2.1 Overview of research methodology

In stage two, a descriptive study takes form. It aims to describe the current state of digitalisation in Swedish healthcare and to provide an understanding of how digital healthcare platforms function. The general purpose of a descriptive study is to get an understanding of a specific topic (Höst, Regnell and Runeson, 2006).

The third stage of the study is an exploratory study, which generates a framework for evaluating digi-physical healthcare. The framework is based on the GQM-framework (Höst et al. 2006). First, performance indicators, or goals, relevant for evaluating digi-physical healthcare in a Swedish primary care context are determined. The indicators are elicited through regulatory documents, public investigations and academia combined with unstructured interviews with key people in, and in connection to, the primary care centres. After the performance indicators have been determined, questions, hypotheses and metrics details the framework further so that the evaluation framework can be used to evaluate digi-physical healthcare.

In the fourth stage, the developed evaluation framework in stage three is used in a case study. In total, three primary care centres, which have all implemented a digital healthcare platform which facilitates digi-physical healthcare, are examined. The potential impact of digi-physical healthcare is determined by comparing performance data prior the implementation with performance data post the implementation. The case study approach does not generalise, i.e. the findings may not be assumed to be true in another situation (Höst et al., 2006). Hence, the findings might not be true for another type of care, for another primary care centre, for another digital platform or in another country. However, the case study approach can provide deep learning and understanding of the subject (Höst et al.).

In stage five, the results from the case study are analysed by comparing the output of the primary care centre evaluation with the findings from the descriptive and exploratory study. Differences between the primary care centres are also discussed. Further, a discussion of the implication of the thesis' findings, its results' validity and legitimacy is done.

2.2 Descriptive study: digitalisation of Swedish healthcare

The investigation on digi-physical healthcare by Göran Stiernstedt et al. (2019) is used as a starting point for the descriptive study. This since the study is widely recognised among healthcare professionals and often referred to by the interviewees in this thesis. Given the reliability of the aforementioned study, other main sources in the descriptive study, such as Ekman et al. (2019), The Ministry of Health and Social affairs (2016) and

Gabrielsson-Järhult, Areskoug-Josefsson, and Kammerlind (2019), originates from references made in the study. Moreover, Brennen and Kreiss (2016) and Bloomberg (2018) are used to describe the differences between digitisation, digitalisation and digital transformation. These sources are deemed legitimate given their origin (published encyclopedia and recognised magazine). SKR (2019) is used as main source for the reimbursement models described. This since SKR is the main responsible party for healthcare in Sweden and thus is to trust on the matter of providing correct reimbursement information. As Doctrin's platform Flow is the platform used for the digi-physical healthcare evaluation in this thesis, Doctrin (2020) is a main source in the descriptive study's section on the digital healthcare platform. The descriptive study is also extended with supplementing sources, used to less extent.

2.3 Exploratory study: defining evaluation framework

2.3.1 Design of evaluation framework

2.3.1.1 GQM-model

There are several standard frameworks for structuring and evaluating data. This thesis will extend the GQM-model, promoted by for example Basili, Caldiera & Rombach (1994) and Höst et al. (2006). The model is not specifically developed for healthcare evaluation, however, its generality makes it suitable as a foundation of the evaluation framework.

The GQM model could be described as a two-phase process, according to Basili et al. (1994), or a three-phase process, according to Höst et al. (2006). Basili et al. identify one definition phase and one data phase, while Höst et al. identifies one definition phase, one data collection phase and one evaluation phase. Even though Höst et al. and Basili et al. use different number of phases, the combined content of the phases is in fact the same: the second phase of the structure in Basili et al. is divided into two phases in Höst et al.

2.3.1.1.1 Definition phase

The definition phase is the preparation phase of the data collection. Basili et al. (1994) suggests dividing the definition phase into three levels: the conceptual level, the operational level, and the quantitative level. The

conceptual level is where the purpose of the collection is stated, in GQM-terms titled the goal of the collection. The operational level includes a set of questions in which a categorisation is done by stating questions corresponding to the goals' quality issue. In the quantitative level, a set of data is associated with every question in order to quantify its answer. The definition phase is described in figure 2.2.

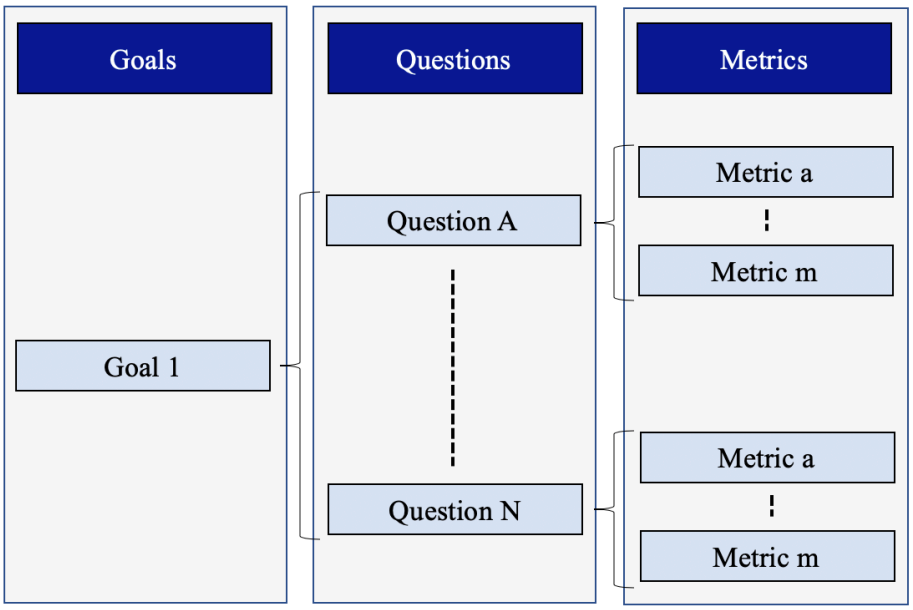

Figure 2.2 The definition phase of the GQM-framework

Basili et al. (1994) determines specific methodological steps to setting goals. The goals should be identified as coordinates along three axes: issue, object and viewpoint, as illustrated in figure 2.3.

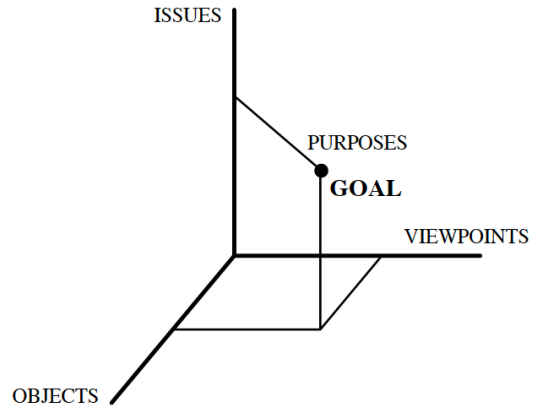

Figure 2.3 Axes of a conceptual goal (Basili et al., 1994)

The Issue-axis corresponds to the specific issue to be investigated, e.g. a process' timeliness or its load. The object-axis corresponds to what should be changed to fix the issue, e.g. change in request-processing. The viewpoint-axis is from where the problem is viewed, e.g. a project manager. These coordinates together specify the goal of the data collection in a structured coordinate system. A purpose also complements the coordinates of the goal. An example of a purpose could be to improve.

Höst et. al. (2006) describes the methodology for setting goals in a slightly different way, however containing the same main structure. The goal is suggested to be defined in such a way that it is possible to phrase it in the following way: "Analyse function X with the purpose AB, with focus on CDE, from the viewpoint of FGH, in the context of company Y". Using the same example as above, the instruction-pattern would be translated into: "Analyse the process with the purpose of improving timeliness, with focus on changing the request-processing, from the viewpoint of the project manager in the context of company Y".

Following the contextual level, a few questions should be introduced to narrow the goal down to the operational level (Höst et al., 2006). For examples se figure 2.4.

- What number of steps is required to complete the service?
- How long time does each step take?
- How much time is planned for each step?
- How are the steps correlated?
- What is the variance of customer behaviours?

Figure 2.4 Example of defining questions based on Höst et al. (2006)

To each of these questions, one should define a hypothesis (Höst et. al., 2006). This to make sure that the answer is measurable in forms of quantifiable data. This leads down to the quantitative level, which is the last part of the defining phase. In this phase, one is to define metrics that would contain sufficient data for answering the questions. Metrics could for example be time per calculation, number of calculations, mean or standard deviation.

2.3.1.1.2 Data phase

The definition phase is followed by the data phase. This is where one specifies and develops the mechanisms of collecting data, collects the data and analyses the data (Höst et. al., 2006).

2.3.1.1.3 Design of thesis framework

As previously mentioned in section 1.2, the aim of the thesis is to evaluate digi-physical healthcare in three areas: quality, efficiency and user satisfaction. One can see these areas as the contextual level in the GQM-framework. However, this would result in wide and unspecific questions and too many metrics per question. The GQM-framework is therefore extended to an AGQM-framework, where A stands for area. The framework will consist of several goals per area, as visualised in figure 2.5.

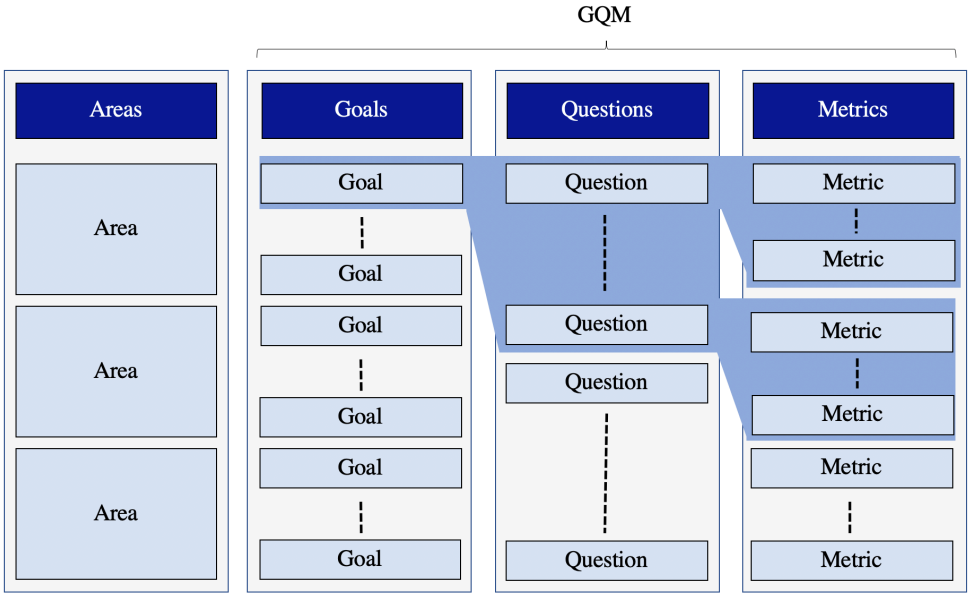

Figure 2.5 AGQM-framework

2.3.2 Eliciting performance indicators

As stated in section 2.1, goals, questions, related hypotheses and metrics of the framework are defined by an exploratory study. The exploratory study is based on a literature study as well as an interview study.

2.3.2.1 Literature study

The thesis grounds its investigation of theoretical performance indicators on three pillars:

- The latest public investigation[1] on digi-physical healthcare by Göran Stiernstedt et al. (2019);
- Swedish legislation on healthcare;
- A systematic literature review

The full list of sources for the literature study is found in table 2.1.

[1] In Swedish: *Statens offentliga utredningar, SOU*

Table 2.1 Sources used in the literature study

Author(s)	*Title*
Abelsson, Morténius, Bergman & Karlsson (2019)	Quality and availability of information in primary healthcare: the patient perspective
Akhavan & Tillgren (2015)	Client/patient perceptions of achieving equity in primary healthcare: a mixed methods study
Andersson Gäre, Areskoug-Josefsson, Avby & Kjellström (2017)	Work motivation among healthcare professionals: A study of well-functioning primary healthcare centres in Sweden
Anell (2015)	Primärvårdens funktion, organisation och ekonomi - en litteraturöversikt
Cabana & Jee (2005)	Does continuity of care improve patient outcomes
Casajuana-Brunet et al. (2006)	Family medicine attributes related to satisfaction, health and costs
Fernholm et al. (2020)	Patient and provider perspectives on reducing risk of harm in primary healthcare: a qualitative questionnaire study in Sweden
Guthrie & Wyke (2006)	Personal continuity and access in UK general practice: a qualitative study of general practitioners' and patients' perceptions of when and how they matter
Johansson, Larsson & Ivarsson (2020)	Patients' Experiences With a Digital Primary Healthcare Concept Using Written Dialogues: A Pilot Study
N/A	Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30))
Rhodes, Sanders & Campbell (2014)	Relationship continuity: when and why do primary care patients think it is safer
van Servellen, Fongwa & Mockus D'Errico (2006)	Continuity of care and quality care outcomes for people experiencing chronic conditions: a literature review
Stiernstedt et al. (2019)	Digifysiskt vårdval - Tillgänglig primärvård baserad på behov och kontinuitet
Wasson et al. (1984)	Continuity of Outpatient Medical Care in Elderly Men: A Randomized Trial
Worral & Knight (2006)	Continuity of care for older patients in family practice: how important is it?
Zakim, Braun, Fritz, & Alscher (2008)	Underutilization of information and knowledge in everyday medical practice: evaluation of a computer-based solution'
Zakim, Fritz, Braun, Fritz & Alscher (2010)	Computerized history-taking as a tool to manage dyslipidemia

2.3.2.1.1 Digi-physical healthcare by Stiernstedt et al. (2019)

In 2019, a public investigation led by the head investigator Göran Stiernstedt, covering digi-physical healthcare, was handed to the minister of Health and Social Affairs. The report, "Digifysiskt vårdval - Tillgänglig primärvård baserad på behov och kontinuitet", is supposed to guide the development of Swedish healthcare. It is therefore considered an important foundation for eliciting performance indicators in the literature study.

2.3.2.1.2 Swedish legislation

The Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30)) is a Swedish framework law[2]. The purpose of the framework law is to state general guidelines and goals for healthcare in Sweden (Vårdgivarguiden, 2017), i.e. the law is written with the purpose to ensure high healthcare quality and healthy inhabitants. One may assume that the law is based on rigorous medical and social consensus, and that the indicators therein are of importance for improving general health. The law is therefore used as a foundation to find healthcare performance indicators.

2.3.2.1.3 Systematic literature review

To academically elicit performance indicators, a literature review on the subject is done. The literature review ensures that the thesis builds upon prior research, as stated by Höst et al. (2006). The thesis is, to the highest extent possible, using peer-reviewed articles from academic journals. To find relevant theoretical literature, the method proposed by Höst et al. is used. Höst et al. describes a typical search process as starting with searching wide, to get a wide as possible understanding of the problem. Subsequently, a selection of articles is chosen for a deeper study and successively followed by an additional, narrowed search for keywords obtained by the deeper study.

To obtain literature, Lubsearch is used. The broader search is performed by searching the database using the keywords *primary care quality sweden*, *primary care efficiency sweden, primary care satisfaction sweden*. After the initial broad search, a selection is made from the criteria:

- Non-disease-specific articles
- Peer-reviewed articles published in academic journals are prioritised

[2] In Swedish: *ramlag*

- Newer articles are considered more relevant than older ones. 2015 was set as an initial lower limit, however older articles are accepted if deemed relevant

Relevant literature is then downloaded and summarised. Relevant sources referred to in the selected papers are also downloaded and used in the thesis. A narrowed search based on *continuity, availability, triage and anamnesis* is done in order to complete the broader search.

2.3.2.1.4 Analysis of literature study

When analysing the data from the literature review, the same process is used for all sources. Firstly, after concluding the sources' relevance for the thesis, they are summarised in approximately ten sentences. This is done in order to get an easily accessible overview of the articles. Following the summary, key words are coded to each source in order to easily get a grasp of the general content of the articles. These key words are thereafter used to structure the outcome of the literature review.

2.3.2.2 Interview study

The design of the interview study is inspired by the "Seven Stages of an Interview Investigation" by Brinkmann & Kvale (2009), see figure 2.6. The seven stages attempt to standardise the interview process by dividing it into several parts.

Figure 2.6 The Seven Stages of an Interview, based on Brinkmann & Kvale (2009)

The first part defined by Brinkmann and Kvale (2009) is called thematising, where the researchers should formulate the purpose of the investigation and be able to answer the questions why and what. The purpose of the interviews in this thesis is to define, by an exploratory approach, the goals of an implementation of digi-physical healthcare at primary care centres. This to establish a relevant framework for evaluation of the digi-physical platform at the primary care centres.

The second part is called designing. This part is where one considers the seven stages and designs the study. The design of the study concerns who to interview and in what way.

In order to get a complete view of the implementation of the digital platform, people with different professional backgrounds and different business roles are interviewed. People with medical roles, e.g. doctors, may see the implementation and its effects from one specific perspective, while business-oriented roles might see it from an economic sense. Furthermore, people outside the day-to-day business, e.g. managers not actually working at the primary care centre, might have another viewpoint than people working with the platform regularly. The list of people that is interviewed is found in table 2.2.

Table 2.2 Interviewees in the interview study

Interviewee	***Description***
Unn Hellberg	*Chief Customer Success Officer at Doctrin*
Maria Ardstål	*Chief Digital Officer at Praktikertjänst*
Amelie Janzon	*Business Coach at Praktikertjänst*
Rebecka Forssander	*Business Coach at Praktikertjänst*
Christina Johansson	*Operations Manager and Physiotherapist, Brahehälsan Primary Care Centre*
Per Svensson	*Operations Manager and Senior Doctor, Herkules Primary Care Centre*
Märit Löfgren	*Senior Doctor, Herkules Primary Care Centre*
Sara Banegas	*Operations Manager and Senior Doctor, Ekerö Primary Care Centre*
Kenneth Jacobsson	*Head Doctor at Praktikertjänst*

For the interviews, an unstructured interview form[3], as defined by Höst et al. (2006), is used. This means that the authors have defined thematic areas and specific questions, however, it is not necessary to ask the questions with the same formulation or order every time. The unstructured interview form fits an exploratory approach. This since the goal of the exploratory approach is to gain knowledge and see what the interviewee has to say. It should also be noted that even though the interviews are carried out with the same

[3] In Swedish: *Öppet riktad intervju*

questionnaire, the interviewees may focus on certain specific areas in the interview, e.g. based on their professional background. Therefore, the outcomes from the interviews might differ in terms of processed thematic areas.

The third part is the interviewing part, where the interviews are conducted. This is done by using the unstructured interview form and contacting the interviewees by telephone or Skype[4]. In some occasions, the interview is conducted physically with the interviewee.

The fourth part is the transcribing part, where the interview is put into words in order to prepare the material for analysis. In consultation with the thesis' supervisor, it is decided to not transcribe the interviews. Instead, notes taken during the interviews is assumed sufficient.

The fifth part of the seven stages is called analysing. The analysis is done in a thematic manner, where elicited evaluation areas, or goals, are summarised in a table. This in order to gather the overall view of relevant evaluation areas. More specifically, the analysis is done by taking inspiration from categorisation described by Gioia, Corley and Hamilton (2013) as well as Brinkmann and Kvale (2009). The data structure presented by Gioia et al. (2013) suggests to first define first order concepts, which corresponds to narrow, specific statements by the interviewees in the interviews. These first order concepts are thereafter digested into fewer, second order themes with a higher level of abstraction. These are subsequently aggregated to dimensions, containing the categories of the statements and concepts, similar to the categorisation proposed by Brinkmann and Kvale (2009). These categories correspond to the goals, or quality indicators, used to develop the framework. The structure provides a logic between statements and categories, enabling the authors to compare interview results by comparing the general themes brought up in the interviews. A visualisation is found in figure 2.7.

[4] Or any other software for internet calls, such as *Teams* or *Facetime*

First order / Concept	Second order / Themes	Aggregate dimension / Category
"Nurses get stressed by their telephone schedule"	Stress at work	Work environment
"Too many patients per day causes stress"		
"It is easier for the nurses to ask questions to the doctors"	Teamwork	
"Teamwork might be improved by using a digital platform"		

Figure 2.7 Example of the data structure used for qualitative analysis

The sixth step is the verifying step, where one ascertains validity, reliability and generalisability of the findings. This is done by comparing the result of the interview study with the result of the literature study as well as letting interviewees take part of the results.

The seventh and last step is reporting, which is to communicate findings and the method in a scientific custom. This is done by reporting the findings in this thesis.

2.3.2.3 Other sources

Apart from a literature study and interviews, findings from a seminar at Praktikertjänst Skåne are also included in the thesis. The subject of the seminar was the goals related to the implementation of the digital platform Flow, i.e. the seminar covered the same subjects as the interviews.

2.4 Case study: evaluation of digi-physical healthcare

To evaluate the impact of digi-physical healthcare, the evaluation framework defined in the exploratory study is used in a case study of three primary care centres. The evaluation framework uses primary care data as input, as well as the data from a survey. The survey is responded to by healthcare professionals at the primary care centres.

2.4.1 Primary care data

Data for the evaluation framework is gathered from several sources. These sources include the medical record systems and the telephone systems at the three primary care centres along with data from their central organisation, Praktikertjänst. Data is also collected from Doctrin's, i.e. the platform provider's, database. To comply with patient anonymity requirements as well as the General Data Protection Regulation, the data have to be anonymised. Central data from Praktikertjänst and Doctrin is collected on an aggregated, anonymised level, while the data from the primary care centres is anonymised at the physical locations of the primary care centres. To get an indication of the impact of the digital platform on the healthcare centres, data is extracted both before the digital platform was introduced as well as after it was introduced.

