Beyond Health Tech

A proposition to enhance the relationship between General Practitioners (GPs) and their chronic patients

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Beyond Health Tech
A proposition to enhance the relationship between General Practitioners (GPs) and their chronic patients

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Preface

What you are about to read is my master thesis of the master Strategic Product Design at the TU Delft. This thesis was in cooperation with Deloitte Digital. I hope you will enjoy reading it!

Olivier

Special thanks to: Giulia, Maaike, Shauna, Naima, Folkert, Pervin, Joesfien, Luc, the Deloitte Digital team and of course my lovely family
Executive Summary

This is the graduation project that was executed for the master Strategic Product Design in collaboration with Deloitte Digital. The project concluded with a proposition that Deloitte could use to inspire potential clients. The proposition shows, how to shape a flourishing and rewarding relationship between chronic patients and GPs by using personal data.

Deloitte is the largest professional service provider worldwide, they are aware that standing still is not an option. They are moving their business model towards an asset-enabled business and are adapting their strategy to their customer’s needs. One of Deloitte’s growth areas is Health. This graduation project will provide Deloitte with a new health proposition.

The increase of chronic patients makes it hard for the health sector to meet the growing demand of care. A reliable solution is health tech. Care providers are working hard to find the best suitable health tech solutions for their problems. Besides the health providers, the government and the patients are also paying attention to it. Patients are getting more self-aware and are putting more effort into staying healthy with all the available resources.

While the growing group of chronic patients embrace the personal data generated by health tech, the overworked GPs show distrust toward health tech. This different perception of personal data has an impact on the quality of the relationship. According to the qualitative research that was conducted, the impact of personal data is visible in the relationship between chronic patients and GPs. The main hurdles that influence the relationship are: 1. lack of knowledge on the trustworthiness of data sources, 2. lack of guidelines on how to share personal data and associated concerns, 3. complexity around data interpretation and 4. lack of support to enable a fruitful relationship between patients and doctors.

The goal of the proposition is to shape a flourishing and rewarding relationship between chronic patients and their GPs, enhancing curiosity, enabling continuity and celebrating openness, and as such overcome those hurdles.

The concept created for the proposition is ‘Meer’. This concept was created through multiple validation and conceptualization sessions. ‘Meer’ is a twofold digital application that creates an ecosystem both for chronic patients and GPs, including a shared view to use during consultations. Four different functionalities of the ecosystem are designed to overcome the four hurdles: 1. With ‘Meer’, chronic patients and GPs can explore the possibilities of devices and trackers to generate personal data by being exposed with a set of validated apps. 2. ‘Meer’ generates a better overview of the patient’s health data for GPs and patients by collecting all the personal data in one application that is easily accessible. 3. More frequent contact with chronic patients is established digitally. This results in the opportunity for GPs to validate new issues more often. 4. ‘Meer’ enables chronic
patients to support GPs by generating the right personal data at the right time.

In the end, ‘Meer’ strengthens the relationship between chronic patients and general practitioners. This enhanced relationship will lead to:
Increased satisfaction and improved enablement & compliance of medication for chronic patients; easier clinical decision making and easier reveal of psychological problems for GPs; and it will generate a therapeutic relationship for the chronic patient.

This proposition shows how the four different hurdles in the relationship between general practitioners and chronic patients caused by the use of personal data can be solved by the concept ‘Meer’. The proposition is valid according to different partners of Deloitte and shows potential for the future of chronic patient care.
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Introduction

This booklet contains the graduation assignment of the Master Strategic Product Design at the Faculty Industrial Design Engineering of the TU Delft. This assignment is commissioned by Deloitte Digital Amsterdam. The topic of this assignment is what the impact of personal data within health care could be and how design could support it.