2.4.2 Survey data

In cases where data cannot be obtained through databases, such as when data is not previously measured or when the metric is a measure of a psychosocial issue, surveys are used. According to Höst et al. (2006) surveys may be mailed, digitally distributed, distributed to a regularly static group (e.g. to people at the same workplace), distributed to visitors or distributed to interested. The survey distributed in this research is distributed digitally to people at the workplaces, e.g. nurses, doctors or other people working with the platform. Since the population is small a total investigation (Höst et al.) is used.

2.4.3 Analysis of data

The time series available for the study do not allow for statistical methods such as time series analysis and paired t-tests. Therefore, averages of periods before the implementation is compared to averages of periods after the implementation. The percentage change between the two averages is used to determine whether the implementation of the platform correlates positively or negatively with performance changes at the primary care centres. For further explanation of determining impact, see appendix A. The length of the time series used to calculate averages depends on the number of data points available at the specific care centre: if the platform was implemented x months before 1 March 2020, the average before will be calculated using data

x months before the implementation date and the average after will be calculated using data x months after the implementation date. Time periods used for calculating averages prior/post the implementation of the digital platform at the different primary care centres can be found in table 2.3.

Table 2.3 Time periods used for calculating averages prior/post the implementation of the digital platform

Centre	*Period prior*	*Period post*	*# months*
A	2018/01-2019/01	2019/02-2020/02	13
B	2019/05 - 2019/09	2019/10-2020/02	5
C	2019/03 - 2019/08	2019/09-2020/02	6

However, averages might be problematic in terms of determining impact over time. To exemplify, by comparing averages one might miss whether the implementation of the platform breaks a negative or positive trend, as seen in figure 2.8.

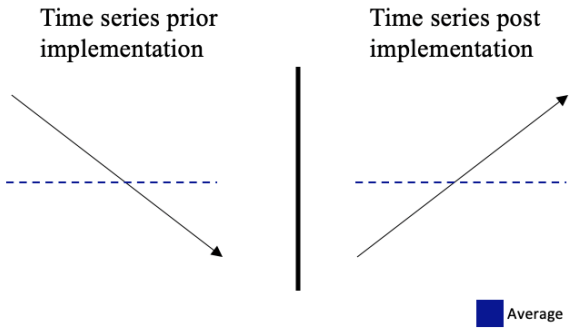

Figure 2.8 The average measure miss impact of implementation

The average before and after will be the same, and indicate no impact, even if the implementation actually seems to have a positive impact. Further, calculating averages might wrongfully assume that the implementation breaks a trend, as described in figure 2.9.

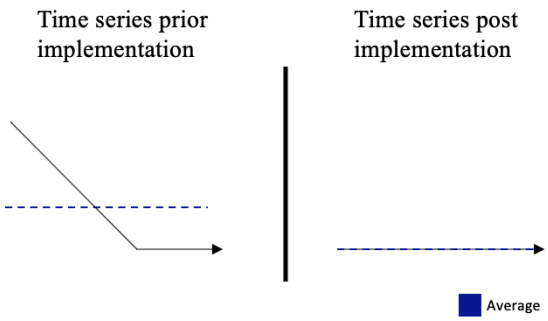

Figure 2.9 The average measure wrongfully assumes impact of implementation

In this case, the average will be lower after the implementation, even if the implementation did not have a negative impact.

For the survey data, the analysis is done by marking the answers as positive, neutral or negative. The answers in the survey are from 1 to 5. Depending on the question, 1 is either be the most negative answer or the most positive answer. If 1 is the most negative answer, 1 and 2 are marked negative, while 4 and 5 are marked positive. If 1 is the most positive answer, 1 and 2 are marked positive, while 4 and 5 are marked negative. For a full list of the questions and explanation to its marking, see appendix B.

2.4.3.1 Strategy to determine impact

The strategy used to determine whether the numeric results indicate a positive, neutral or negative impact is described in table 2.4. Type of metric describes if the result data is a percentage change prior/post the implementation, e.g. the change in continuity before and after the implementation of the platform, or if the metric is based on answers from the survey.

Table 2.4 Strategy for determining impact, per centre

Type of metric	*Positive*	*Uncertain*	*Negative*
Percentage change, where an increase is positive for the primary care centre	>0%	0%	<0%
Percentage change, where a decrease is positive for the primary care centre	<0%	0%	>0%
Survey answer	>33% positive <33% negative	All other	<33% positive >33% negative

The total impact is thereafter determined combining the impacts on each primary care centre. The strategy is described in table 2.5. Case 1, case 2, case 3 describe hypothetical impacts on primary care centres, and the order of the impacts is independent, i.e. it does not depend which care centre has which impact to determine the final impact. To exemplify, the three first rows are described in text:

Row 1. Three positive impacts equal a total positive impact

Row 2. Two positive impacts and one uncertain impact equals a total positive impact

Row 3. One positive and two uncertain impacts equals a total uncertain impact

Table 2.5 Strategy for determining impact, total

Case 1	*Case 2*	*Case 3*	*Total impact*

2.5 Credibility of research

To assess the credibility of a thesis, Höst et al. (2006) propose to evaluate the thesis from three perspectives: reliability, validity and representativeness. Reliability concerns the precision of the data collection and the data analysis. Höst et al. suggests that reliability will increase by being meticulous when collecting data, as well as letting a third party inspect the data collection. To increase reliability in this thesis, the data is extracted meticulously and inspiration on data collection is taken from prior internal evaluations at Doctrin. However, to increase reliability further, one would need to ensure a random selection of primary care centres, which is further discussed in section 7.2.

Validity is the relationship between the investigated object and what is actually measured (Höst et al, 2006). According to Höst et al., validity could be improved by triangulating, i.e. studying the same object with several methods. In the framework creation, triangulating is done by performing both a literature study as well as an interview study. In the evaluation of the impact on the primary care centres, triangulating is done by using both data from the primary care centres as well as survey data. However, it might still be difficult to exclude external effects affecting the primary care centres, due to complexity of healthcare. This will be further elaborated in section 7.2.

Representativeness is, according to Höst et al. (2006), how well the conclusions are generalisable on the whole population. As mentioned in section 1.3, the nature of the case study makes the generalisability low. Thus, larger studies would have to be done in order to increase the representativeness, see section 7.2 for a more elaborative discussion.

3 Digitalisation and its implications for Swedish healthcare

Overall, this chapter aims to provide the reader with a deeper understanding of digitalisation in the context of Swedish healthcare. The knowledge lays the foundation for a more elaborate analysis of the wider implications of the thesis' results. The section begins with a description of how the similar concepts digitisation, digitalisation and digital transformation differ and are used throughout the thesis. Thereafter, an overview of why Swedish healthcare, and particularly Swedish primary care, needs to be digitalised follow. Information on the digitalisation of Swedish primary care is also provided. Lastly, basic information on reimbursement models for traditional and pure digital care and a view on the future of digital healthcare is presented.

3.1 Digitisation, digitalisation and digital transformation

According to Brennen and Kreiss (2016), there is value in making a distinction between the two interrelated concepts digitisation and digitalisation, which are often used in literature with varying definitions and interchangeability. The authors define digitisation as "the material process of converting analog streams of information into digital bits" and digitalisation as "the way many domains of social life are restructured around digital communication and media infrastructures". Additionally, they highlight that digitalisation discusses the impact digitisation has on social structures and how digital media affect the modern world.

In contrast to Brennen and Kreiss (2016), The Ministry of Health and Social affairs (2016) uses the concept digitisation in their vision for eHealth 2025 to describe the conversion of analog data to bits and its societal implications, e.g. how information technologies, IT, are changing services. According to the Ministry, new innovative information and communication technology

tools drive digitisation, which have greatly impacted the manner in which we in society choose to interact with each other. Meetings no longer have to occur in the physical world and services can be adapted to individual user needs. Moreover, the Ministry highlight that Swedish society is already highly digitised, with a history of companies pioneering the information and communication field and a high ranking globally in terms of citizens' digital maturity.

Bloomberg (2018, 29 April) defines the third concept, digital transformation, as "the customer-driven strategic business transformation that requires cross-cutting organizational change as well as the implementation of digital technologies", i.e. customer focus and change management is central and facilitate digitalisation undertakings. Moreover, Bloomberg summarise the difference between digitisation, digitalisation and digital transformation in the following manner:

> *"We digitize information, we digitalize processes and roles that make up the operations of a business, and we digitally transform the business and its strategy. Each one is necessary but not sufficient for the next, and most importantly, digitization and digitalization are essentially about technology, but digital transformation is not. Digital transformation is about the customer."*

To summarise, in line with Brennen and Kreiss (2016), this thesis defines the concept digitisation as conversion of analogue information to digital and digitalisation as the broader and, or, social impacts of digital communication and IT. Digital transformation is, in accordance with the reasoning of Bloomberg (2018, 29 April), defined as a term used to express digitalisation undertakings in combination with the change management and people focus required.

3.2 Digitalisation of Swedish healthcare

3.2.1 Reasons for digitalising Swedish Healthcare

Healthcare is one of the major areas of public spending, corresponding to approximately 14% of total expenditure (Sweden.se, 2019). Thus, efficiency within the area is highly important to ensure efficient use of taxes. Additionally, The Ministry of Health and Social Affairs (2016) emphasises that the need for increased efficiency is also high due to, firstly, patients expecting more of their care providers, and secondly, Sweden's aging

population. Stiernstedt et al. (2019) also emphasises that Swedish healthcare is highly limited in terms of resources, consequently, stressing the need for efficiency.

The efficiency issues within healthcare are highly related to digitalisation in the sense that digitalisation, according to the Ministry of Health and Social Affairs (2016), could be a mean to gain the much-needed efficiency increase. The Ministry also point out that digitalisation can be a significant catalyser for improving quality of service, both for patients and service providers within health and medical care. This is supported Stiernstedt et al. (2019), who state that healthcare accessibility and efficiency may increase by digitalising Swedish healthcare.

Digitalisation of Swedish healthcare also has several other potential benefits. According to the The Ministry of Health and Social Affairs (2016), patient experience can in general improve with digitisation. This since communication and IT can help patients become more informed, independent and in control of their care, which is generally appreciated amongst patients, and contributes to better health. Access to information and efficient communication enables patients to be more actively involved in decisions regarding their own health. Patients can also easier access their information and get support tailored to their individual needs. Moreover, patients who previously have struggled to communicate with healthcare, due to the traditional communication channels being poorly adapted to their needs, can now connect in ways that fit them.

The Ministry of Health and Social Affairs (2016) also believes that service providers can see wide-ranging operational development from digitisation in terms of better follow-up and support systems, more efficient and equal services, and improved information handling. Work-environment improvements can also occur from new and better documentation and decision-making processes, both in terms of quality and efficiency. Moreover, communication technologies are not only for the communication between the service providers and their patients, but also for communication amid providers and communication between different roles at care centres. Additionally, the Ministry of Health and Social Affairs is of the opinion that digitalisation of healthcare can bring new and improved procedures and methods, aid research and increase equality within healthcare by adapting to user needs and reducing discrimination due to e.g. gender and socio-economic factors.

3.2.2 Reasons for digitalisation of Swedish primary care

According to the study "Utilization of digital primary care in Sweden" by Ekman et al. (2019), Swedish primary care quality is considered to be high internationally. However, public opinion is that Swedish primary care accessibility has decreased. For example, Stiernstedt et al. (2019) state that when booking a visit at a primary care centre nowadays, six weeks waiting time is normal. Moreover, Stiernstedt et al. describes that Swedish primary care has other negative aspects. For example, all patients do not have a single point of contact at the primary care centre, affecting continuity negatively. Moreover, the triaging of patients is not always done well, causing patients to receive a doctor appointment despite no true need. Hence, the limited healthcare resources are used in an inefficient way. Moreover, Ekman et al. mean that Regions are not able to uphold the national patient guarantee, which requires primary care providers to supply care within a certain amount of time. Users are also less satisfied with traditional care and many users find the healthcare system complex. Thus, in line with general healthcare as described in section 3.2.1, primary care could possibly gain from digitalisation.

Potential benefits of digitalising primary care centres are for example described by Stiernstedt et al. (2019). The authors mean that digitalisation offer care providers higher flexibility and autonomy, as well as a better work-environment. This by for example enabling personnel to more freely choose work hours and physical workplace according to individual needs. Moreover, Stiernstedt et al. emphasises that efficiency and quality in primary care can increase by digitalising the follow-up, anamnesis, and triage process.

3.2.3 Digitalisation of Swedish primary care

3.2.3.1 Digital primary care, increased usage and associated criticism

Due to primarily regulation changes, healthcare digitalisation has in recent years disrupted traditional primary care (Stiernstedt et al., 2019). Ekman et al. (2019) explains that from the time of the emerge of private digital primary care providers in mid-2016, until the end of their study in December 2017, the use of digital primary care has significantly increased in Sweden. Ekman et al. also concludes that about two percent of all doctor-led primary care visits are performed through digital consultations. The Ekman et al. predict that usage of digital healthcare will increase in coming years and that digital healthcare will extend in scope.

As the use of digital primary care has increased, it has been subject to wide criticism. Firstly, concern is raised regarding private digital healthcare providers primarily delivering care to those with less actual need of care and better socioeconomic status to gain easy profits, from the mainly publicly funded healthcare system (Ekman et al., 2019). Similarly, Stiernstedt et al. (2019), describes that eDoctors have been criticised for their heavy marketing, which some feel violates to principle of prioritising care for those most in need and encourages unnecessary care. A third aspect is the suspicion that eDoctors prescribe antibiotics more liberal than regular primary care centres. Decreasing the usage of antibiotics is brought up as a world health issue by the UN News (2019, 29 April), and has been brought up as a potential problem for digital medical appointments, both internationally (Ray et al., 2019) and nationally (Cederberg, 2017, 17 May).

However, eDoctors have also been key drivers of the digitalisation of Swedish primary care. This perspective might add some nuance to the discussion of their positive versus negative societal impact. Moreover, Stiernstedt et al. (2019) points out that the Swedish healthcare system has not been able to keep up with the digitalisation wave, i.e. regulation has not been adapted to the establishment of eDoctors. Thus, eDoctors have been allowed to operate on other grounds than traditional primary care providers. Naturally, this may provoke different stakeholders.

3.2.3.2 Usage of digital primary care and its effects

Although many believe that digital primary care makes care more accessible and provides high user satisfaction, it is uncertain how digital primary care is actually used and what impact it has. There are also uncertainties regarding its effects and how patient safety and efficiency are assured in digital medical consultation in a European context. (Ekman et al., 2019.) This is further emphasised by Stiernstedt et al. (2019), which states that *"*there are yet few Swedish studies that highlight the use of digital healthcare services in comparison to traditional care" [5].

The mentioned lack of knowledge of the impact of digital consultations, has encouraged investigations on how digital healthcare is used, and by whom. Ekman et al. (2019) has explored how digital primary care is actually used in

[5] Authors' translation from Swedish to English

Sweden by comparing digital out-of-county consultation data from the Jönköping Region with traditional care data from Kronoberg Region. Since data from digital consultations, initiated by in-county patients in the Jönköping Region is not included, about 10% of the total data for Swedish digital consultations is not included.

According to Ekman et al. (2019) digital healthcare is consumed less in rural areas than in metropolitan areas. Healthcare is used less by those of lower socioeconomic status than those of higher. This aligns with how traditional, physical care is used. Data also shows that care is sought at similar times and days of the week as traditional care. Although all ages use digital healthcare, the users are on average younger than those who use traditional, office-hours, care and few elderly use digital services. Meanwhile, younger adults and parents with little children are the most frequent users. Moreover, the usage pattern, defined as frequency of use per age, resembles the usage pattern seen in telephone contacts with nurses and in out-of-hours care, see figure 3.1. Generally, publicly funded patients using digital healthcare are more often female than male, while the opposite applies for privately funded patients. Privately funded users are also on average older.

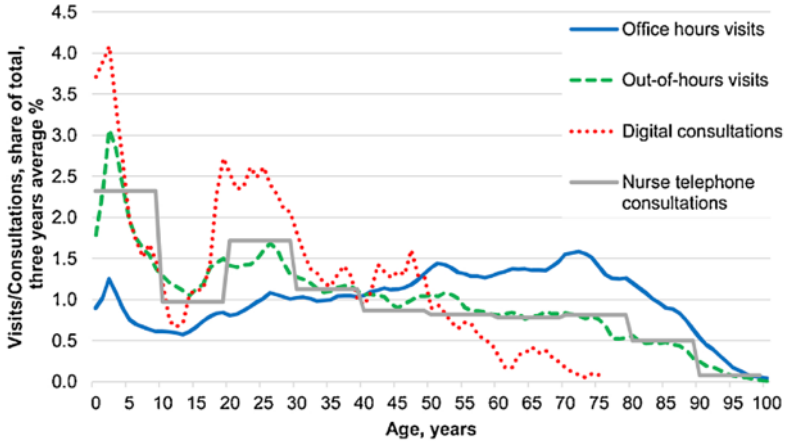

Figure 3.1 Visits and consultations by age and type of contact (Ekman et al., 2019)

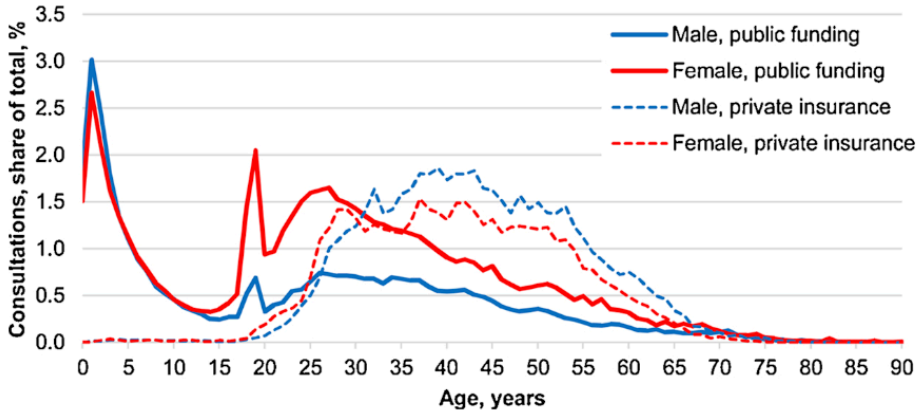

Figure 3.2 Visits and consultations by age and sex (Ekman et al., 2019)

Ekman et al. (2019) further explains that the high usage of digital healthcare amongst women aged 18 and 19, as described in figure 3.2, is, or at least partly is, due to use of contraceptives and price regulations causing visits to, in most areas, be free for patients aged 20 and under. According to Ekman et al., the lower use of digital healthcare among those of lower socioeconomic status may be derived from their relative lower Internet access.

Moreover, Ekman et al. (2019) concludes that during office-hours in traditional physical primary care, common diagnoses for young children aged 0-9 are respiratory and ear infections, while skin issues are most common in digital healthcare for the same age-group. Generally, acute URI, i.e. acute respiratory infection, is a common diagnosis for both traditional and digital primary care. Urinary tract infection is a typical diagnosis amongst women in both digital primary care and out-of-hours, physical care, while issues like depression are more usual in traditional, office-hours, care. Tonsillitis and acne are other examples of usual diagnoses for digital primary care. Moreover, Stiernstedt et al. (2019) states that "the diagnosis-spectra is the same as in emergency primary care"[6]. Ekman et al. further describes that, as indicated by these facts, physical visits for some conditions may in the future be substituted by digital healthcare. Digital healthcare may actually be better at satisfying some patients' needs. The study by Ekman et al. also concludes that more studies are needed for proper evaluation of digital primary care to understand how, and to which extent, it can efficiently substitute traditional care.

[6] Authors' translation from Swedish to English

Similar to Ekman et al. (2019), Gabrielsson-Järhult et al. (2019) have evaluated digital primary care. The study examined data gathered from September 2017 to January 2019. In line with the reasoning by Ekman et al. and Stiernstedt et al. (2019), the authors confirm that prior evaluation information on digital healthcare is lacking. The study shows similar usage patterns for digital healthcare as the study by Ekman et al. in terms of age and gender of users, as well as for common diagnoses. Gabrielsson-Järhult et al. further finds that most digital visits are performed by a doctor and less than 5% seek on-site care afterwards. According to the authors, the latter indicates that the patient generally needs no further care and that patients seek digital help for minor issues. Moreover, the study states that patients experience that digital healthcare provides have high accessibility, high safety and high professionalism. Patients also see the service as smart in terms of resource usage.

3.2.3.3 Digital healthcare providers and their operation models

Min Doktor and Kry, founded in 2013 and 2014 respectively, were early players on the Swedish digital healthcare market (Stiernstedt et al., 2019). Today, they provide approximately 90% of all digital visits (Ekman et al., 2019). There are several more players, including platform providers, on the Swedish digital healthcare market with other operation models than the early eDoctors. Digital platform providers such as Doctrin offers primary care centres tools for providing their patients with digital healthcare. Doctrin's white label MedTech-platform, Flow, is for example used by Capio and Praktikertjänst. Moreover, today not only private actors supply digital healthcare, but also many Regions.

As of 2015, Kry and Min Doktor, are legally based in Region Jönköping. This since the Region, according to Ekman et al. (2019), started to allow digital healthcare providers to function within the regional healthcare system and be compensated per consultation consistent with an in-county or out-of-county schedule. In other words, eDoctors could through regulatory changes in the Region serve both in-county and out-of-county patients digitally with compensation. Ekman et al. further explains that the only condition was that eDoctors needed cooperation agreements with physical care providers in the Region to operate. In 2019, according to Stiernstedt et al., many eDoctors shifted regulatory base from Jönköping Region to Sörmland Region. This since the in-county patients in Sörmland do not have to pay for primary care visits, including digital ones.

3.3 Reimbursement models

3.3.1 Traditional reimbursement models

The traditional reimbursement model for primary care centres is different for different regions, however the model contains the same elements. One part of the model is the capitation, which is a reimbursement based on the number of listings. This is typically the largest share of reimbursement. There is also a floating reimbursement based on the number of office visits, as well as goal-based, coverage-based and geographically based reimbursements.

3.3.2 Capitation, or fixed, reimbursement

SKR (2019) describes the fixed reimbursement as a fixed, risk-adjusted capitation reimbursement. The reimbursement is based on the number of listings at the healthcare centre and is adjusted to take into account the differences in healthcare need of people. According to SKR, the regions use one major measure for socioeconomic status, care need index, and one major measure for healthcare need, adjusted clinical groups, to adjust the capitation

The care need index, CNI, is based on seven factors:

Share of...
- ... patients over 65 years old
- ... patients born outside of Sweden
- ... patients unemployed (or not in education) between 16 and 64 years old
- ... patients who are a single parent with children 17 years old or younger
- ... patients who have moved into the area
- ... patients with low level of education and between 25 and 64 years old
- ... patients younger than five years old

Figure 3.3 Factors of CNI-measure, SKR (2019)

The adjusted clinical groups, ACG, is based on five factors:

- The duration of the condition
- The seriousness of the condition
- Diagnostic safety
- Etiology
- Need of specialised care

Figure 3.4 Factors of ACG-measure, SKR (2019)

The two measures are used to calculate weights. A weight-value of one equals an average patient group, a weight-value less than one equals a patient group with less care-intensive characteristics and a weight-value larger than one indicates a care-intensive patient group. To exemplify, a primary care centre with CNI-value of 1.5 and ACG of 0.5 has patients with lower socioeconomic status although better general health condition. Regions may also base the capitation on sex and age.

3.3.2.1 Floating reimbursement

The floating reimbursement is based on number of visits at the centre, and varies depending on where the patient is listed (SKR, 2019). The reimbursement is low when the patient is listed at the primary care centre it visits and high if the patient is listed in another region. The reimbursement is on a medium level if the patient is unlisted or listed at another primary care centre in the region. SKR states further that the reimbursement also may vary depending on what type of healthcare professional the patient is meeting.

3.3.2.2 Other reimbursement

Additionally, the primary care centres can be reimbursed based on goal-related factors. According to SKR (2019), these could either be pure reimbursements if a goal is fulfilled, or a deduction of the total reimbursement if goals are not fulfilled. To encourage primary care centres to minimise the referrals to specialty care, coverage-based reimbursement may also be used. To compensate for different geographical conditions, such as distance to patients, infrastructural communications and other geographical factors.

3.3.3 Digital reimbursement model

The previously mentioned out-of-county patients, are according to Stiernstedt et al. (2019), common for digital providers, thus the reimbursement for out-of-county visits becomes central for digital providers. The authors describe that the out-of-county digital visit reimbursement was originally SEK 2 000 per consultation in Jönköping. Since then, the reimbursement level has decreased substantially. Ekman et al. (2019) states that for changes in reimbursement to be fair, knowledge of digital healthcare's cost-efficiency must increase. The authors' study also show that although the reimbursement levels have generally lowered with time, the

overall trend is that overall public spending on digital healthcare is increasing.

3.3.4 Reimbursement for traditional compared to digital healthcare

A difference between traditional physical primary care and digital healthcare lies within how they are reimbursed. According to Ekman et al. (2019), Swedish physical primary care providers are reimbursed through capitation and fee-for service, while digital providers are reimbursed per-visit. The authors explain that generally, in Sweden, in-county physical doctor consultations are reimbursed with less than digital out-of-county ones. This means that digital out-of-county care is today more financially beneficial to offer, than integrated in-county digital healthcare. Stiernstedt et al. (2019) approximates that on average, the percentual country wide additional cost for digital out-of-county doctor consultations is 340%, comparing the digital out-of-county visits cost to the cost the visits would have generated if they were in-county non-digital visits made by listed patients. Moreover, the percentual additional cost does not take into account that some of the cost are allocated to Sörmland Region and Jönköping Region, which takes out a 5 and 2 percent margin from the private digital providers reimbursement. Moreover, the authors highlight that the digital healthcare providers' per-visit reimbursement model incentivise them to provide high accessibility. In contrast, high capitation has the opposite effect. Additionally, the way the reimbursement system is set up today, with out-of-county digital visits being reimbursed per-visit, eDoctors are less keen on putting resources into the development of smart tools for higher care efficiency, i.e. in terms of number of visits.

3.4 Digi-physical healthcare as the future of digital healthcare

Stiernstedt et al. (2019) mean that for digital healthcare to truly aid patients, care providers and the society at large, the distance between traditional physical care and digital healthcare must lessen. Digital healthcare platform providers aid this process. They digitalise traditional care instead of operating in parallel with it. Stiernstedt et al. describes that in digi-physical healthcare each provider provides both physical and digital healthcare, either in-house or through out-sourcing. A clearer point of contact for the patient

can be achieved by this, lessening the patient's confusion of which provider or actor to contact for what. In turn, patients seeking care at the right care level can decrease the general consumption of care.

After finishing this chapter on digitalisation and its implications by pointing to the importance of digi-physical healthcare and digital healthcare platforms, the next chapter will present information on the specific digital healthcare platform used for the digi-physical healthcare evaluation in this thesis.

4 The digital healthcare platform

To understand the evaluation framework and the digi-physical healthcare evaluation in this thesis, some knowledge about the digital platform used in the evaluation process is needed. Therefore, this section provides information about the platform and its main features.

4.1 Doctrin and the digital healthcare platform Flow

Doctrin, a start-up founded in Stockholm 2016, provides a digital platform, Flow, to primary care centres in Sweden (Doctrin, 2020a). The digital platform allows traditional care providers to provide digital services along with their traditional services and automates some of the traditional work in a primary healthcare centre, i.e. enables digi-physical healthcare. An overview of the patient journey using Flow is presented in figure 4.1. Flow's possible impact on primary care centres was first evaluated at the primary care centre Capio Ringen in 2018 (Stiernstedt et al., 2019). According to the evaluation, the use of the platform improved, amongst other things, continuity, teamwork, work environment, phone accessibility, physical walk-in waiting time and prioritisation of whom to help according to real need.

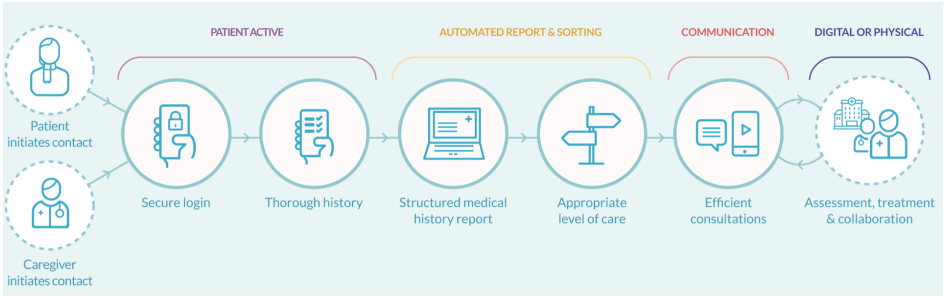

Figure 4.1 The patient journey using Flow (Doctrin, 2020b)

4.1.1 Re-designing the primary care contact

The standard procedure for contacting primary care centres today is that patients call the care centre. In a best-case scenario, a patient calling may be put in queue to speak, or directly speak, to a healthcare professional, e.g. a nurse. The answering healthcare professional will then perform a brief anamnesis of the condition of the patient and, if necessary, book a physical appointment. However, telephone queue might be full or closed for the day which is why primary care centres might not fulfil the Treatment Guarantee (1177, 2020), which states that a person is guaranteed to get in contact with the healthcare centre the day of seeking care. To ease this procedure, the contact process through the digital platform is re-designed. A case is started by signing in with Bank-ID on a smartphone, tablet or computer. The patient can initiate contact whenever, there is never a full queue or closed hours (Doctrin, 2020b).

4.1.2 Automated anamnesis and medical overviews

When a patient starts a new medical case, they have to answer questions regarding symptoms and medical history (Doctrin, 2020b). The questions are adapted to each patient based on a number of factors, such as sex, age and symptoms. These questions produce a medical overview, available to the healthcare professionals. The healthcare professionals use the medical report to decide on the correct level of care, and might next give the patient selfcare advice, schedule a meeting for a first examination, lab tests or digital consultations with staff at the healthcare centre. The overview generated by the questions also enables smarter prioritising based on the need of each patient. The caregivers may also start chatting with the patient to get more information if needed.

4.1.3 Digital asynchronous communication

When a patient and a caregiver are connected through the platform, they can communicate asynchronously using chat (Doctrin, 2020b). The chat function supports patients sending photos and healthcare providers sending photos or documents to the patient. The patient may contact the caregiver at any time, and time-constraining factors such as the time of the day or work situations are not restraining the possibility for contact. The healthcare professionals respond to patients in the platform during regular opening hours.

Sometimes, the healthcare centre needs to come in contact with an existing patient. This could for example be when the caregiver needs to send out test results or book a new appointment. The standard today is doing this by telephone or by post. The digi-physical platform provides a healthcare-initiated contact (Doctrin, 2020b). This means that, unlike calling, a healthcare professional may contact a patient regardless if the patient is available or not. It also means that the caregiver does not have to produce a physical letter and bear the cost for such actions. The patient can thereafter answer when suitable.

The platform also enables asynchronous collaboration between healthcare professionals in the platform (Doctrin, 2020b). If a caregiver needs input from another profession, such as a doctor or a physiotherapist, this could be done directly in the platform. If another person needs to take over the case, this can also be done within the platform, where all medical history and dialogue are gathered.

4.1.4 Video visits

For some patient cases, it is not necessary to have a physical visit. This is exemplified by the rise of eDoctors such as Kry and MinDoktor (Sprengel, 2018, 15 January). In the same manner, the digital platform enables video appointments for caregivers and patients (Doctrin, 2020b). The video appointments are done directly in the application and does not require additional software.

4.1.5 Short summary

To summarise, this chapter has described how the digital healthcare platform function and how it can alter the way care providers at primary care centres work with patients. The chapter has also clarified that digi-physical healthcare is the integrated physical and digital care an implementation of the digital platform enables. In the next chapter, an evaluation framework for digi-physical healthcare, based on the digital platform described in this chapter, is constructed.

5 Construction of the evaluation framework

In this section, the evaluation framework is formed. First, goals which constitute the first part of the evaluation framework are presented. To be exact, goals elicited in the literature study are followed by goals elicited in the interview study. Thereafter, the found goals are aggregated and merged. The goals can be thought of as primary care quality, efficiency or satisfaction indicators. The evaluation framework is next expanded with questions, relating hypotheses and connecting metrics. Lastly, a summary of the developed framework is provided.

5.1 Goals

5.1.1 Literature findings

The systematic literature review, Stiernstedt et al. (2019) and Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30)) together generate useful goals for digi-physical healthcare. The obtained goals, see table 5.1, include continuity, availability, consultation time, communication, triage, anamnesis, patient satisfaction, cost efficiency and work environment.

Table 5.1 Goals elicited via the literature study

Author(s)	*Goal(s)*
Abelsson et al. (2019)	Continuity, communication
Akhavan & Tillgren (2015)	Availability, continuity, patient satisfaction
Andersson Gäre et al. (2017)	Work environment
Anell (2015)	Continuity, triage, patient satisfaction
Cabana & Jee (2005)	Continuity
Casajuana-Brunet et al. (2006)	Continuity
Fernholm et al. (2020)	Continuity, communication
Guthrie & Wyke (2006)	Continuity, availability, patient satisfaction
Johansson et al. (2020)	Triage, communication
Rhodes, Sanders & Campbell (2014)	Continuity
van Servellen et al. (2006)	Continuity
Stiernstedt et al. (2019)	Availability, continuity, work environment, communication
Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30))	Availability, triage, continuity, work environment, communication, use of resources
Wasson et al. (1984)	Continuity
Worral & Knight (2006)	Continuity
Zakim et al. (2008)	Anamnesis
Zakim et al. (2010)	Anamnesis

To share further insights from the literature study, some of the performance indicators are elaborated in the following sections.

5.1.1.1 Availability

Availability is one of the clearest stated goals of Swedish healthcare. This is defined in Chapter 5 Section 1 of the Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30)) as well as by Stiernstedt et al. (2019). According to the Treatment Guarantee (1177, 2020), an individual

should be able to get in contact with primary care the same day as seeking care. Within three days, a medical assessment should be done and if needed, a visit to specialty care should be available within 90 days.

It is natural to argue that availability impact medical outcomes. If a patient does not get medical treatment in time, minor issues might get fatal. However, according to the systematic literature review, availability is also an equity factor. This is thoroughly investigated in literature. Akhavan and Tillgren (2015) is, in their mixed method qualitative study, investigating what makes primary healthcare equal. They highlight, along with other factors, access to healthcare, i.e. availability, and non-stressful appointments as important factors of achieving equity. When discussing availability, Akhavan and Tillgren reports that participants were generally satisfied as long as they could get in touch by phone and make an appointment. However, some patients experienced problems with long waiting times, when calling the primary care centre. Additionally, non-native speakers were sometimes struggling to express themselves when calling in. In conclusion, the study found that shorter waiting times and more efficient ways of communicating would infer a higher level of access to healthcare.

Availability and rapid responses from healthcare providers seem to be even more important for non-chronic patients. A qualitative analysis of semi-structured interviews, presented in a paper by Guthrie and Wyke (2006), found that although all interviewed patients had availability as one of their top priorities in primary care, patients without any ongoing or chronic diseases valued rapid access over personal continuity.

5.1.1.2 Triage

Triage is when a patient is transmitted to the correct level of care, i.e. if the patient should visit primary care, emergency care, specialty care or no care at all, as defined in section 1.5. The sentence “The individual with the largest need of care should be prioritised in healthcare” in Chapter 1 Section 1 of the Swedish Health and Medical Service Act (sw. Hälso- och sjukvårdslagen (2017:30)) indicates that triage is important as a performance indicator.

In academia, digital triaging is for example examined in a pilot study by Johansson et al. (2020). In the study, patients were triaged digitally through written dialogues rather than through regular phone calls, which is the Swedish standard procedure. The triage was later evaluated in the areas of communication, technical functionality and general experience. Patients

experienced a risk of incorrect assessment and a risk in doctors' ability to asses correct care needs, however, a majority of patients felt validated. In terms of communication, the written dialogue provided the same opportunity for advice, support and was even a better media of communication for specific female or male diseases, according to the patients. Johansson et al. conclude that the patients had an overall good experience with a written dialogue concept.

5.1.1.3 Continuity

According to Chapter 5 Section 1 of the Swedish Health and Medical Service Act, primary care in Sweden is enforced to target a high continuity level. Stiernstedt et al. (2019) as well point out that continuity shall highly influence the governance of healthcare. This since it can positively impact efficiency and safety of care, according to the authors. Moreover, Stiernstedt et al. define continuity as regularly visiting the same health professional, in particular the same doctor.

In literature, continuity is a well-explored area, from an efficiency perspective, a medical perspective and a satisfactory perspective. In a literature review from 2015, Anell explains the importance of continuity. Several observational studies (Cabana & Jee, 2004; van Servellen et al., 2006; Worral and Knight, 2006; Sans-Corrales et al., 2006), reviewed by Anell (2015), show correlation between continuity and patient satisfaction, disease prevention, treatment alignment, fewer hospitalisation days, better general health and increased efficiency. For example, Cabana & Jee found that continuity of care lowered the need of care for patients. Explicitly, the study discovered that patients regularly seeing the same doctor used emergency care less and had fewer hospitalisation days, compared to patients without continuity. Further, according to Cabana & Jee, continuity was found to increase the satisfaction of care and increase the receipt of preventive services. In addition to the observational studies, Anell also refers to Wasson et al. (1984) who performed a randomised control trial concluding correlation between continuity and decreased cost for a primary healthcare centre. Similar were brought forward by Casajuana-Brunet et al. (2006). In this study, higher continuity was shown to correlate with lower costs in form of fewer hospitalisation days, fewer intensive car days and lower percentage of emergency hospitalisations.

Moreover, continuity is considered to decrease the risk of mistreatment. This was concluded in a questionnaire study by Fernholm et al. (2020). The study

investigated how patients, with record of harm in primary care, and practice managers understood reasons for harm and possibilities to reduce risk of harm. Along with factors such as medical competence, continuity was highlighted. Practice managers comprehended continuity as minimising the risk of misdiagnosing due to lack of patient-doctor relation. Patients expressed a feeling of risk of fragmented care if not regularly seeing the same doctor. In the same study by Fernholm et al., patients further expressed discomfort of continuously seeing different doctors when in need of care. Thus, lack of continuity was seen as both a medical quality factor as well as a patient satisfaction factor.

Continuity as a satisfaction factor is further explored by Abelsson et al. (2019) in their qualitative study. Regularly seeing the same doctor was highlighted as an important factor for patient satisfaction, along with e.g. need for easy access to care, patient involvement and information exchange. Doctor continuity was also seen as a factor increasing patients' feeling for security and being taken care of. This is also confirmed by Rhodes et al. (2014), who performed a study on patients in North West England. The patients in the study considered relationship continuity an important factor for assuring psychosocial security and safety at general practice consultations.

5.1.1.4 Work environment

Stiernstedt et al. (2019) evaluates the cause of need for hired personnel in the care industry. One possible explanation relates to the work environment. A good work environment is, according to the report, important for both attracting new employees as well as keeping existing ones. Additionally, it is also vital for supplying quality care for patients.

In academia, Andersson Gäre et al. (2017) investigates work-motivation on well-functioning primary healthcare centres in Sweden. Interviewed healthcare professionals highlighted several factors that positively affected working conditions, including well-designed schedules, holidays and flexible work hours. The factor most frequently described as morale-boosting was the actual consultations with patients and the ability to provide quality care for their patients. Working together and interacting with colleagues is expressed as joyful, along with solving complex problems, both concerning medical issues and organisational improvement efforts. Training outside the healthcare centre was also seen as a major contributor to work motivation, and restriction of such arrangements were regarded negatively. As

organisational tools, systems providing specific information about organisational and individual performance, such as business intelligence systems, encouraged motivation.

5.1.1.5 Communication

Communication is one of the areas brought forward as important for care providers in Chapter 5 Section 1 of the Swedish Health and Medical Service Act: “Promote good communication between the patient and healthcare professionals”. This is also mentioned by Stiernstedt et al., 2019, where Regions are recommended to enforce primary care centres to enable both physical and digital means of communication and care.

In the systematic literature review, communication is studied both as a medical quality factor as well as a satisfactory factor. As a medical factor, communication is explored by Fernholm et al. (2020). The paper describes that patients see poor communication as contributing to a higher risk of maltreatment. Patients with previous harm in healthcare, highlights functioning follow-up routines along with high patient involvement as considerably important for achieving quality care. By practice managers, communication was also stated as an important medical quality factor. Fernholm et al. also highlights online medical records, inter-collegial team-work and medication labelling as important factors for delivering adequate care. Abelsson et al. (2019) underlines well-functioning contact paths as important satisfactory factors. For patients contacting primary care internet was the preferred way of contacting, however most patients were also satisfied by booking through the telephone as well as using the Swedish online health counselling service 1177.

5.1.1.6 Anamnesis

The process of anamnesis follows a long medical tradition. Historically, doctors have asked questions regarding the patient’s health issues and followed up with further questioning, depending on the patient’s answers. In line with the sentence “Healthcare should be of good quality with good a hygienic standard“ in Chapter 5 Section 1 of the Swedish Health and Medical Service Act, it is of utmost important that the anamnesis is done correctly to ensure high medical quality.

Traditional anamnesis relies fully on the doctor’s analytic capabilities to diagnose correctly and accurately. In the rise of artificial intelligence, machine learning and power of processors, intelligent algorithms might be

able to improve the diagnosing process. There are a few examples of this in academia. In a study by Zakim, et al. (2008), a computer-based history-taking reported approximately 3.5 health problems more than the doctor-based history-taking, indicating benefits of using computer-based histories. Zakim et al. (2010) also show that a computerised history-taking program outperformed doctor-based history-taking for routine checks of risk for coronary events.

5.1.2 Interview findings

Through interviews with key individuals at Doctrin, Praktikertjänst, and the three primary care centres, the goals presented in table 5.2 have been elicited as important to consider or incorporate in the evaluation framework. Table 5.2 clarifies how each goal connects to the overlying evaluation areas and which stakeholders have been their elicitation source.

Table 5.2 Goals elicited from interviews and their respective elicitor

Evaluation area(s)	*Goal*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
Quality	Availability	x	x		x	x	x	x	x	
Quality/efficiency	Triage	x	x	x	x	x	x	x		
Quality/efficiency	Continuity	x	x	x		x	x	x	x	x
Efficiency	Use of resources	x	x	x	x	x	x	x	x	
Efficiency	Productivity	x	x		x		x	x	x	
Satisfaction	Work environment	x	x		x	x	x	x	x	
Quality	Medical quality	x							x	x
Satisfaction	Patient experience	x			x				x	

A: Unn Hellberg, Chief Customer Success Officer at Doctrin
B: Maria Ardstål, Chief Digital Officer at Praktikertjänst
C: Amelie Janzon, Business Coach at Praktikertjänst
D: Rebecka Forssander, Business Coach at Praktikertjänst
E: Christina Johansson, Operations Manager and Physiotherapist, Brahehälsan Primary Care Centre
F: Per Svensson, Operations Manager and Senior Doctor, Herkules Primary Care Centre
G: Märit Löfgren, Senior Doctor, Herkules Primary Care Centre
H: Sara Banegas, Operations Manager and Senior Doctor, Ekerö Primary Care Centre
I: Kenneth Jacobsson, Head Doctor at Praktikertjänst

Figure 5.1 provides an initial overview of the essence of the elicited goals. Thereafter, the goals elicited through the interviews are more clearly defined and their inclusion in the framework described. The definitions and descriptions are based on the interview study.

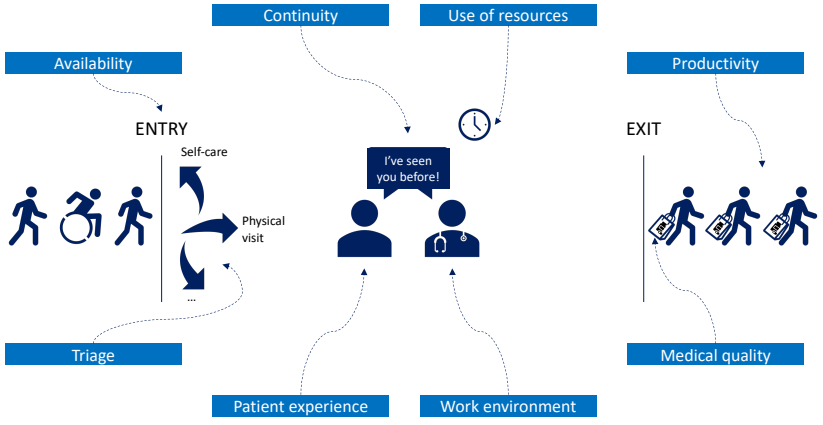

Figure 5.1 Goals elicited from interviews

5.1.2.1 Availability

Together, the interviewees define three types of availability. The first type of availability concerns the general ability for a patient seeking care to be able to present his or her reason for seeking care at the primary care centre. To exemplify, if a patient calling the primary care centre is notified that the telephone queue is full when he or she calls, or that the telephone is closed due to calling out of office-hours, the patient has not been able to present its case. The second type of availability focuses on the opportunity to come in actual contact with the primary care centre on the day of seeking care. Here, actual contact means to get a response from the care provider. The third and last type of availability concerns how accessible care is for different types of patients. For example, patients can differ in terms of age, sex, gender physiological ability and psychological capability. Generally, the interviewees believe that good care shall have high availability, why availability is included as a goal in the framework.

5.1.2.2 Triage

According to the interviewees, triage of patients is the process of directing patients to the right level of care, which is in line with the definition in section 1.5. Triaging also includes the process of prioritising which patients to aid first after their respective care need. It is believed that the primary care centre's ability to triage patients reflects its overall quality and that good triage can increase the centre's efficiency. Therefore, triage is included in the framework.

5.1.2.3 Continuity

Similar to academia and section 1.5, the interviewees define continuity as being able to meet the same doctor continuously. That is, continuity increases if patients frequently see the same care contact at the primary care centre. The interviewees believe that continuity contributes to better quality and efficiency of care. To elaborate, the doctor who has seen a patient frequently is believed to know the patient and his or her medical history better. By knowing the patient, the doctor is able to provide superior quality of care in a more patient oriented and efficient manner. Therefore, continuity is one of the goals that should be incorporated in the framework.

5.1.2.4 Use of resources

Use of resources cover both the use of human and material resources. Lower use of resources for the same outcome is believed to free resources for other

value creating activities at the primary care centre. Thus, it is important to monitor the use of resources and include it in the evaluation model.

5.1.2.5 Productivity

Productivity is linked to the output generated by the primary care centre. Applying the same logic as with the use of resources, higher productivity with the same use of resources is believed to increase created primary care value. That is, more patients can be helped and, or, to a greater extent. Naturally, it shall therefore be included as a goal.

5.1.2.6 Work environment

In this context, primarily psychological perceptions of the work environment are included in the concept. Not only is it a goal in itself for the personnel to have a good work environment, but a good work environment is also believed to cause improvement of the delivered quality of care and the patient experience. Hence, it shall be analysed.

5.1.2.7 Medical quality

Medical quality covers how correctly patients have been medically treated. The Head Doctor at Praktikertjänst highlights that to assure high medical quality, it is important to evaluate continuity, prescription of antibiotics, the share of patients with diabetes who have had their sugar level measured in the last 15 months, the share of patients with high blood pressure who have had their pressure level checked in the last 15 months, and the share of patients diagnosed with mental illness who have seen a psychologist or doctor in the last 12 months. High medical quality is of course central for primary care centres. Hence, it is included as a goal in the framework.

5.1.2.8 Patient experience

Patient experience relates to how patients perceive their received service or care and is affected by how well, and how timely, patients' questions are managed and answered. The interviewees do not see patient satisfaction as to which level the patient receives all asked for, since it might not be medically correct to always meet the patient's wishes. Neither does the interviewees believe that patient satisfaction is always reflected in the patient's happiness after a consultation. This since patients often receive information which is of a very emotional nature and which may, not wrongfully, give rise to negative feelings within patients. A good patient experience is, as with the work environment, a natural goal in itself and shall therefore be included in the framework.

5.1.3 Aggregated findings

The findings from the literature study and the interviews are summarised in the table 5.3. In line with how Höst et al. (2006) structure goals, each elicited goal presented in this section can be expressed as: Analyse [goal] with the purpose of evaluating the impact of digi-physical healthcare, with focus on quality, efficiency, and patient and healthcare provider satisfaction, from the viewpoint of primary care centres and patients, in the context of Swedish healthcare.

Table 5.3 Summary of elicited goals

Evaluation area(s)	***Goal***	***Theory***	***Interviews***
Quality	Availability	x	x
Quality/efficiency	Triage	x	x
Quality/efficiency	Continuity	x	x
Efficiency	Use of resources	x	x
Efficiency	Productivity		x
Satisfaction	Work environment	x	x
Quality	Medical quality	x	x
Satisfaction	Patient experience	x	x

The literature study and the interview study do, in general, result in the same general categories for the evaluation framework. The literature study suggests using anamnesis and communication as separate categories. However, communication might be incorporated in e.g. medical quality and as patient experience while anamnesis might be incorporated into medical quality. Therefore, these will not be used as standalone goals in the evaluation framework.

5.2 Questions, relating hypotheses and metrics

To construct a useable framework, the goals are narrowed down to an operational level and a quantitative level. That is, they spur into questions, relating hypotheses and connecting metrics. These are based on the interview study as well as the theoretical study. By inserting metric data prior and post the implementation of the platform, the questions can be answered, and their

related hypotheses proven or disproven. The metrics are defined to be comparable between primary care centres. Table 5.4 provides an initial overview of all goals, questions and hypotheses.

Table 5.4 Goals, questions and hypotheses

Goal	*Question*	*Hypothesis*
Availability	1. Opportunity to present case on the same day	Positive impact
	2. Opportunity to come in contact on the same day	Uncertain impact
	3. Opportunity to access care	Positive impact
	4. Seeking pattern	Negative impact
Triage	1. Routing to right level of care	Positive impact
	2. Prioritisation	Positive impact
Continuity	1. Doctor continuity	Positive impact
Use of resource	1. Human resource use	Uncertain impact
	2. Material resource use	Positive impact
	3. eDoctor visits	Positive impact
	4. Total costs	Uncertain impact
Productivity	1. Productivity	Positive impact
Work environment	1. Collaboration and trust	Positive impact
	2. Work flexibility	Positive impact
	3. Workload related stress	Positive impact
	4. Ethical stress	Positive impact
	5. Happiness and motivation	Positive impact
	6. Attractiveness of workplace	Positive impact
Medical quality	1. Prescription of antibiotics	Uncertain impact
	2. Follow-up of patients	Positive impact
Patient experience	1. Management of patients' questions	Positive impact
	2. Timeliness of patient cases	Positive impact
	3. Attractiveness of primary care centre	Positive impact

5.2.1 Availability

The quality indicator, or goal, availability spur into four questions with relating hypotheses and metrics. The questions concern patients' opportunity to present their case on the day of seeking care, patients' opportunity to come in contact on the day of seeking care, patients' opportunity to access care and patients' seeking pattern.

Regarding the question of patients' opportunity to present their case on the day of seeking care, the interviewees hypothesise that patients can to a greater extent present their cases to the primary care centre after implementation of the digital platform. Prior to implementation of the digital platform, patients have generally been able to seek care via telephone, 1177 and physical walk-in. Of these, the primary communication channel for most patients seeking care have been telephone. In the seminar at Praktikertjänst Skåne, operation managers explained all patients are not able to present their cases via telephone since they are often unable to answer all incoming calls from patients. They cannot answer all calls since the telephone has a limited queue and since they are not open 24/7. The other mentioned channels for seeking care are also restricted in capacity. Post the implementation of the digital platform, patients can also seek care digitally. The digital channel does not put a limit on the inflow of patients in terms of total quantity and time-of-day, thus increasing the ability for patients to present their cases to the primary care centre. All four channels for seeking care post implementation are visualised in figure 5.2. Question one, its hypothesis and metric are summarised in table 5.5.

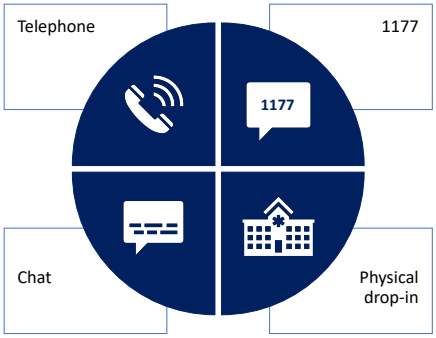

Figure 5.2 The four sources of patient inflow; telephone, 1177, the digital platform and physical walk-in

Table 5.5 Question 1, availability

	Question 1
Question	How does the implementation of the digital platform affect patients' ability to present their respective case to the primary care centre?
Hypothesis	Patients can to a greater extent present their cases to the primary care centre after implementation of the digital platform
Metric	Test overall impact on patients' ability of presenting their respective case: - **Opportunity to present case:** Share of patients seeking contact that presents their case to the primary care centre, on the same weekday

The above question concerned patients' ability to present their case on the same day as seeking care. However, being able to present a case is not the same as actually coming in contact, as described in section 5.1.2.1. In contrast to the prior question, interviewees are uncertain whether implementation of the digital platforms positively or negatively impacts patients' ability of receiving a response from the primary care centre on the day of seeking care. Patient with higher actual care need might see a positive impact. This since care providers can easier choose which patients to respond to first when more patients are able to present their cases. On the other hand, patients with less actual care need can, following the same reasoning, see a negative impact. It could be that the general impact is positive, if the time to answer digital messages is less than the time to answer ingoing calls. However, the interviewees belief on the matter is uncertain. Question two, its hypothesis and metric are summarised in table 5.6.

Table 5.6 Question 2, availability

	Question 2
Question	How does the implementation of the digital platform affect patients' ability of coming in contact with, i.e. receiving a response from, the primary centre on the day of seeking care?
Hypothesis	The implementation of the digital platform's impact on patients' ability of coming in contact with the primary centre on the day of seeking care is uncertain
Metric	Test impact on patients' ability of coming in contact with the primary care centre on the day of seeking care: - **Opportunity to come in contact on the day of seeking care:** Share of patients seeking contact that comes in contact on the same weekday

Regarding the accessibility of care for different patient groups, the interviewees hypothesise that the digital platform can have a positive impact. To elaborate, some interviewees point out that they believe that the digital

platform increases the inclusion of, or the ease of access for, patients by opening up the centre for groups that have a harder time reaching the more traditional primary care. That is, by use of the digital platform more patients are able to seek and receive care according to their individual needs. One interviewee exemplifies that both patients with socially restricting phobias and younger patients, not used to non-digital contact channels, might find it easier to seek care via the digital channel. Several interviewees also comment on how the digital platform affect the elderly. They have noticed that there is a societal presumption that elderly might be excluded as care is made more digital. Contrary to this belief, they are convinced that senior patients are good at handling the digital channel. Moreover, they mention that other age-groups' potential higher use of the digital channel can have positive spill over effects on the elderly. That is, as more patients seek care digitally, telephone availability can increase to the benefit of older patients calling the care centre. Question three, its hypothesis and metrics are summarised in table 5.7.

Table 5.7 Question 3, availability

	Question 3
Question	How does the implementation of the digital platform affect how accessible care is for different types of patients, i.e. equity in care?
Hypothesis	Interviewees believe that the implementation of the digital platform increases the inclusion of, and the ease of access for, patients
Metric	Test impact on accessibility: - **Opportunity to access care, general:** Share of care providers which answer positively to the question: Do you feel that the platform improves primary care accessibility, i.e. the availability of care for different patient groups? - **Opportunity to access care, age and sex:** Distribution of contacts per age-group and sex in traditional care compared to distribution of contacts per age-group and sex in pure digital healthcare

During the seminar at Praktikertjänst Skåne, operation managers raised the concern that opening up the digital channel encourages patients to seek care through both the digital channel and the telephone, thus the digital platform negatively impacts patients' seeking pattern. If this is true for all patients seeking digital healthcare, the total incoming load on the primary care centre's communication channels after implementation of the platform would increase and the telephone load would not decrease. Operation managers with 100% telephone availability prior to implementation of the digital tool were especially worried of this sort of outcome. This since if the

hypothesis is true for all patients seeking digital healthcare, the digital platform would only increase their incoming load without them helping more patients. In contrast, operation managers with low telephone availability prior to implementation were not so worried about this. Even though it might be true that some patients seek via both channels, the digital channel would still have a positive impact on the number of patients coming in contact. A doctor and customer success manager at Doctrin, points out that the concern might to some extent be accurate when the time it takes to answer patients' digital messages is long. She describes that long response times cause patients to feel uncertain whether they have been heard or not. Therefore, they make supplementary phone calls for extra safety. Consequently, the number of dual contacts can be positively affected by decreasing the time it takes to answer messages. Question four, its hypothesis and metrics are summarised in table 5.8.

Table 5.8 Question 4, availability

	Question 4
Question	How does the implementation of the digital platform affect patients' seeking pattern?
Hypothesis	Seminar participants hypothesise that the digital platform creates double seeking, i.e. that patients seek care through multiple contact channels. Thus, the implementation of the digital platform is believed to negatively impacts patients' seeking pattern
Metric	Test if the platform may encourage double seeking: - **Number of dual contacts:** The share of care providers which answer positively to the question: Do you experience that some patients tend to seek care via both the digital channel and via other inflow channels on the same day? Test if the time to answer patients' digital messages impact occurrence of double seekers: - **Digital answer time:** Average time until first response to patients' digital messages

5.2.2 Triage

The quality indicator, or goal, triage spur into two questions with relating hypotheses and metrics. The questions concern care providers ability to route patients to the right level of care and care providers ability to prioritise patients after care need.

Regarding routing patients to the right level of care, interviewees believes that patients to a greater extent are directed to the right level of care early via the digital platform. All patients seeking care digitally fill in triaging forms, which provide the platform and the primary care centre with structured anamneses. These structured anamneses increase the care providers' understanding of patients' reasons for seeking care, which is also confirmed by Johansson et al. (2020). Early triaging to the right level of care is facilitated manually by care providers through combining information from the structured triage-forms and the asynchronous chat. The latter can, in contrary to phone contact, include pictures and information can be collected in a calmer, and therefore more thought-through, manner. Moreover, the platform enables digital collaboration between different professional groups at an early stage of the patient contact, making it easier for the team as a whole to direct the patient to the appropriate next step. Furthermore, the handover feature allows care providers to seamlessly handover patients to an appropriate care level, thus providing patients with the right level of care quickly. Question one, its hypothesis and metric is summarised in table 5.9.

Table 5.9 Question 1, triage

	Question 1
Question	How does the implementation of the digital platform affect the ability to route patients to the right level of care?
Hypothesis	Interviewees and theory believe routing to the right level of care will be improved by the implementation of digital platform
Metric	- **Routing to right level of care, general:** The share of care providers which answer positively to the question: Do you feel that the digital platform enables you to more easily direct the patients to the right level of care? E.g. do different professions to a greater extent see patients that should rightfully see them?

Regarding prioritising patients, it is believed that the platform enables easier prioritising of patients after care need than other inflow channels. This since in the platform, all patients seeking care are visible and one can choose which case to respond to first depending on how the patients have filled in their

forms. This is not the case via phone where the order of patients is fixed based on the incoming order of the calls, i.e. one cannot choose which phone call to prioritise based on urgency. The extent to which the platform allows for prioritising of patients depends on the extent to which inflow of patients will shift towards the digital channel. In the seminar, some operations managers highlighted that the patient inflow via the digital channel will more likely be high if availability in other channels is low. Primary care centre operators with high availability are less optimistic in terms of how high the flow via the digital channel will be. The aforementioned belief arises from the idea that high availability causes patients to prefer traditional contact, i.e. calling or walk-in, to contacting the centre through the digital channel. Question two, its hypothesis and metric are summarised in table 5.10.

Table 5.10 Question 2, triage

	Question 2
Question	How does the implementation of the digital platform affect the possibility of prioritising patients after care need?
Hypothesis	Interviewees believe prioritising care will be improved by the implementation of the digital platform
Metric	Test impact on ability to prioritise those most in need: - **Prioritisation of patients after need, opportunity:** Share of incoming patient cases which arrive via the platform and therefore allows for prioritisation among cases - **Prioritisation of patients after need, experience:** The share of care providers which answer positively to the question: Do you feel that the digital platform enables you to more easily prioritise which patients to respond to first after their individual care need?

5.2.3 Continuity

The quality indicator, or goal, continuity spur into one question with a relating hypothesis and metric. The general belief among the interviewees is that by using the digital platform, doctor continuity will improve. The assumption is that the tool enables primary care personnel to easily direct patients in need of consultation to the doctor that has been their primary point of contact. Here, the ability for one to calmly look through patients' medical records when working in the chat, together with the possibility of handing over patients to individual doctors digitally, is considered to be key. The question, its hypothesis and metric are summarised in table 5.11.

Table 5.11 Question 1, continuity

	Question 1
Question	How does the implementation of the digital platform affect doctor continuity?
Hypothesis	Interviewees believe continuity will be improved by the implementation of the digital platform
Metric	Test impact on doctor continuity: - **Doctor continuity:** Share of patients with doctor continuity

5.2.4 Use of resources

The quality indicator, or goal, use of resources spur into four questions with relating hypotheses and metrics. The questions concern human resources, material resources, eDoctor visits and the primary care centre's total costs.

Regarding human resources, the interviewees believe that human resource use might initially increase as a result of implementing the digital platform. This since it is natural for changes in ways of working to require extra personnel, training and adjustment time. However, it is uncertain whether working with the digital platform reduce the human resource need at the primary care centre, and their associated cost, per patient long term. The platform is believed to positively impact contacts and thereby reduce the use of human resources. However, it is unclear if the platform decreases or increases administrative time per patient and if it worsens or improves management of frequent visitors.

Contacts

Shorter and fewer contacts may derive from a shortened anamnesis collection time, smarter routing of patients to the right level of care, higher continuity, digital closure of cases that previously would have occurred physically, and easier follow-up.

Firstly, the anamnesis collection time from a care provider perspective is expected to shorten since patients fill in their medical information digitally. The saved time from not having to take anamnesis in person, together with the fact that professionals can be more prepared prior to contacts, might result in a reduction in the total time per contact and reduce the need for reoccurring contacts. Secondly, the improved triage allows for more efficient and collaborative routing of patients to the right level of care early. This is

believed to decrease time spent inhouse on decision-making, lower the number of contacts per patient, decrease time spent per contact and reduce the number of unnecessary physical visits. Although easier collaborative decision making in the triage stage might result in more members of the personnel being involved on a per case basis, it is not seen as a factor negatively impacting the total time professionals spend per case. Thirdly, the improved continuity can potentially increase the efficiency of visits. This since continuity makes care providers more familiar with their patients. Fourthly, the platform enables digital closure of cases that previously would have occurred in the physical world. Digital closures are possible since cases can be handed over digitally to doctors in the platform and since the platform provides the technical features required. This is also aided by the ability to gather information through the use of forms, text and pictures. Lastly, shorter and fewer follow-up visits may derive from use of the digital platform's function for healthcare-initiated contact. For example, by sending out forms prior to scheduling yearly physical visits, visits can be avoided completely, be scheduled in a more appropriate time slot or be carried out more efficiently.

Administrative time

Working digitally also alters the healthcare providers' administrative work. Since the anamnesis and other information is gathered digitally, there is less of a need for doctors to dictate their notes and for medical secretaries to write them down. Instead, personnel can take notes by copying digital information. This saves administrative time, both for healthcare providers and administrative personnel. Lab results, or other information that has previously been sent via mail, can also be sent out digitally by the healthcare providers by copying information from the medical record system. According to operation managers, this is more efficient than writing a letter. However, some operations managers seem to feel that copying information between the medical record system and Flow is more time intensive than sending a letter.

Frequent visitors

There is a general belief among some of the interviewees that a small group of patients stand for a large share of the primary care centres contacts. Hence, affecting this group's sie and seeking pattern would greatly impact the use of resources. Whether the digital platform impacts these patients' seeking patterns remains uncertain. One theory is that the platform visualises patients seeking pattern, thus making it easier to act on frequent visitors. Moreover,

the function for healthcare-initiated contact might also enable personnel to work proactively with the frequent visitors. The hypothesised reduction of contact time and amount of contacts could potentially also decrease the resources used for this group. Another theory is that some patients which are frequent visitors might seek care even more as seeking care becomes easier via the digital platform. For example, seeking is made easier for patients in the sense that they do not have to wait in line to be able to present their case. Question one, its hypothesis and metrics are summarised in table 5.12.

Table 5.12 Question 1, use of resources

	Question 1
Question	How does the implementation of the digital platform affect the use of human resources and their associated cost?
Hypothesis	According to the interviewees it is uncertain whether working with the digital platform reduce the use of human resources at the primary care centre. The platform is believed to positively impact contacts and thereby reduce the use of human resources. However, it is unclear if the implementation of the platform may increase administrative time per patient and if it worsens management of frequent visitors
Metric	Test impact on human resources and associated costs per patient: - **Human resource use, time:** Number of full-time employments total and per profession, per patient listed at the primary care centre - **Human resource use, capital:** Personnel cost per listed patient - **Human resource use, experienced:** The share of care providers which answer positively to the question: Do you feel that the digital platform shortens the average time needed per patient case? Test potential drivers of the hypothesised lower human resources and associated costs: - **Contacts, time per contact:** The share of care providers which answer positively to the question: Do you feel that the digital platform shortens the average time needed per contact? - **Contacts, physical visits per visiting patient:** Average number of physical visits per patient physically visiting the primary care centre - **Contacts, physical visits per listed patient:** Average number of physical visits per listed patient - **Contacts, physical visits per listed patient and profession:** Average number of physical visits per listed patient per profession - **Administrative time per contact:** The share of care providers which answer positively to the question: Do you feel that the digital platform shortens the average time spent on administrative duties, such as filling in medical records and letter writing, per contact? - **Frequent visitors, extent:** hare of patients that physically visits doctors, nurse or assistant nurses which are deemed frequent visitors - **Frequent visitors, total resource use:** Share of total physical doctor, nurse or assistant nurse visits which can be related to frequent visitors - **Frequent visitors, average resource use:** Average number of physical doctor, nurse or assistant nurse visits per frequent visitor

Regarding material resources use and their related costs, the interviewees belief is that these will decrease per patient. This, firstly, as a result of physical visits decreasing. Secondly, costs associated with non-digital communication, such as postal costs, are also expected to decrease as more of the postal communication is handled digitally. Question two, its hypothesis and metrics are summarised in table 5.13.

Table 5.13 Question 2, use of resources

	Question 2
Question	How does the implementation of the digital platform affect use of material resources and their associated costs?
Hypothesis	Interviewees believe that working with the digital platform will reduce the use of material resources at the primary care centre
Metric	Test impact on material resources and associated costs: - **Material resource use, general:** Average material costs per listed patient - **Material resource use, postal:** Average postal costs per listed patient

Out-of-county eDoctor visits, and the cost associated with them, is by the interviewees expected to decrease with the implementation of the digital platform. In other words, the belief is that adopting a digital platform might be necessary for keeping listed patients' digital contacts inhouse. Question three, its hypothesis and metric are summarised in table 5.14.

Table 5.14 Question 3, use of resources

	Question 3
Question	How does the implementation of the digital platform affect patients out-of-county eDoctor visits and their related costs?
Hypothesis	Interviewees believe that the implementation of the platform will positively impact the use of eDoctors, i.e. the listed patients' utilisation of eDoctors will decrease
Metric	Test impact on patients out-of-county eDoctor visits: - **eDoctor visits, extent:** Average number of out-of-county eDoctor visits per listed patient

As mentioned in the previous hypotheses, many costs are expected to decrease as a result of using the digital platform. However, it is uncertain whether those potential cost savings outweigh the operational costs of the platform. Thus, question four regards the total costs of the primary care centre. The question, its hypothesis and metric are summarised in table 5.15.

Table 5.15 Question 4, use of resources

	Question 4
Question	How does the implementation of the digital platform generally affect the primary care centre's total costs?
Hypothesis	The implementation of the digital platform's impact on total cost is uncertain
Metric	Test impact on the primary care centre's total costs - **Total costs:** The primary care centre's total costs, including the costs of the digital platform, per listed patient

5.2.5 Productivity

The quality indicator, or goal, productivity spur into one question with a relating hypothesis and metric. The question concerns the number of patients cared for per worked hour. The number of patients taken care of per employee depends on the amount of time spent per patient contact. Hence, productivity per employee is believed to increase as a result of the decreased usage of human resources per patient. Although the interviewees believe that the general productivity per employee will rise, they are not certain that all professions at the primary care centre will see a rise in productivity. The question, its hypothesis and its metrics are summarised in table 5.16.

Table 5.16 Question 1, productivity

	Question 1
Question	How does the implementation of the digital platform affect the number of patients taken care of, i.e. productivity?
Hypothesis	Interviewees believe productivity will be increased by the implementation of the digital platform
Metric	Test impact on productivity: - **Productivity, general:** Number of handled contacts per hour spent on patient-oriented activities - **Productivity, per profession:** Number of handled contacts per hour spent on patient-oriented activities per profession - **Productivity, medical:** Number of diagnosed patients per hour spent on patient-oriented activities

5.2.6 Work environment

The quality indicator, or goal, work environment spur into six questions with relating hypotheses and metrics. The questions concern collaboration and trust amongst colleagues, work flexibility, workload related stress, ethical stress, happiness and motivation at work, and the general attractiveness of the primary care centre as a workplace.

There is consensus among the interviewees that there are potential work environment gains from using the digital platform. Regarding collaboration, the digital platform is believed to enable greater collaboration and thereby improve trust among colleagues. Greater collaboration may be achieved through digital handovers and via digital team collaboration on patient cases. The question, its hypothesis and its metrics are summarised in table 5.17.

Table 5.17 Question 1, work environment

	Question 1
Question	How does the implementation of the digital platform affect collaboration and trust amongst colleagues?
Hypothesis	The collaboration among colleagues is believed to improve by the implementation of the digital platform
Metric	Test impact on collaboration and trust: - **Collaboration and trust, digital:** Average number of care professions involved per digital patient case - **Collaboration and trust, experience:** The share of care providers which answer positively to the question: Do you feel that collaboration and trust amongst colleagues improved a while after the implementation of the digital platform?

Regarding work flexibility, it is believed to be increased by the implementation of the digital platform. Both in terms of not being restricted to the physical location of the primary care centre for work, and in terms of not being as tied up during remote-care contacts with patients. A doctor might for example use the digital platform from home and a triaging nurse can take breaks when there is a need, instead of being restricted to scheduled time slots in the telephone triage. The question, its hypothesis and metric are summarised in table 5.18.

Table 5.18 Question 2, work environment

	Question 2
Question	How does the implementation of the digital platform affect work flexibility?
Hypothesis	Work flexibility is believed to increase with the implementation of the digital platform
Metric	Test the impact on work flexibility: - **Work flexibility:** The share of care providers which answer positively to the question: Do you experience that work flexibility increased a while after implementation of the digital platform?

Concerning workload related stress, interviewees believe it might be lowered in the long-term as a result of the assumed reduce in human resource need per patient. Of course, the relative workload will not necessarily be lower if all the extra time is either eradicated by personnel reductions, or by higher expectations on productivity. However, workload stress is also determined by how workers perceive their workload, not only by the workload's numerical value. With greater work flexibility and more team collaboration, workers may perceive their work to be less stressful. The question, its hypothesis and its metric are summarised in table 5.19.

Table 5.19 Question 3, work environment

	Question 3
Question	How does the implementation of the digital platform affect workload related stress?
Hypothesis	The workload related stress is believed to decrease with the implementation of the digital platform
Metric	Test impact on workload related stress: - **Workload related stress:** The share of care providers which answer positively to the question: Do you feel that your workload related stress reduced a while after the implementation of the digital platform?

Regarding ethical stress, i.e. the perceived stress from not being able to provide care to all patients in need of it, it is believed to decrease from using the platform. This as a result of the assumed higher ability for patients to present their cases. The idea is that if a larger share of patients come in contact with the primary care centre, there is a decreased risk of missing patients with real issues. Less ethical stress can also follow from being able to offer physical visits closer to the present, as a result of fewer patients needing physical consultations when cases are closed digitally. The question, its hypothesis and its metric are summarised in table 5.20.

Table 5.20 Question 4, work environment

	Question 4
Question	How does the implementation of the digital platform affect ethical stress?
Hypothesis	The ethical related stress is believed to decrease with the implementation of the digital platform
Metric	Test impact on ethical stress: - **Ethical stress:** The share of care providers which answer positively to the question: Do you feel that your ethically induced stress reduced a while after the implementation of the digital platform?

Regarding work happiness and motivation, the potential ease in administrative tasks, as mentioned in use of resources, can improve work happiness and motivation. This since administrative tasks are often viewed as tedious and less joyful. Work happiness and motivation is also assumed to increase as a result of the above hypothesised improved factors, in line with Andersson Gäre et al. (2017). As consequence of improved motivation, one might suspect that personnel's total days of sick leave might decrease. The question, its hypothesis and its metric are summarised in table 5.21.

Table 5.21 Question 5, work environment

	Question 5
Question	How does the implementation of the digital platform affect work happiness and motivation?
Hypothesis	Happiness and motivation are believed to increase with the implementation of the digital platform
Metric	Test impact on happiness and motivation: - **Happiness and motivation:** The share of care providers which answer positively on the question: Do you experience that you work happiness and motivation improved a while after the implementation of the digital platform? - **Attractiveness of workplace, sick days:** Average number of sick days per employee

Altogether, according to the interviewees, these improved factors of work environment might improve the attractiveness of the workplace. Improved attractiveness might decrease personnel turnover and ease the recruitment of personnel. The question regarding attractiveness of workplace, its hypothesis and its metrics are summarised in table 5.22.

Table 5.22 Question 6, work environment

	Question 6
Question	How does the implementation of the digital platform affect the attractiveness of the workplace?
Hypothesis	The attractiveness is believed to increase with the implementation of the digital platform
Metric	Test impact on attractiveness of workplace: - **Attractiveness of workplace, experience:** The share of care providers which answer positively to the question: Do you consider that your workplace's attractiveness increased a while after the implementation of the digital platform? - **Attractiveness of workplace, personnel turnover:** Average personnel turnover - **Attractiveness of workplace, applications:** Average number of applicants per open position

5.2.7 Medical quality

The quality indicator, or goal, medical quality spur into two questions with relating hypotheses and metrics. The questions concern prescription of antibiotics and follow-up of patients.

Regarding prescription of antibiotics, the standardised digital anamnesis, and the assumed improved doctor continuity and work environment, is expected to reflect positively on the correctness of professionals' medical assessments and their prescription of medicals. To elaborate, the standardised anamnesis provides professionals with a better base for decision-making by assuring that relevant symptoms and medical data is collected, improved continuity increases the extent to which professionals know their patients' medical history and a good work environment decreases stress amongst professionals. However, higher availability, along with an ambition to finish cases digitally, is believed to have the opposite impact on prescriptions, i.e. result in more liberal prescriptions. Thus, the hypothesised impact on prescriptions is neither purely positive nor purely negative. The question regarding prescription of antibiotics, its hypothesis and its metrics are summarised in table 5.23.

Table 5.23 Question 1, medical quality

	Question 1
Question	How does the implementation of the digital platform affect prescription of antibiotics?
Hypothesis	The impact on medical quality due to the implementation of the digital platform is uncertain
Metric	Test impact on prescriptions: - **Prescription of antibiotics:** Amount of antibiotics prescribed, weighted by patient list size - **Prescription of antibiotics, narrow spectrum:** Share of antibiotics prescribed which are narrow-spectrum antibiotics - **Prescription of antibiotics, experience:** The share of care providers which answer positively to the question: Do you experience more liberal prescription of antibiotics post the implementation of the digital platform?

Regarding the follow-up of patients, it is believed to be made easier with the digital platform's function healthcare-initiated contact. The platform can be used to send out test results digitally instead of via mail, and it can also be used to facilitate yearly controls and thus replace physical yearly visits and mails associated. Thus, follow-up of patients with diabetes, high blood pressure or mental illness is believed to be improved. The question regarding follow-up, its hypothesis and its metrics are summarised in table 5.24.

Table 5.24 Question 2, medical quality

	Question 2
Question	How does the implementation of the digital platform affect follow-up of patients with diabetes, high blood pressure or mental illness?
Hypothesis	The follow-up is believed to improve with the implementation of the digital platform
Metric	Test impact on follow up of patients: - **Follow-up of patients, diabetes:** Share of patients with diabetes who have had their sugar level measured in the last 15 months - **Follow-up of patients, high blood pressure:** Share of patients with high blood pressure who have had their pressure level checked in the last 15 months - **Follow-up of patients, mental illness:** Share of patients with mental illnesses who have seen a psychologist or doctor in the last 12 months - **Follow-up of patients, experience:** The share of care providers which answer positively to the question: Do you experience that it is easier to do follow-ups on patients with, e.g. diabetes, high blood pressure or mental illness, post the implementation of the digital platform, e.g. by the use of the function for healthcare initiated contact?

5.2.8 Patient experience

The quality indicator, or goal, patient experience spur into three questions with relating hypotheses and metrics. The questions concern how well and how timely patients' questions are answered, as well as how well a primary care centre attracts patients.

Through structured digital anamneses, enhanced triage, increased continuity and higher-quality work environment, interviewees believe that patients' questions will be better managed, i.e. the communication between patient and care provider is assumed to be improved. Structured pre-contact anamneses allow professionals to be more prepared for visits, enhanced triage improves patients' chances of getting answers from the right professional, increased continuity means that more patients can get answers from a professional that knows them, and lastly, a better work environment can result in less stressed professionals providing more thought-through answers. Question one, its hypothesis and metric are summarised in table 5.25.

Table 5.25 Question 1, patient experience

	Question 1
Question	How does the implementation of the digital platform affect how well patients' questions are answered?
Hypothesis	Patients' questions are believed to be more well managed with the implementation of the digital platform
Metric	Test impact on how well patients' questions are answered: - **Management of patients' questions:** The share of patients which answer positively to the question: Did you receive enough information via the digital platform?

Moreover, patient questions are also hypothesised to be met in a timelier manner. The time reduction from a patient perspective is mainly driven by the idea of the digital platform, i.e. collecting anamnesis in a smart fashion, initially directing the patient to the right level of care, enabling fast collaborative decision making, facilitating digital closure of cases that would otherwise have been carried out in person, and shortening the waiting time for physical consultations.

Via triage forms, patients' anamnesis is collected. Since this information exists digitally, patients might spend less time than traditionally after their initial contact on presenting their background information to professionals.

Thus, their case can be perceived as being handled in a more efficient and timely manner. Patients can, on the basis of the triage form they have chosen to fill in, be directed to a specific profession in their initial contact, if the care centre chooses to configure the platform that way. This is believed to shorten patients' case time. For example, instead of both speaking to a nurse and a physiotherapist, a patient might only have to communicate with the physiotherapist.

The digital platform enables care providers who are handling cases to easily receive support in decision making from colleagues. This via the team chat feature. This is believed to shorten patients' case time. For example, a nurse requiring support from a doctor can instead of walking to the doctor's office, and waiting until they are unoccupied, directly ask for support in the chat.

Routed first point of contact, team chats and handovers, enable digital closure of cases that would previously have been booked in for physical meetings. The ability to gather information through the use of forms, text and pictures also aids this. Consequently, the medical assessment time from a patient perspective decreases. Finishing more cases digitally, which would otherwise have been carried out in the physical world, is also believed to free up doctors' schedules, thus decreasing the waiting time for physical medical consultations. Question two, its hypothesis and metric are summarised in table 5.26.

Table 5.26 Question 2, patient experience

	Question 2
Question	How does the implementation of the digital platform affect how timely patients' questions are answered?
Hypothesis	Patient questions are hypothesised to be met in a timelier manner with the implementation of the digital platform
Metric	Test impact on how timely patients' questions are answered: - **Case time from a patient perspective, experience:** The share of care providers which answer positively to the question: Do you experience that patients' questions are answered timelier via the digital platform than via e.g. phone or physical visits? - **Case time from a patient perspective, regional data:** Share of patients which are medical assessed within three days - **Case time from a patient perspective, physical visits**: The share of care providers which answer positively to the question: Do you experience that you can schedule patients for physical visits closer in time post the implementation of the digital platform?

Furthermore, the interviewees hypothesise is that the implementation of the digital platform can increase primary care centre attractiveness. Since it is every patient's choice to register at a primary care centre in Sweden, high attractiveness could increase the total number of listed patients. Naturally, if other primary care centres all have digital platforms, adopting a platform might be crucial for keeping a sufficient list size. Question three, its hypothesis and metric are summarised in table 5.27.

Table 5.27 Question 3, patient experience

	Question 3
Question	How does the implementation of the digital platform affect the primary care centre's attractiveness from a patient perspective?
Hypothesis	The interviewees hypothesise that the implementation of the digital platform can increase primary care centre attractiveness
Metric	Test impact primary care centre attractiveness from a patient perspective: - **Attractiveness of primary care centre, list size:** Change in list size prior and post the implementation - **Attractiveness of primary care centre, experience:** The share of patients which answer positively to the question: Would you recommend the digital platform after your experience with using it?

5.3 Summary of framework

The literature study and interview study suggest that the evaluation framework shall contain eight performance indicators. These are subordinated the evaluation areas quality, efficiency and user satisfaction.
The evaluation area quality includes the performance indicators availability, triage, continuity and medical quality. These are assumed to be mainly positively affected by the implementation of a digital platform. A mainly positive impact is also believed to be seen when evaluating efficiency, which includes the performance indicators triage, continuity, use of resources and productivity. The area satisfaction, which contains the performance indicators work environment and patient satisfaction, is on the other hand believed to be fully positively affected. An overview of the framework's areas, goals and hypotheses can be seen in table 5.28.

Table 5.28 Overview of framework areas, goals and hypotheses

Area	***Goal***	***Hypothesis***
Quality	Availability	Mainly positive impact
Quality/efficiency	Triage	Positive impact
Quality/efficiency	Continuity	Positive impact
Efficiency	Use of resources	Mainly positive impact
Efficiency	Productivity	Positive impact
Satisfaction	Work environment	Positive impact
Quality	Medical quality	Mainly positive impact
Satisfaction	Patient experience	Positive impact

Next, the developed framework will be used to evaluate the impact of implementing the digital platform Flow at three primary care centres. This to assess the value of digi-physical healthcare.

6 Evaluating the impact of digi-physical healthcare

In this chapter, the impact of digi-physical healthcare is determined by evaluating how the implementation of a digital healthcare platform correlates with changes in performance at three different primary care centres. The chapter begins with a brief description of the three primary care centres. Thereafter the main results from the evaluation are presented and analysed. For full results, see appendix A.

6.1 Description of primary care centres

The evaluation data is gathered from three primary care centres, see description of the centres in table 6.1. Further, the primary care centres are reimbursed in different ways, see table 6.2.

Table 6.1 Description of primary care centres

Healthcare centre	***Region***	***# of listed patients (Jan 2020)***	***# of healthcare professionals (Jan 2020)***	***Digital platform, implementation date***	***Share of patients seeking care digitally (Jan 2020)*** [a]
Centre A	Skåne	8000	30	2019-02-17	21%
Centre B	Västra Götaland	14000	56	2019-10-01	16%
Centre C	Stockholm	21000	50	2019-09-24	32%

[a] Share of total patients incoming through the digital platform.

Table 6.2 Reimbursement models (Stiernstedt et al., 2019)

Region	*Capitation share*	*Adj. by ACG*	*Adj. by CNI*	*Adj. by age*	*Adj. by sex*
Skåne	90%	80%	20%	No	No
Västra Götaland	90%	50%	2%	Yes	Yes
Stockholm	61%	49%	24%	Yes	No

6.2 The impact of digi-physical healthcare

6.2.1 Availability

Whether the digital platform improves the opportunity for patients to present their case is unclear, due to inconclusive results. Primary care centre A and B show slightly positive impact (just above zero), while primary care centre C show a negative impact (-9%). However, centre C would likely have shown a more positive impact if not for the centre's intentional decrease in telephone availability post the implementation; telephone availability was lowered intentionally by the primary care centre to increase inflow of patients via the digital channel. This strategy contradicts the argument in section 3.3.4, where low capitation-based reimbursement incentivises high availability. Since centre C has the lowest capitation-based reimbursement of the centres, the opposite would be expected. Thus, the intentionally lowered availability might rather indicate that the centre has a strong belief in the digital platform's long-term potential on availability.

In terms of accessibility, i.e. opportunity to access care, the distribution of non-digital contacts prior and post the implementation does not differ remarkably[7]. In contrast, the distribution of contacts, per age-group and sex, seeking care via the digital channel differs significantly from traditional non-digital healthcare, both prior and post implementation. In comparison to non-digital healthcare usage, the utilisation of the digital healthcare platform is noticeably higher among patients aged 25-49 and considerably lower for patients younger than one year and older than 65 (most notably lower for patient over 75). Moreover, there is higher utilisation among women aged

[7] Non-digital contact data does not include data from initial telephone contacts with patients

15-24. The relative low utilisation by patients younger than one might be explained by the digital platform first being made available to patient younger than one in December 2019. The higher utilisation observed among young adults and adults is also highlighted in a number of survey responses, in which care providers stress that they believe that the platform benefits younger patients with good technical skills and tools. Although some survey respondents view lower senior utilisation as negative for patient equality, the interviewees do not necessarily believe that this is bad for general accessibility. As previously mentioned in section 5.2.1, the interviewees mean that younger age-groups' higher utilisation of the digital channel can improve access for older patients in traditional channels. Thus, it is uncertain whether the difference in age-group usage is positive or negative for accessibility.

One could however argue that the interviewees' belief in a positive effect is more likely. Although the use of the digital channel is more prominent among younger adults, we still see the same usage pattern in non-digital healthcare contacts. This might, in line with the reasoning of the interviewees, indicate that when younger patients utilise the digital way of seeking care more, senior patients are allowed to utilise the telephone to greater degree, and thus the usage pattern of non-digital healthcare remain unaffected. If this is true, the digital platform has only resulted in more ways of seeking care, and its implementation is positive for accessibility. To further clarify this issue, usage patterns for telephone contacts would need to be examined. This was not possible in this thesis.

Moreover, the survey results for opportunity to access care does not indicate if the platform impacts accessibility in a specific direction. Some respondents discuss the potential negative impact on older patients, while other respondents mention that better sorting, i.e. triaging, ability among patients that seek care digitally creates a more equal care. The spread in survey comments indicate that accessibility perhaps should have been divided into more granular areas, such as accessibility based on medical condition, ethnicity or socio-economic status.

The usage pattern does not show utilisation depending on socio-economic status. Thus, no conclusion can be drawn whether the digital platform is providing care to a higher degree to those of better socioeconomic status, as eDoctors do, see section 3.2.3.1, or not. However, many survey respondents mention that they do not believe that accessibility is improved via the

platform for those without a computer and Bank-ID. Since those with lower socioeconomic status generally have lower access to computers and Bank-ID, this could indicate that the digital platform could receive similar critique as eDoctors have received on the matter. In contrast, the usage patterns do show that it might be inaccurate to accuse digital platforms of encouraging unnecessary care, which eDoctors often are accused of, see section 3.2.3.1. That is, the implementation has not altered the distribution of contacts in non-digital healthcare, even though younger patients seek care through the digital platform more frequently. This is reasonable given that primary care centres triage patients in the platform, while eDoctors might supply visits to all who seek care.

Moreover, as for eDoctor usage, see figure 3.2 in section 3.2.3.2, younger patients, and particularly younger women, use the digital platform at the primary care centres to a greater extent than they use traditional care. However, in comparison to the eDoctor usage, digital platform usage does not seem to be as high for young children, i.e. parents to younger children. This difference might, at least partially, be explained by the digital platform first being made available to patient younger than one in December 2019.

The survey results concerning impact on patients' seeking pattern does not indicate whether the platform creates a double seeking problem, i.e. causes patients to seek care through multiple channels, or not. Moreover, the results do not say if the extent of double seeking is impacted by the time until first digital message response. However, survey respondents mention that they experience that quick responses lower the amount of double seeking. Furthermore, answers in the survey indicate that double seeking might be a problem that is reduced with time, mostly occurring the first time a patient seeks care digitally. Moreover, one survey respondent brings forward that patients seem to seek care via several different digital healthcare providers, e.g. via Kry, MinDoktor and the digital platform. Since double seeking in multiple channels negatively impacts resource efficiency in public healthcare, it is an important matter to highlight.

To summarise, the digital platforms impact on patients' opportunity to present their case is uncertain. There are some indications that younger patient's higher utilisation of digi-physical healthcare might be positive for primary care centre's general accessibility, but no final conclusion can be drawn. The digital platform could potentially face similar critique as eDoctors in regard to being more accessible to those of better socio-economic

status. In contrast, it might be inaccurate to accuse digital platforms of promoting unnecessary care. Whether patients tend to seek care both via the platform and other channels or not is uncertain. There are indications that this might be the case if the time to answer digital messages is high and if the patient seeking care is using the digital channel for the first-time. All things considered, the digital platforms impact on availability is uncertain.

6.2.2 Triage

With 89% positive answers, out of the 59 respondents in the survey, there seems to be consensus among respondents at primary care centre C that the digital platform makes it easier to route patients to the right level of care. Respondents at centre B also seem to be positive to the routing process in the digital platform, with 40% positive and 44% neutral answers. However, there seems to be a larger spread in the answers of primary care centre A, with 38% negative answers and only 25% positive answers. The respondents answering negatively emphasise that nuances when speaking, e.g. the pitch of the voice, which makes it easier to fully interpret the condition of the patient., are lost via chat. This way of reasoning goes in line with findings on digital triage by Johansson et al. (2020). In the study, patients experienced a risk of incorrect assessment when using written dialogues rather than phone calls. On the other hand, positive survey respondents highlight the structure of the patient anamnesis form as an increased security of not missing to ask any questions, as well as the increased collaboration, as main factors of improving triage. One respondent describes the positive effect of increased collaboration in the following manner: “Before, an appointment was booked since you could not ask for advice while on the phone. Now it is possible to include the doctor while the contact is ongoing”[8]. Increased collaboration resulting in a positive impact on healthcare quality goes in line with Fernholm et al. (2020), where communication and inter-collegial teamwork is highlighted as minimising the risk of maltreatment.

Regarding the prioritisation of patients, discrepancies is once again seen in the survey answers; the respondents from primary care centre C are reporting positive impacts of the digital platform (72% positive answers), while A and B have a larger share of neutral, 31% versus 56%, and negative responses, 31% versus 12%.

[8] Authors’ translation from Swedish to English

There seems to be that centre C sees a more positive impact on triage than the other primary care centers. It might be that this is related to centre C having the highest share of digitally incoming contacts out of the three centers, but it might also be that outcome of the triaging and prioritising is dependent on other factors than just if the digital platform is implemented. These factors could for example include how the process of triaging looks like at the individual centres, and to what extent the care centres have changed their ways of working after implementing the platform. For example, at primary care centre C, all patients calling the centre are encouraged to go through the platform, and resources have been clearly allocated to answer patients in the digital platform. The focus on the digital channel is not emphasised in the same way at primary care centres A and B. However, the work process at the primary care centres have not been studied enough to draw conclusions regarding this subject.

To conclude, triage seems to be positively affected by the digital platform. However, there is a spread in the results depending on primary care centre, why one might suspect environmental factors, such as way of working, affecting the impact of the implementation.

6.2.3 Continuity

According to the data obtained from the centres, doctor continuity is negatively affected by the introduction of the digital platform. The doctor continuity decreased at two of the centres, by 5% and 8%, while the doctor continuity at the third primary care centre was practically unchanged. Due to continuity being one of the most important and well-researched quality measures in literature, the negative indications should be noted and further investigated. For example, an investigation regarding the cause of the decline needs to be done. Rolling averages, as used for calculating continuity, implies a delay in effect. This since the rolling average for a month depends on what happened 12 months earlier. Therefore, the decline might be caused by factors impacting the centre earlier than the implementation date. This means the time series in this investigation might be too short to actually see any impact of the platform.

Apart from investigating the cause of the decline, one should further granulate the issue of continuity. The results of Guthrie and Wyke (2006), used in the literature study, indicate that non-chronic patients might be

satisfied with trading continuity for availability. Thus, an analysis on sub-groups of patients would increase the understanding of this issue. It could be that patients requiring continuity, e.g. chronically ill patients, still gets continuity despite the indication that the implementation of platform impacts continuity negatively. Instead, the decreased continuity might be due to decreased continuity of non-chronic patients, who might be more satisfied with higher availability caused by the implementation of the digital platform. Hence, the negative results in this thesis might not be an explicit negative impact of the implementation, even if the data shows decreased continuity.

Further, other factors are suspected to affect whether continuity is impacted by the introduction of the digital platform or not. The digital platform might only improve continuity if the primary care centre uses the platform to strategically schedule patients to the same healthcare professional. Therefore, the impact of the digital platform is dependent on scheduling and ways of working. Primary care centre C have a clear strategy of using the platform in order to enhance continuity for chronically ill patients. The fact that the continuity still is decreased at the primary care centre is therefore unexpected. To clarify why this is the case, the cause of the decrease should be investigated further.

To summarise, our data shows a slightly negative impact on continuity from implementing a digital platform. However, this issue needs further investigation to fully understand the subject. One should especially analyse the cause of the decline, continuity on a sub-group level and how the primary care centre works with the platform to improve continuity.

6.2.4 Use of resources

The data collected from the centres on material resource use and total cost show that the implementation of the platform seems to negatively correlate with these costs. However, it is hard to determine if it truly is the digital platform that creates this cost increase, especially since no interview indicated that this result was to be expected. Instead, one might suspect that this negative effect rather is due to other, unmeasured, factors. One external effect could for example be that the postage cost increased by 22% 1 January 2020. However, this do not explain the full negative correlation. Moreover, given that the implementation of the platform occurred relatively recently, it might not be realistic to expect to see positive effects on costs already. Generally, it takes time for businesses to convert resource use savings or

productivity gains to actual cost savings. Moreover, the data for human resource use show inconclusive results. That is, the impact on number of full-time employments is uncertain, the impact on personal costs is negative and the experienced impact on time needed per patient case is inconclusive.

Nevertheless, the hypothesised drivers of human resources and associated cost show four interesting results. Firstly, the survey shows that care providers to a great extent believe that the platform enables a reduction in time needed per contact. The positive impact on individual contacts could potentially indicate that even though we do not yet see conclusive positive impact on patient case time and human resources overall, this might be to expect in the future. Moreover, one survey participant writes that "I tend to double-check the information from the digital platform orally, which is why the time gain probably is not that great", indicating that changes in ways of working could enable the primary care centres to actually capture the potential that they themselves see.

Secondly, centre A, which implemented the platform first out of the three centres, and centre C, which implemented the platform after centre A but prior to centre B, show noteworthy results for physical visits per listed patient. Just as centre B, centre A and C see a slight increase in total number of physical visits per patient, i.e. the impact on resource use for visits is negative. However, for centre A and C, the number of physical doctor visits per listed patient has decreased by 11% and 3%, while the number of physical nurse visits has increased by 18% and 7 %, respectively. This indicates that the primary care centres use of the platform has led to a shift in which profession handles patients. In other words, the way the platform alters triage might have reduced unnecessary doctor visits. Since doctor visits are more expensive, due to e.g. doctors' higher salaries, leveraging this shift could potentially reduce the centres' costs. The question remains whether centre B, which implemented the platform last, will see this shift in the future as well and thereby strengthen the hypothesis that the platform truly impacts visits in this way, or not.

Thirdly, the impact on administrative time is negative. Several survey comments indicate that this is caused by poor integration between the digital platform system and the medical records system. In contrast, a respondent meaning that the administrative time has decreased states that "it is easy to copy what patients have written". This indicates that perhaps the care providers digital know-how impacts their experience of the digital platform's

impact on administrative time. Hence, by improving care providers digital know-how, the platform's impact on administration might instead be positive.

Fourthly, when analysing the full results for frequent visitors it becomes clear that no conclusions concerning frequent visitor impact can be drawn from the gathered data. To exemplify, an increase in share of physically visiting patients which are deemed frequent visitors can be positive, if it originates from non-frequent visitors receiving less unnecessary physical visits, or negative if it originates from patients generally seeking more care unnecessarily. Similar reasoning applies for the share of total physical visits which can be related to frequent visitors; a share increase is positive if it is due to unnecessary visits by non-frequent visitors decreasing, or negative if frequent visitors are unnecessarily visiting more. The same goes for average number of physical visits per frequent visitor; an increase could be interpreted as positive, if it derives from the frequent visitor pool now to a greater extent containing patients that actually needs multiple visits, or as negative, if it derives from some frequent visitors now unnecessarily visiting more often than previously. For conclusions on the implementation of the digital platform's impact on frequent visitors to be drawn, the data would need to imply if the analysed frequent visitors are in actual need of multiple visits, or not. In the future, the metric for frequent visitors needs to be adapted to capture this difference. Then, analyses could be made regarding whether the digital platform encourages patients to unnecessarily increase healthcare consumption or not.

Even though no conclusion can be drawn in regard to the impact on frequent visitors, the numeric results from studying frequent visitors are still interesting in aspects other than digi-physical healthcare. The numeric results from studying frequent visitor data show that 9-18% of physically visiting patients are frequent visitors and that they in turn constitute for 35-46% of all visits. That is, frequent visitors use 3-4 times more resources than the average patient, indicating that the hypothesised importance of tracking this group of users is accurate.
To summarise, the impact on use of resources is uncertain. This since the overall impact on human resource use is uncertain and the impact on cost is negative. However, it is worth highlighting that, firstly, survey respondents believe that the platform enables a reduction in time needed per contact, indicating that a positive effect on resources can be expected in the future if ways of working are adapted. Secondly, two centres see a resource-wise

positive shift in visits, from doctor visits to nurse visits, indicating a reduction in unnecessary doctor visits. Thirdly, by improving care providers digital know-how, the platforms impact on administration might shift from the current negative to positive. Lastly, the framework metrics for frequent visitors do not capture if frequent visitors are in true need of multiple visits or not. Thus, they are insufficient impact indicators and must be altered if they are to be used in future work.

6.2.5 Productivity

A more efficient use of healthcare professionals' time may decrease costs, due to a decrease in personnel. Increased productivity also implies that the same number of employees may handle an increased list of patients, i.e. increased revenue. Thus, an increase in productivity is a key part of decreasing costs and increasing revenue, and productivity subsequently has the potential to create business value.

The productivity based on the number of patient interactions has increased by approximately 50% (ranging from 43% to 55%) in general, where nurses account for the largest increase, with an average of 85% (ranging from 67% to 102%). However, the productivity based on the number of appointments resulting in a diagnosis have decreased, by an average of 6% (ranging from an increase of 1% to a decrease of 17%). The difference in the measures indicates that interactions, not resulting in a diagnosis, have increased compared to interactions resulting in a diagnosis. Decreased number of interactions resulting in a diagnosis might be seen as something negative, since one may interpret it as less care being given at the primary care centre. However, this is not necessarily the case; there might be advantages with increased interaction-based productivity. Increased interactions might be due to doctors taking part in the triaging process, as explained in the analysis of effect on triage. This will not result in a diagnosis, however, provides other benefits. Firstly, unnecessary doctor appointments and lab tests might be avoided if a doctor is included in the triaging; if a doctor is included, the nurse doing the triaging might not have to schedule precautionary doctor appointments that could be avoided by collaborating with a doctor. Thus, costs associated with these issues can potentially decrease, as discussed in the analysis of use of resources. Secondly, it may also be an advantage in terms of medical quality. If the number of interactions is increased, the risk of missing out on a patient is decreased. As stated by Fernholm et al. (2020),

both healthcare professionals and patients highlight that bad communication contributes to a high risk of maltreatment.

To conclude, the digital platform has a positive impact on productivity on interaction-based productivity and a negative impact on diagnosis-based productivity. Further, no clear conclusion may be drawn on the business value created.

6.2.6 Work environment

Collaboration and trust amongst colleagues are, according to the survey, enhanced by implementing the digital platform, with 73% positive responses across the care centres. Collaboration is perceived as a factor boosting motivation at work, according to Andersson Gäre et al. (2017). One respondent in the survey confirms this correlation by stating: *"*It is a fun way of working, we collaborate more between different professions"[9]. Another respondent exemplifies this by stating: "It is nice to be able to get involved and involve other professions in the chat. This implies shorter paths of contact and shorter decision paths"[10].

The respondents in the survey further highlight that the digital platform increases work flexibility, with 47% positive responses compared to 15% negative responses. One respondent states it as: "It is easier to work from home. It is also easier to reach patients at a time that suits me" [11]
Increased work flexibility, according to Andersson Gäre et al. (2017), also increases work motivation at the primary care centre. However, even though the digital platform seems to have a positive impact on collaboration and flexibility, the survey does not indicate a general positive impact on work motivation, contradicting the findings of Andersson Gäre et al. The reason for this could be that increased work motivation is a secondary effect, i.e. that increased collaboration and flexibility increases work motivation, not the platform itself. Respondents might not take this into account when assessing correlation between the platform and work motivation.

The digital platform's impact on stress-related issues is unclear. The result from the survey is scattered, with a majority of neutral answers. Healthcare

[9] Authors' translation from Swedish to English
[10] Authors' translation from Swedish to English
[11] Authors' translation from Swedish to English

professionals feeling lower stress levels due to the platform, emphasise that compared to the standard telephone contact, the platform provides more information about the patient prior to first contact. This makes the triaging easier and less stressful. Thus, the platform potentially decreases stress for employees performing these tasks, mainly triage-nurses. Respondents feeling that their workload related stress has increased state the fact that the digital platforms entails an additional platform to administrate seems to be the major issue. As previously discussed in the analysis of use of resources, improved digital know-how could potentially improve the experience of administrative time. Some respondents suggest that the increased stress is due to not being given scheduled time to manage the platform, that working in the platform is put on top of their regular tasks. One respondent further elaborates the issue of stress by stating that during the introductory phase of the platform, the stress level was increased, while it decreased after learning how to efficiently work in the platform: "It was more stressful in the beginning, when we did not know how to use the system. After that, the stress level has decreased"[12]. Thus, the platform itself does not seem to lower stress levels initially, if ways of working are not adapted. Employees need to be given sufficient resources to use the platform, both in terms of adapted schedules as well as trainings when introducing the platform. This reasoning is in line with Andersson Gäre et al. (2017), where well-designed schedules and trainings were important factors of work motivation.

Moreover, the attractiveness of the workplace seems to be positively affected by the implementation of the digital platform, with 59% positive responses. However, no data was available on personnel turnover or applicants per open position, why the increased attractiveness is solely based on the current employees' beliefs.

Conclusively, the results indicate that the digital platform improves the work environment. This due to increased collaboration, increased attractiveness of the workplace and a possible decrease in stress levels long-term.

6.2.7 Medical quality

According to the results of the survey, healthcare professionals do not think antibiotic prescriptions are done more liberally with the digital platform, with

[12] Authors' translation from Swedish to English

only 5% negative results. Data on the exact number of prescriptions were not obtained. Therefore, a definite answer on the change in prescription is not possible to determine by this thesis, however, a positive indication is given from the survey.

In the survey, only 8% of the respondents found the follow-up routines were not improved by the digital platform. Out of these five persons, four persons stated that they had not used the feature where healthcare professionals initiate contact with the patient, and therefore answered negatively. 54% found the follow-up unchanged and 37% found the follow up improved, where comments describe it as the best function of the digital platform. One respondent highlights that the platform improves communication by making it easier to send out material and self-assessment forms:

> *"It has become easier to communicate with patients, e.g. to reschedule appointments, send out material and send out self-assessment forms. I have the freedom to have video appointments with my patients instead of physical appointments"*[13]

Thus, one can conclude that the platform improves follow-ups. As mentioned in the literature study, Fernholm et al. (2020) highlight well-functioning communication paths as important for delivering high quality care and malfunctioning follow-up routines as a factor correlated with prior harm in healthcare. By applying Fernholm et al.'s findings on the thesis result, one can conclude that the digital platform might reduce the risk of maltreatments and improve the possibilities of delivering quality care.

To summarise, the non-negative indications on antibiotic prescriptions and the positive impact on follow-ups indicate that the digital platform has a positive impact on medical quality. However, definite data on antibiotic prescriptions and follow-ups would improve the validity of the results. Additionally, data on quality metrics for key patient groups would further strengthen conclusions on long term quality effects.

6.2.8 Patient experience

According to the survey, healthcare professionals experience that patients get answered timelier through the digital platform than through a telephone call or a physical visit, with 49% positive responses and only 19% negative

[13] Authors' translation from Swedish to English

responses. Whether the digital platform enabled healthcare professionals to be able to book physical appointments earlier in time or not is unclear, since respondents from primary care centre A did not report a positive impact while primary care centre B and C did. Overall, there seems to be a slightly positive impact on the timeliness of patient cases. In line with Guthrie and Wyke (2006), whose study found rapid responses as a top priority for patients, the positive impact on timeliness would imply that the platform has a slightly positive impact on patient satisfaction.

However, using opinions of a secondary source, i.e. healthcare professionals, to measure patient satisfaction might not be the most accurate way. Due to COVID-19, surveys with patients were not possible to conduct. Therefore, the only primary data available for the thesis was the post-use evaluations filled in by patients after using the platform. These evaluations measure if patients receive enough information as well as if patients would recommend the digital platform. Approximately 90% of patients using the digital platform felt they got enough information. This goes in line with Johansson et al. (2020), where patients had felt that the written dialogue provided the same opportunity for advice and support as triage through the telephone. Additionally, 90% of patients would recommend the platform. This is also a reasonable result recalling Abelsson et al. (2019), where internet was seen as the preferred way of contacting healthcare. Thus, both primary sources as well as secondary sources indicate that patients are generally satisfied with the digital platform.

6.3 Summary of findings

To conclude, the digital platform's impact on patient and healthcare satisfaction is positive, while the impact on quality and efficiency is unclear. The positive impact on satisfaction is clear, since both work environment and patient experience seem to be positively affected. However, neither quality nor efficiency is unanimously positively or negatively affected. Regarding quality, the triaging process and the medical quality is positively affected, continuity is negatively affected and the impact on availability is uncertain. Concerning efficiency, the impact is uncertain due to the uncertain effect on use of resources and productivity along with positive impact on triage and negative impact on continuity. For an overview of the impact, see table 6.4.

Table 6.3 Summary of impact of the digital platform

Area	*Goal*	*Hypothesised impact*	*Actual impact*
Quality	Availability	Mainly positive	Uncertain
Quality	Medical quality	Mainly positive	Positive
Quality/efficiency	Triage	Positive	Positive
Quality/efficiency	Continuity	Positive	Negative
Efficiency	Use of resource	Mainly positive	Uncertain
Efficiency	Productivity	Positive	Uncertain
Satisfaction	Work environment	Positive	Positive
Satisfaction	Patient experience	Positive	Positive

Thus, the general impact of the platform is uncertain, with satisfaction as the only clear positive impact. In the next chapter, implications of the results are discussed.

7 Discussion

In this section, a discussion of the result is provided. The discussion regards ways of working's effect on the impact of the implementation of the digital platform, relations between goals and the business value of digi-physical healthcare. Further, the methodology of the thesis is discussed along with the thesis' validity. Lastly, future work is proposed in order to further advance knowledge within the area.

7.1 Discussion of findings

7.1.1 A digital way of working

The potential gains of digitalisation, such as efficiency and accessibility, is brought forward by The Ministry of Health and Social Affairs (2016) and Stiernstedt et al. (2019) in section 3.2.1. After interviewing healthcare professionals and analysing the impact of digi-physical healthcare, it becomes clear that digitalisation of processes is not what creates real impact. That is, merely implementing the platform does not necessarily generate value. The digital platform can to no doubt facilitate change, but it is the extent and how people choose to use the platform's features which impacts the value it creates. That providers' ways of working with the digital platform impact the value created is exemplified in several sections of the analysis, for example in the sections regarding triage and availability. That is, both the impact on triage and availability is seen to be affected by the ways of working. That the extent to which ways of working have been adapted affects the impact realised is also pointed to in several parts of the thesis. For example, in the hypothesis on resources use interviewees stress that realising positive effects requires extensive changes in ways of working.

To alter ways of working to the necessary extent takes time. Initial training, learning from doing and adapting processes thereafter, are all time-

consuming activities. For all studied centres the implementations of the platform occurred quite recently. Thus, it is understandable that the impact seen in this thesis on for example use of resources and continuity is not extensive. It is likely that in time, effects on these performance indicators might be seen if ways of working are altered for goal fulfilment.

In conclusion, implementing a digital platform does not create impact in itself, it only enables value creation. For the true potential of the digi-physical healthcare to be seen, primary care centres must strive for digital transformation. That is, they must implement the change in work-processes needed to facilitate digitalisation undertakings, as implied by Bloomberg (2018, 29 April) in section 3.1. They must also realise that changing ways of working takes time, thus, the strive to create value is a long-term commitment. This is a key takeaway for any primary care centre hoping to realise the potential benefit of digi-physical healthcare.

7.1.2 Goal-relations and implications over time

As indicated in some of the hypotheses in section 5.2 the performance indicators, or goals, in the evaluation framework sometimes impact one another. For example, in the first hypothesis for patient experience, enhanced triage, increased continuity and higher-quality work environment are assumed to have positive spill-over effects on patient experience. One might reflect upon the implications of the possible relations between the goals. Could for example a positive impact on one goal predict a future positive impact on another goal? If so, what predictions can be made from the results in this thesis?

The positive impact seen in this thesis on triage and work environment might indicate that improved use of resources is to be expected in the future. To elaborate, improved work environment and better triage results in more motivated personnel, which better prioritises patients after their needs. This could in the future lead to more work being carried out by the existing staff, and less unnecessary visits occurring. Thus, productivity and use of resources could be positively impacted. However, one could also argue that the negative impact seen in this thesis on continuity could predict a future negative impact on patient experience, in line with the findings of e.g. Abelsson et al. (2019) discussed in section 5.1.1.

From these examples, it is easy to see that this thesis does not suffice for determining the exact relations between the goals and their potential future implications for one another. If, however, one could conclude what implications the effect on one goal has on the future outcome of other goals, the work associated with the evaluation of digital platforms could be reduced significantly. That is, by using the identified cause-effect relationship, the number of measures in the evaluation framework could be reduced, positively impacting the consequent time required for data extraction and analysis. Easier evaluation processes could accelerate the development of digi-physical healthcare and thereby primary care as well.

7.1.3 Business value and its impact on adoption

In regard to business value of digi-physical healthcare, the analysis shows no clear impact on profits. However, the digital platform's positive impact on both healthcare provider and patient satisfaction implies that revenue might increase, and cost might decrease in the long run. Further, the increase in interaction-based productivity as well as improved triage could also lead to gains in profit.

Revenue might increase as a result of increased patient satisfaction, as described in section 3.3, a large share of the income for primary care centres are based on the number of listings. One might argue that a satisfied patient is keen to stay listed at their existing care centre, while a dissatisfied patient might switch centres. A primary care centre with satisfied patients is more likely to have a higher number of listings, which consequently leads to higher revenue for the primary care centre. Thus, implementing a digital platform might create business value for the primary care centre by increasing or keeping the list size. Patient satisfaction might also lead to reduced costs of out-of-county visits, due to patients using the primary care centre's digital service rather than using eDoctors.

Further, cost might be reduced as a result of improved attractiveness of the workplace. This since improved attractiveness might reduce the use of medical locums, which are both common and expensive. Nordqvist, Bern & Morild (2015) states that a medical locum costs approximately 1.5 to 2 times more than an employed doctor and accounts for a large share of the workforce. As an example, Nordqvist et al. (2015) states that costs of medical locums accounted for approximately 18% of the personnel cost in the primary care of Region Dalarna. Costs might also decrease if the improved

triage and improved interaction-based productivity can translate into reduction in use of resources, e.g. savings in personnel costs.

Moreover, the reimbursement system for digi-physical healthcare also contributes to uncertainty regarding the potential business value. In interviews with healthcare professionals, they articulate a difficulty of receiving reimbursement for digi-physical healthcare. In some regions, the primary care centre is not eligible for reimbursements for certain types of digi-physical healthcare, and sometimes, the primary care centres do not know how to get reimbursement for digi-physical healthcare. Therefore, a nationally modified reimbursement model suited for digi-physical healthcare is needed for the positive effect on patient interactions, as described in section 7.1.3, to translate into financial gain.

Additionally, there are other, societal benefits of modifying the reimbursement model. A modified reimbursement model would incentivise especially privately owned primary care centres, which constitute 43% of primary care centres in Sweden (SKL, 2019), to adopt digi-physical primary care. A faster adoption rate is important for two reasons. Firstly, it decreases the distance between traditional physical care and digital healthcare. This would benefit patients, as described by Stiernstedt et al. (2019) in section 3.4. Secondly, fast adoption is of societal interest. This since a slow adoption of digi-physical healthcare could imply that the majority of the demand on digital healthcare services would be supplied by the relatively expensive eDoctors, such as Kry and MinDoktor. Of course, eDoctors only remain expensive if they continue benefitting from the out-of-county reimbursement models, which is uncertain if they will in the long term.

Conclusively, even though the case studies show no financial gains of implementing digi-physical healthcare, the increase in satisfaction as well as the improved triage and interaction-based productivity implies that there are potential gains to be realised in the future. The business value would be even greater if a new, modified, reimbursement model was implemented. To correctly reimburse digi-physical healthcare would facilitate large scale adoption of digital platforms. This would benefit both patients and primary care centres.

7.2 Discussion of methodology

7.2.1 Developing the evaluation framework

The framework was elicited through a literature study along with an interview study with key people at the primary care centres, the parent organisation and the platform provider. The literature study is based on a framework law, the latest major public investigation on the subject along with academic sources. Beyond these sources, the authors considered including quality measures used at a regional level in Swedish primary care. Of course, adding for example regional primary care sources could have extended the medical quality aspects of the evaluation. This was however not realistic due to the scope of this thesis but would have improved the framework.

The interview study was to be, and would have benefited to be, supplemented with interviews with healthcare professionals around Sweden without a link to either Praktikertjänst or Doctrin, which both have high interest in the outcome of this thesis. However, due to the COVID-19-pandemic (WHO, 2020), the authors found it both unethical and impractical to occupy healthcare professionals' time for further exploration of quality measures in healthcare. Therefore, none of the interviewees where completely independent from the digital platform and one might suspect a bias of 'wanting the digital platform to succeed' in interviewees. Nevertheless, the interviews were used to provide hypotheses, and not answers on impacts. Thus, none of the interviewees have any interest in providing faulty quality measures, why the interviews are deemed sufficiently unbiased.

7.2.2 Evaluating primary care centres

The evaluation's validity is affected by several factors. The biggest source of error is the inability to prove if effects are due to the implementation of the platform or other external factors. The implementation was done at different locations, at different times and in different ways. There was no control group available to perform a randomised control trial. A control group could have been created by dividing primary care centres into two groups, one where the digital platform was implemented, one where it was not. A comparison on the performance of the two groups would then more clearly describe the effect of digi-physical healthcare. A better design, however not practically

feasible, would be to divide each primary care centre into two independent halves. One half would implement the platform and one would not. The two groups of primary care centres would be identical except for the implementation of the platform. Thus, the groups would be perfectly suitable to use for evaluating the effect of implementing a digital platform.

A second factor affecting validity is the scope. The scope is, due to the nature of the thesis, limited. Given a larger scope, a more in-depth investigation could have been done. More time would have enabled an investigation of what caused different effects seen in the results. One could further investigate external factors, ways of working and changes at the primary care centres to establish whether the effects were in fact caused by the implementation of a digital platform or something else. A larger scope would also include the possibility of performing the investigation on a larger number of healthcare centres. A larger number of healthcare centres would enable a more precise and valid data analysis, since statistical measures such as paired t-tests and ANOVA-tables could have been used. This would make statistical inferences possible, compared to the current limited indications, and strengthen the validity. A larger number of healthcare centres, along with the second randomised controlled trial-design proposed earlier in this section, would also include the possibility to understand factors affecting the success of the implementation. For example, one could examine whether geographical location affects the impact of digi-physical healthcare.

Lastly, the data available might affect validity. Firstly, patients contacting the primary care centre through the digital platform constitutes 10-25% of total patients. This is a relatively small share, why the effect of the implementation might not be as substantial as it could have been. Secondly, the access to, and accuracy of, data affects the validity of the thesis. The primary care centres use several business intelligence systems, which generally do not have user-friendly data access. The systems are also different between centres, i.e. Region Skåne does not use the same systems as Region Stockholm. Together, these issues make it hard to assure accurate extraction of data and comparison between centres. This causes uncertainties in data and may therefore affect the analysis. Thirdly, the length of the time series also affects validity. The most recent implementation of the digital platform was done in October 2019. This makes the implementation time fairly short, which arguably could affect how well the primary care centre has adjusted to a digi-physical way of working. Short time periods also make the results more sensitive to normal cyclic patterns in the data, as healthcare

data typically has clear seasonal patterns. For example, number of visits are usually higher post-Christmas. If longer time series, both prior and post the implementation, had been available comparisons with the same time period during the previous year would have excluded this effect.

7.2.3 External input

To strengthen the findings of the thesis, an unfinished version of the paper was sent to the supervisor at Doctrin, Unn Hellberg. Hellberg has worked at Doctrin for two years, first as a Customer Success Manager and then as a Chief Customer Success Officer, and is thus familiar with the software and its potential effects on primary care centres. Hellberg read the thesis and provided input on the methodology of the case study. She also commented the analysis and the discussion. The input resulted in clarifications and adjustments of some parts of the thesis.

7.3 Further work

The evaluation of digital platforms would be enhanced by further investigation. There are several aspects making this thesis incomplete, where the aspects provided when discussing the methodology provides a few.

To validate the evaluation framework, further in-depth studies investigating quality measures should be done. Firstly, one should investigate further how to best adapt traditional performance measures to capture the benefits and drawbacks of digi-physical healthcare. For example, availability in a physical care environment might not be perfectly equivalent to availability in a digi-physical environment. One might suspect that geographical availability, i.e. being able to get care wherever the patient is situated, should be a part of the availability measure for digi-physical healthcare. One of the clearest benefits of digi-physical healthcare is highlighted in the spring when this thesis is written, 2020, when the pandemic caused by the COVID-19-virus is affecting everyone's daily life. To reduce the reproduction number of the virus, people suspecting that they are infected by the virus should avoid being in close contact with other people. In these cases, digital healthcare may help restraining the contagion. Increased usage of digital healthcare during the spring of 2020 is for example highlighted by Lüning (2020, 2 April). Thus,

measures should be more adapted to correctly determine the effect of digi-physical healthcare.

Secondly, further studies regarding the cause-effect relations between performance indicators discussed in section 7.1.2 would benefit the evaluation framework. It could also enable efficiency gains in evaluating and developing digital platforms.

Furthermore, future studies should include performing an evaluation of digital platforms with a randomized controlled trial. This to be able to conclude any cause-effect relationships. The randomized controlled trial should ideally be done on a large enough number of primary care centres to draw statistically significant inferences, rather than indicational inferences as done in this thesis. The evaluation should also be done with longer time series. When evaluating the centres in this thesis, the length of the time series may induce biased results due to cyclicality and noise in data. Different length of series for different primary care centres may also contribute to bias. The design of the random controlled trial could be influenced by the design proposed in the methodology discussion, or another design, as long as causality and statistical inference may be determined in an unbiased way.

Further, future work may also include an investigation on which factors impact the success of the implementation of a digital platform. As seen in this thesis, results differ between primary care centres. The cause of this may not be entirely determined by this thesis, however the thesis suggests that the way of working might influence the effect of an implementation of a digital platform. To fully understand the outcome of digi-physical healthcare, one should investigate what way of working makes a digital platform value-adding and what other factors impact the effect of the platform. This could for example be done by determining the effect of the digital platform, e.g. by the RCT-study proposed in 7.2.2, and then comparing the way of working, the management and other factors at the different primary care centres to determine the impact on the value created.

8 Conclusion

In conclusion, the impact of the implementation of the digital platform on primary care satisfaction is positive, while the impact on quality and efficiency is uncertain, see table 8.1. To fully and precisely determine the effect, and establish the cause of the effect, further studies investigating the impact of digi-physical healthcare needs to be conducted in a larger scale than what was possible in the scope of this thesis. This could for example be done by using a randomized population of primary care centres, using longer time series and expanding the analysis of data to a statistical analysis, in order to acquire significant results.

Table 8.1 Impact of the digital platform

Area	***Impact***
Satisfaction	Positive
Quality	Uncertain
Efficiency	Uncertain

Moreover, ways of working seem to influence what impact individual primary care centres realise from digi-physical healthcare. Ensuring sufficient resources for digital platform training, both from a managerial and operational perspective, is thus highly relevant, as well as adaptation of ways of working to realise the full potential of digi-physical healthcare.

Further, the case study shows no current financial gains of implementing digi-physical healthcare. However, the increase in satisfaction as well as the improved triage and interaction-based productivity implies that there are potential gains to be realised in the future. Moreover, a modified reimbursement model, capturing all aspects of digi-physical healthcare, would generate further business value and increase adoption rate of digi-physical healthcare. This would in turn decrease the distance between digital and physical healthcare, which potentially could improve Swedish healthcare in general.

To improve the process of evaluating digital platforms, and thereby primary care, future studies could analyse how evaluation measures can be further adapted to digi-physical healthcare and thus capture the benefits not currently captured in evaluation measures. Investigations on potential cause-effect relations between performance indicators could also be performed, as well as examinations of which factors impact the success of digital platform implementations.

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Appendix A Full result of case study

In this appendix, the full result of the case study is presented.

A.1 Full results

A.1.1 Availability

Table A.1.1 Result of evaluating primary care centres, availability

Question	*Metric*	*A*	*B*	*C*	*Impact*
1. Opportunity to present case	Change in average share of patients seeking contact that presents their case to the primary care centre on the same weekday, prior/post implementation	0,1%[a]	0,4%	-8,8%	
2. Opportunity to come in contact on the day of seeking care	Change in average share of patients seeking contact that comes in contact on the same weekday, prior/post implementation	No data	No data	No data	
3. Opportunity to access care	Share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the platform improves primary care accessibility, i.e. the availability of care for different patient groups?	(31/38/31)%	(28/40/32)%	(17/67/17)%	
	Distribution of contacts per age group and sex in traditional care compared to distribution of contacts per age group and sex in pure digital healthcare	See graph			
4. Seeking pattern impact	The share of care providers which answer positively (dual seeking. Is unusual)/neutrally/negatively to the question: Do you experience that some patients tend to seek care via	(31/50/19)%	(48/24/28)%	(33/39/28)%	

	both the digital channel and via other inflow channels on the same day?				
	Potential driver: Average time until first response to patients' digital messages (**within office hours** / all hours)	(**64,5**/ 556,6) min	(**54,0**/ 423,8) min	(**23,5**/ 353,2) min	

[a] Values for 6 months prior and 12 months post used

[b] Values for 6 months prior and 2 months post used

[c] Values for 3 months post used

Usage patterns

The following graphs show the distribution of contacts per age group and sex in non-digital healthcare prior implementation, compared to distribution of contacts per age group and sex in non-digital and digital healthcare post implementation. Note that the non-digital contacts do not include data on initial telephone contacts, i.e. telephone contacts originating from patients seeking care via telephone. The digital contacts post the implementation refers to digital platform contacts, i.e. platform contacts originating from patients seeking care via the digital platform.

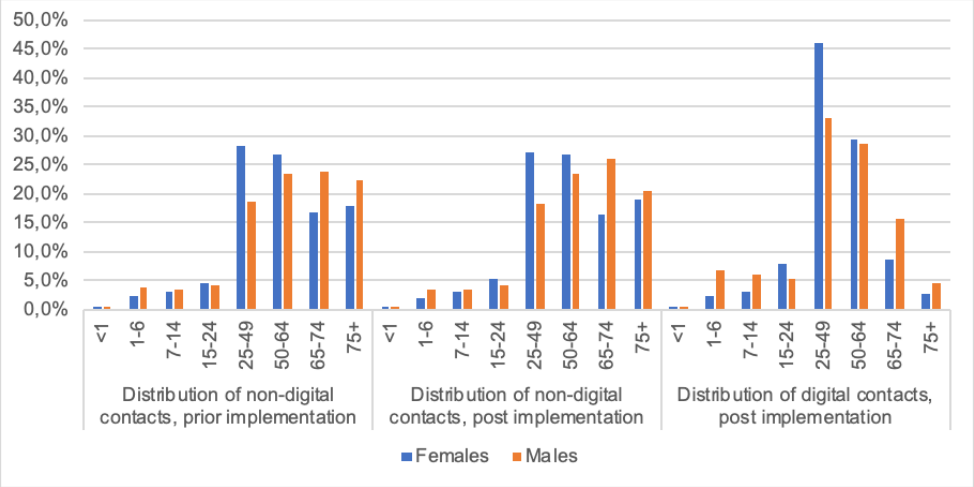

Figure A.1.1 Usage patterns prior and post the implementation of the platform for centre A

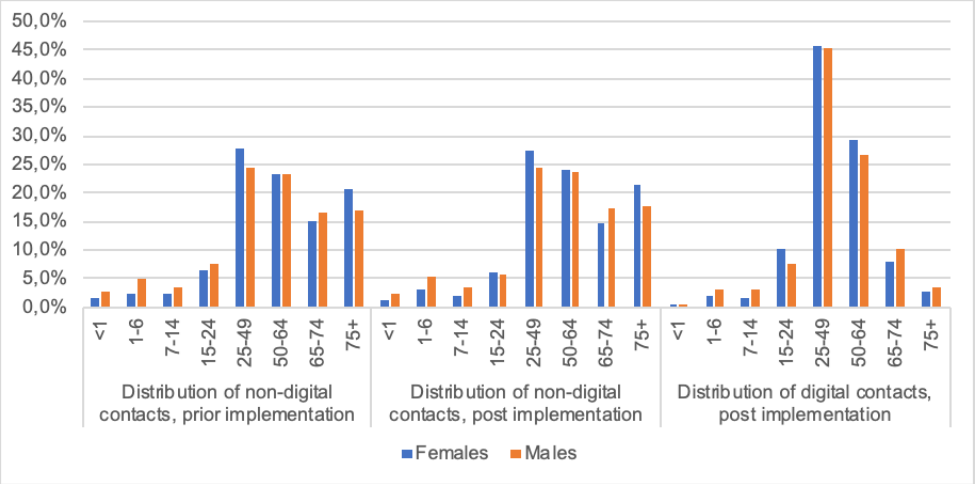

Figure A.1.2 Usage patterns prior and post the implementation of the platform for centre B

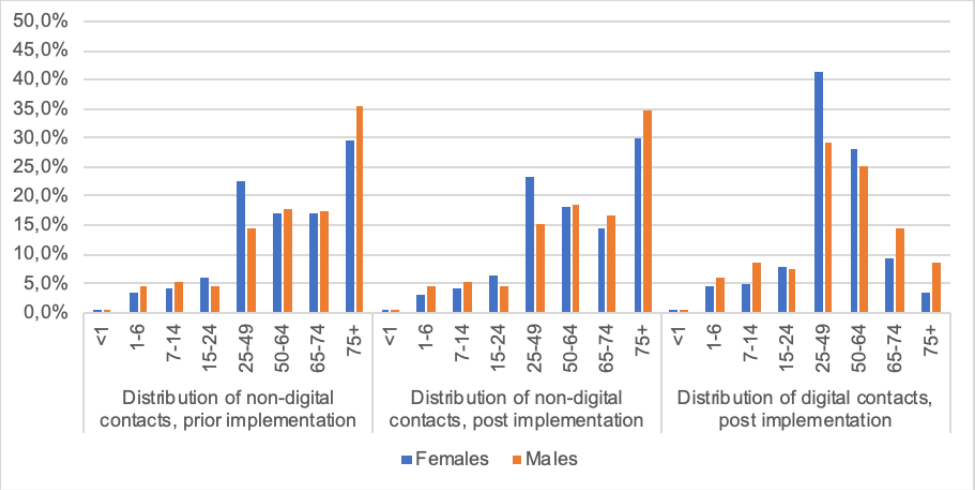

Figure A.1.3 Usage patterns prior and post the implementation of the platform for centre C

A.1.2 Triage

Table A.1.2 Result of evaluating primary care centres, triage

Question	*Metric*	*Case A*	*Case B*	*Case C*	*Impact*
1. Routing to right level of care	The share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the digital platform enables	(25/38/38)%	(40/44/16)%	(89/11/0)%	

		you to more easily direct the patients to the right level of care? E.g. do different professions to a greater extent see patients that should rightfully see them?				
2.	Prioritisation of patients after need	Share of incoming patient cases which arrives via the platform and therefore allows for prioritisation among cases, post implementation	14,6%[a]	12,2%	25,3%	
		The share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the digital platform enables you to more easily prioritise which patients to respond to first after their individual care need?	(38/31/ 31)%	(32/56/ 12)%	(72/28/ 0)%	

[a] Only values for 12 months post available and used.

A.1.3 Continuity

Table A.1.3 Result of evaluating primary care centres, continuity

Question	*Metric*	*A*	*B*	*C*	*Impact*
1. Doctor continuity	Change in average share of patients with doctor continuity	-5,4%[a]	-0,4%	-7,4%	

[a] Only values for 11 months post available and used.

A.1.4 Use of resources

Table A.1.4 Result of evaluating primary care centres, use of resources

Question	*Metric*	*A*	*B*	*C*	*Impact*
1. Human resource use	Change in average number of full-time employments, per thousand patients listed at the primary care centre	-7,9%[a]	3,1%	5,3%	
	Change in average number of full-time employments per profession, per thousand patients listed at the primary care centre (doctor)	-9,3%[a]	9,6%	14,7%	

	Change in average number of full-time employments per profession, per thousand patients listed at the primary care centre (nurse)	-8,5%[a]	6,2%	1,3%	
	Change in average number of full-time employments per profession, per thousand patients listed at the primary care centre (physiotherapist)	-1,8%[a]	0,5%	N/A	
	Change in average number of full-time employments per profession, per thousand patients listed at the primary care centre (psychologist)	11,6%[a]	N/A	4,9%	
	Change in average number of full-time employments per profession, per thousand patients listed at the primary care centre (other)	-20,7%[a]	-4,5%	6,3%	
Change in average personnel cost per listed patient		6,4%[a]	25,0%	16,9%	
Share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the digital platform shortens the average time needed per patient case?		(25/50/25)%	(32/44/24)%	(56/33/11)%	
Potential driver: Share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the digital platform shortens the average time needed per contact?		(31/44/25)%	(36/52/12)%	(67/28/6)%	
Potential driver: Change in average number of physical visits per patient physically visiting the primary care centre		6,2%[b]	1,4%	1,7%	
Potential driver: Change in average number of physical visits per listed patient		5,4%[b]	6,6%	2,6%	
	Change in average number of physical visits per listed patient per profession (doctor)	-10,7%[b]	3,8%	-2,5%	
	Change in average number of physical visits per listed patient per profession (nurse)	17,5%[b]	11,0%	6,5%	

		Change in average number of physical visits per listed patient per profession (physiotherapist)	7,8%[b]	N/A	N/A	
		Change in average number of physical visits per listed patient per profession (phycologist)	N/A	N/A	N/A	
		Change in average number of physical visits per listed patient per profession (other)	N/A	N/A	N/A	
		Potential driver: Share of care providers which answer positively/neutrally/negatively to the question: Do you feel that the digital platform shortens the average time spent on administrative duties, such as filling in medical records and letter writing, per contact?	(19/44/ 38)%	(16/32/ 52)%	(28/33/ 39)%	
		Potential driver: Change in share of patients that physically visits doctors, nurse or assistant nurses which are deemed frequent visitors	4,8%[b]	-7,1%	-0,9%	
		Potential driver: Change in share of total physical doctor, nurse or assistant nurse visits which can be related to frequent visitors	2,9%[b]	-2,7%	2,6%	
		Potential driver: Change in average number of physical doctor, nurse or assistant nurse visits for frequent visitors	0,7%[b]	0,5%	3,3%	
2.	Material resource use	Change in average material costs per listed patient	14,1%[a]	16,2%	8,5%	
		Change in average postal costs per listed patient	26,5%[a]	15,3%	26,5%	
3.	eDoctor visits	Change in average number of out-of-county eDoctor visits per listed patient	No data	No data	No data	
4.	Total costs	Change in average total costs, including the costs of the digital platform, per listed patient	5,4%[a]	1,1%	14,3%	

[a]Only values for 12 months post available and used.
[b]Only values for 11 months post available and used.

Table A.1.5 Share of frequent visitors and their total share of physical visits

	A	*B*	*C*
Share of patients that are frequent visitors[a]	13.3%	17.7%	9.3%
Share of total physical visits[b] frequent visitors stand for	41.7%	46.2%	35.1%
Use of resources factor	3.1	2.6	3.8

[a]Patients with >5 physical doctor, nurse or assistant nurse visits cumulative 12 months, average 2019
[b]Total physical doctor, nurse or assistant nurse visits cumulative 12 months, average 2019

A.1.5 Productivity

Table A.1.6 Result of evaluating primary care centres, productivity

Question	*Metric*	*A*	*B*	*C*	*Impact*
1. Productivity, number of contacts	Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post implementation	55%	45%	43%	
	Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post implementation (doctors)	14%	10%	10%	
	Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post implementation (nurses)	102%	86%	67%	
	Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post implementation (physiotherapists)	6%	N/A	N/A	
	Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post	N/A	N/A	12%	

		implementation (psychologists)				
		Change in average number of patient contacts per hour spent on patient-oriented activities, prior/post implementation (other)	N/A	N/A	N/A	
2.	Productivity, number of diagnoses	Change in average number of diagnoses per hour spent on patient-oriented activities, prior/post implementation (doctors)	-9%	-1%	-17%	

A.1.6 Work environment

Table A.1.7 Result of evaluating primary care centres, work environment

Question		***Metric***	***A***	***B***	***C***	***Impact***
1.	Collaboration and trust	Average number of care professions involved per digital patient case	No data	No data	No data	No data
		The share of care providers which answer positively/neutrally/negatively to the question: Do you feel that collaboration and trust amongst colleagues improved after the implementation of the digital platform?	(38/50/ 13)%	(92/8/ 0)%	(78/17/ 6)%	
2.	Work flexibility	The share of care providers which answer positively/neutrally/negatively to the question: Do you experience that work flexibility increased after implementation of the digital platform?	(50/38/ 13)%	(32/52/ 16)%	(67/17/ 17)%	
3.	Workload related stress	The share of care providers which answer positively/neutrally/negatively to the question: Do you feel that your workload related stress reduced a while after the implementation of the digital platform	(13/63/ 25)%	(40/40/ 20)%	(28/44/ 28)%	

4.	Ethical stress	The share of care providers which answer positively/neutrally/negatively to the question: Do you feel that your ethically induced stress reduced a while after the implementation of the digital platform	(19/63/19)%	(36/44/20)%	(28/44/28)%	
5.	Happiness and motivation	The share of care providers which answer positively/neutrally/negatively to the question: Do you experience that your work happiness and motivation improved a while after after the implementation of the digital platform	(25/44/31)%	(28/52/20)%	(28/50/22)%	
		Change in. average number of sick days per employee, prior/post implementation	No data	No data	No data	
6.	Attractiveness of workplace	The share of care providers which answer positively/neutrally/negatively to the question: Do you consider that your workplace's attractiveness increased a while after the implementation of the digital platform	(44/19/38)%	(72/24/4)%	(56/39/6)%	
		Change in average personnel turnover, prior/post implementation	No data	No data	No data	
		Number of applicants per open position after implementation of platform?	No data	No data	No data	

A.1.7 Medical quality

Table A.1.8 Result of evaluating primary care centres, medical quality

Question		*Metric*	*A*	*B*	*C*	*Impact*
1.	Prescriptions of antibiotics	Change in average, amount of antibiotics prescribed, weighted by patient list size, prior/post implementation	No data	No data	No data	
		Change in average, share of antibiotics prescribed which are narrowed-spectrum antibiotics, prior/post implementation	No data	No data	No data	

		The share of care providers which answer positively (i.e. less liberal prescription)/neutrally/negatively to the question: Do you experience more liberal prescription of antibiotics post the implementation of the digital platform?	(44/50/6)%	(48/44/8)%	(61/39/0)%	
2.	Follow up	Change in average, share of patients with diabetes have had their sugar level measured in the last 12 months, prior/post implementation	No data	No data	No data	
		Change in average, share of patients with high blood pressure who have had their blood pressure checked the last 12 months, prior/post implementation	No data	No data	No data	
		Change in average, share of patients with mental illness who have seen a psychologist or doctor in the last 12 months, prior/post implementation	No data	No data	No data	
		The share of care providers which answer positively/neutrally/negatively to the question: Do you experience that it is easier to do follow-ups on patients with, e.g. diabetes, high blood pressure or mental illness, post the implementation of the digital platform, e.g. by the use of the healthcare initated contact function?	(50/44/6)%	(32/52/16)%	(33/67/0)%	

A.1.8 Patient experience

Table A.1.9 Result of evaluating primary care centres, patient experience

Question		Metric	Case A	Case B	Case C	Total
1.	Management of patients' questions	Share of patients answering positively to: Did you receive enough information via the digital platform?	No data	92%	90%	
2.	Timeliness of patient cases	The share of care providers which answer positively/neutrally/negatively to the question: Do you experience that patients' questions are answered timelier via the digital platform than via e.g. phone or physical visits?	(56/31/13)%	(40/24/36)%	(56/44/0)%	

	Change of average, share of patients which are medical assessed within three days, prior/post implementation	No data	No data	No data	
	The share of care providers which answer positively/neutrally/negatively to the question: Do you experience that you can schedule patients for physical visits closer in time post the implementation of the digital platform?	(13/38/ 50)%	(48/36/ 16)%	(44/28/ 28)%	
3. Attractiveness of primary care centre	Change of average list size, prior/post implementation	4,4%	0%	1%	
	Share of patients answering positively to: Would you recommend the digital platform after your experience with using it?	No data	93%	88%	

Appendix B Survey results

In this appendix, the survey and its results are presented. The survey was sent out in Swedish, why some text in this chapter will be in Swedish as well. All text answers are deleted in order to maintain anonymity.

B.1 Introductory text

Hej,
Detta är en inbjudan till att delta i en enkät som syftar till att utröna hur Praktikertjänst24 upplevs påverka vårdcentralers verksamhet. Svaren från enkäten kommer tillsammans med journaldata användas i ett examensarbete som syftar till att utvärdera effekten av digifysisk vård* inom primärvården. Effekten utforskas inom tre områden: kvalitet, effektivitet och nöjdhet. Arbetet skrivs av två civilingenjörsstudenter från Lunds Universitet, Ellen Peber och Erik Wästfelt.

Mer information om arbetet:
Examensarbetet utförs i samarbete med Praktikertjänst samt plattformsleverantören av PTJ24, Doctrin. Fallstudier genomförs på tre av Praktikertjänsts vårdcentraler: Brahehälsan i Löberöd, Herkules Vårdcentral i Borås och Ekerö Vårdcentral. Arbetet skall publiceras under sommaren 2020.

Mer information om enkäten:
Enkäten tar uppskattningsvis 5-10 minuter att fylla i och innehåller frågor om hur arbetsmiljö, tillgänglighet, triage, resursanvändning och medicinsk kvalitet upplevs ha påverkats av implementeringen av PTJ24. Ni är helt anonyma i enkäten, och svaren kommer att publiceras på en aggregerad nivå. Citat från fritextsvar kan komma att användas i uppsatsen, men då på ett sådant sätt att det inte går att härleda citatet till en enskild medarbetare.

Stort tack för att ni tar er tiden att fylla i enkäten. Era svar är väldigt viktiga; dels då de bidrar till att öka kunskapen i Sverige kring digifysiskt vård, men även då svaren kan komma att påverka hur plattformen vidare implementeras inom Praktikertjänst. Tveka inte att nå ut om ni har några frågor!

Vänligen,
Ellen Peber och Erik Wästfelt
ine15epe@student.lu.se, ine15ewa@student.lu.se
Civilingenjörsprogrammet inom Industriell ekonomi, Lunds Universitet

*Vård som kan vara digital och/eller fysisk, beroende på patientens behov. Plattformar likt PTJ24 möjliggör för primärvården att erbjuda digifysisk vård.

B.2 Questions

B.2.1 Overview

Fråga 1: Arbetsplats
Vilken vårdcentral jobbar du på?

Table B.2.1 Question 1, overview

Healthcare centre	*Number of answers*	*Share of answers*
Brahehälsan Löberöd.	16	27%
Herkules Vårdcentral	25	43%
Ekerö Vårdcentral	18	31%
Totalt	59	100%

Fråga 2: Arbetsuppgifter
Vilken är din titel och arbetsroll på vårdcentralen

Table B.2.2 Question 2, overview

Healthcare centre	*Number of answers*	*Share of answers*
Doctor	23	39%
Nurse	16	27%
Physiotherapist	9	15%
Psychologist	2	3%
Other	9	15%
Total	59	100%

B.2.2 Work environment

Fråga 1 – Flexibilitet i arbetet

Upplever du att du kan vara mer flexibel i ditt arbete, och mer självständigt anpassa ditt arbete efter dina individuella behov, efter implementationen av Praktikertjänst24?
1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.3 Question 1, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	50%	38%	13%
Herkules Vårdcentral	32%	52%	16%
Ekerö Vårdcentral	67%	17%	17%
Total	47%	37%	15%

Fråga 2 – Stressig arbetsmiljö

Har du upplevt att Praktikertjänst24 har bidragit till en mer eller mindre stressig arbetsmiljö?

1 (mycket mindre stress) till 5 (mycket mer stress) där 1 och 2 är positivt, 3 är neutralt och 1 och 2 är positivt

Table B.2.4 Question 2, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	13%	63%	25%
Herkules Vårdcentral	40%	40%	20%
Ekerö Vårdcentral	28%	44%	28%
Total	29%	47%	24%

Fråga 3 – Etisk stress

Har din stress relaterat till att tillgodose patienters vårdbehov ökat eller minskat sedan införandet av Praktikertjänst24?

1 (mycket mindre stress) till 5 (mycket mer stress) där 1 och 2 är positivt, 3 är neutralt och 1 och 2 är positivt

Table B.2.5 Question 3, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	19%	63%	19%
Herkules Vårdcentral	36%	44%	20%
Ekerö Vårdcentral	28%	44%	28%
Total	29%	49%	22%

Fråga 4 – Samarbete på arbetsplatsen

Tycker du att Praktikertjänst24 bidrar till ökade möjligheter för samarbete mellan anställda och olika professioner?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.6 Question 4, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	38%	50%	13%
Herkules Vårdcentral	92%	8%	0%
Ekerö Vårdcentral	78%	17%	6%
Total	73%	22%	5%

Fråga 5 - Motivation

Har Praktikerjänst24 påverkat hur motiverad du är i ditt arbete och hur kul du upplever att det är att gå till jobbet?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.7 Question 5, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	25%	44%	31%
Herkules Vårdcentral	28%	52%	20%
Ekerö Vårdcentral	28%	50%	22%
Total	27%	49%	24%

Fråga 6 – Arbetsplatsens attraktivitet

Tror du att en tjänst som Praktikertjänst24 ökar attraktiviteten hos arbetsplatsen?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.8 Question 6, work environment

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	44%	19%	38%
Herkules Vårdcentral	72%	24%	4%
Ekerö Vårdcentral	56%	39%	6%
Total	59%	27%	14%

B.2.3 Availability

Fråga 1 - Patientjämlikhet
Tycker/tror du att Praktikertjänst24 möjliggör en mer jämlik vård?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.9 Question 1, availability

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	31%	38%	31%
Herkules Vårdcentral	28%	40%	32%
Ekerö Vårdcentral	17%	67%	17%
Total	25%	47%	27%

Fråga 2 - Dubbelsökning
Tycker/tror du att det är vanligt med dubbelsökning, det vill säga att patienter som först söker via telefon sedan söker via den digitala tjänsten, eller vice versa?

1 (mycket ovanligt) till 5 (mycket vanligt), där 4 och 5 är negativt, 3 är neutralt och 1 och 2 är positivt

Table B.2.10 Question 2, availability

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	19%	50%	31%
Herkules Vårdcentral	48%	24%	28%
Ekerö Vårdcentral	28%	39%	33%
Total	25%	36%	39%

Fråga 3 – Inbokning av patienter

Anser du att det är möjligt att boka in patienter närmre i tiden efter implementationen av Praktikertjänst24?

1 (inte alls) till 5 (absolut)

Table B.2.11 Question 3, availability

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	13%	38%	50%
Herkules Vårdcentral	48%	36%	16%
Ekerö Vårdcentral	44%	28%	28%
Total	37%	34%	29%

Fråga 4 – Besvarande av patienter

Anser du att det går snabbare att besvara patienters frågor via Praktikertjänst24 jämfört med telefontid eller fysiska besök?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.12 Question 4, availability

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	56%	31%	13%
Herkules Vårdcentral	40%	24%	36%
Ekerö Vårdcentral	56%	44%	0%
Total	49%	32%	19%

B.2.4 Triage

Fråga 1 – Triage på Praktikertjänst 24

Tycker du att Praktikertjänst24 gör det enklare att triagera patienter på ett korrekt sätt, i jämförelse med till exempel telefontriage?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.13 Question 1, triage

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	25%	38%	38%
Herkules Vårdcentral	40%	44%	16%
Ekerö Vårdcentral	89%	11%	0%
Total	51%	32%	17%

Fråga 2 – Prioritering av patienter

Tycker du att det blir enklare att prioritera patienter efter vårdbehov med hjälp av Praktikertjänst24 jämfört med exempelvis telefon?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.14 Question 2, triage

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	38%	31%	31%
Herkules Vårdcentral	32%	56%	12%
Ekerö Vårdcentral	72%	28%	0%
Total	46%	41%	14%

B.2.5 Use of resources

Fråga 1 - Hanteringstid

Anser du att Praktikertjänst24 kortar tiden som behövs för att hantera ett patientärende?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.15 Question 1, use of resources

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	25%	50%	25%
Herkules Vårdcentral	32%	44%	24%
Ekerö Vårdcentral	56%	33%	11%
Total	37%	42%	20%

Fråga 2 - Mötestid

Anser du att Praktikertjänst24 möjliggör kortare möten med varje patient, till exempel genom att de görs digitalt eller via att en strukturerad anamnes redan är gjord innan träff?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.16 Question 2, use of resources

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	31%	44%	25%
Herkules Vårdcentral	36%	52%	12%
Ekerö Vårdcentral	67%	28%	6%
Total	44%	42%	14%

Fråga 3 – Administrativ tid

Anser du att Praktikerjänst24 minskar administrativ tid per patientärende?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.17 Question 3, use of resources

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	19%	44%	38%
Herkules Vårdcentral	16%	32%	52%
Ekerö Vårdcentral	28%	33%	39%
Total	20%	36%	44%

Fritextruta för kommentarer

B.2.6 Medical quality

Fråga 1 – Antibiotikaförskrivning

Anser du att olika typer av antibiotikaförskrivningar görs mer liberalt med Praktikertjänst24?

1 (inte alls) till 5 (absolut), där 1 och 2 är positivt, 3 är neutralt och 4 och 5 är negativt

Table B.2.18 Question 1, medical quality

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	44%	50%	6%
Herkules Vårdcentral	48%	44%	8%
Ekerö Vårdcentral	61%	39%	0%
Total	51%	44%	5%

Fråga 2 – Uppföljning

Anser du att VIK-funktionen i Praktikertjänst24 det har blivit enklare med uppföljning av exempelvis diabetiker, hypertoni och psykisk ohälsa?

1 (inte alls) till 5 (absolut), där 1 och 2 är negativt, 3 är neutralt och 4 och 5 är positivt

Table B.2.19 Question 2, medical quality

Healthcare centre	*Share of positive answers*	*Share of neutral answers*	*Share of negative answers*
Brahehälsan Löberöd	50%	44%	6%
Herkules Vårdcentral	32%	52%	16%
Ekerö Vårdcentral	33%	67%	0%
Total	37%	54%	8%

Appendix C Interview form

In this appendix, the questionnaire used in the interview study is presented.

C.1 Introductory text

Titel: Evaluation of digi-physical healthcare using GQM-model
Mål: Få fram kvalitets-, effektivitets- och nöjdhetshetsindikatorer och korresponderande mätpunkter
Datum och tid: x/x – 2020
Intervjuare: Ellen Peber, Erik Wästfel
Intervjuobjekt:
Kort information om intervjuobjektet:

C.2 Questions

C.2.1 Vad har tidigare gjorts hos er på kvalitets- och effektivitets- och nöjdhetsområdet?

Nedan följer tre frågor relaterade till GQM. Därmed ges intervjuobjektet dessförinnan en kort förklaring av GQM modellen.

C.2.2 G – Mål.

Vad är dina/era mål gällande kvalitet, effektivitet och nöjdhet?

C.2.3 Q - Frågor

Vilka frågor tycker du skall besvaras för att utvärdera målen?

C.2.4 M – Mätetal

Vilka mått tror du man kan använda för att uppnå målen och besvara frågeställningarna?
Vilka databaser kan vi leta i?

C.2.5 Resultat

Vad förväntar du dig för slags resultat?
Är du något du tror vi kommer se en tydlig förbättring inom?
Är det något du tror vi kommer se en tydlig försämring inom?

C.2.6 Resultatpåverkan

Vad tror du kommer påverka hur bra vårt resultat blir? (felkällor, vårdcentralsberoendefaktorer)

C.2.7 Hinder

Vad tror du har varit/är ett reellt hinder för en lyckad implementation av plattformen och därmed dess möjlighet till positiv påverkan på vårdcentralerna?

C.2.8 Möjliggörare

Vad tror du har varit/är möjliggörare för en lyckad implementation av plattformen och därmed dess möjlighet till positiv påverkan på vårdcentralerna?

C.2.9 Är det något du skulle vilja tilläga som vi inte har frågat om?