This first chapter will elaborate on Deloitte and Deloitte Digital, the topic of this assignment, technology and healthcare. Next, it will focus on the target audience and relationships. The second half of the first chapter will explain more about the assignment and methodology.
Deloitte Digital
The Deloitte Digital team is part of technology consulting within Deloitte. Deloitte Digital has positioned itself as a digital agency that helps companies’ digital transformation. Deloitte Digital describes itself as:

“Deloitte Digital is a bold and innovative part of Deloitte. We offer everything digital from strategy, multi-channel, bespoke development and managed solutions. Deloitte Digital is an innovative leader in online and mobile strategy, design and development, offering world-class knowledge and resources from the leading global business and technology consultancy. We work with a wide range of iconic local and global organizations, helping them understand and profit from the online and mobile revolution.

Our focus is on the areas of digital strategy, mobile, social/web, content management and managed services. Underpinned by digital tech architecture, application implementation and development expertise. We approach our work with great energy and passion as we align our client’s business aspirations to the goals of the end user.”

Purpose Deloitte
The purpose of Deloitte is to make an impact that matters (Deloitte, 2018). They aim to achieve this through four characteristics. The first characteristic is to create an impact that matters by delivering absolute top quality. The second characteristic is to ensure that all employees are inspired. The third characteristic emphasizes the contribution Deloitte wants to have on society. The last characteristic of Deloitte is that they are a pioneer in their discipline.

Strategy
The purpose and its characteristics are the roof of the strategy of Deloitte (Figure 1.). The strategic pillars of Deloitte are based on their goal of: Being the undisputed leader in professional services, as they presented in their 2020 strategy. The first strategic pillar emphasizes the quality, integrity and positive change of Deloitte. This pillar is the license to operate and the foundation for Deloitte’s purpose: to create an impact that matters. The second pillar is becoming a premier career destination. They want to be the first choice for the country’s best talent, as they believe that this will guarantee success. Third is to accelerate growth and innovation, since digitalization is still increasing and staying relevant for our premium clients is very important. The fourth pillar is to improve their client portfolio. They will establish this through exclusive services for clients where they can create the biggest impact and where profits are sufficient. The fifth pillar is to establish a lean operation to be able to invest in quality, talent and innovation such that overhead costs can be spared. The final pillar is seeking internationalization. Deloitte is one of the biggest international companies and has to use that to be able to serve clients worldwide smoothly and consistently.

Asset-enabled business.
Deloitte embraces asset-enabled business models since they believe that these are the future of the professional service market (Deloitte, 2018). Asset-enabled business models are based on delivering and supporting delivered services Deloitte created. This means that Deloitte is reshaping its business model from headcount, time, and material-based towards a value-based, and technology enabled business model. This asset-enabled business is needed to meet client demand and competition, driven by new technological possibilities. There are three degrees of assetization. Firstly, tools. These are methodologies that help professionals work more efficiently. The second degree is solutions, in which software plays a crucial role and is created for a specific client. The final degree is products that are software enabled and applicable for multiple clients.

Digital Health Compliance
Deloitte is doing business in multiple sectors. One of the fastest growing sectors within the Netherlands and internationally is the Health sector (DHC, 2018). The growing demand of (digital) technology will change this market and Deloitte aims to be a major player in it, since they have the capability to support hospitals, insurances and other health-related companies to deal with the implementation of digital technologies. Deloitte Digital Health Compliance resembles five different offerings: (1) digital strategy, (2) compliance blueprint, (3) implementation pro-
gram, (4) compliance health check and (5) compliance monitoring. Besides these offerings, Deloitte has different departments which could also execute specific offerings, such as implementing Salesforce digital health cloud.

Deloitte Digital executed several health projects such as the care robot Alice which will help the elderly be less lonely (Figure 2). Another example is the Connected Care project (Figure 3). In this project Deloitte Digital designed the concept of an IOT based nutrition pump. The two projects are often used to showcase Deloitte Digital’s capabilities. The methodology in both of these projects was based on Design Thinking, which means they were designed based on customer needs. This is very important when you are creating solutions in health care, according to Helena Lisachuk IOT Director at Deloitte Digital. This assignment will also make use of Design Thinking because of the fact that it is often used by Deloitte Digital itself. In chapter 1.6 this methodology will be explained in more detail.

Insights
To deliver a desirable end-product for the client of this assignment (Deloitte), it is important to include their strategy in the design process. Looking at the four different levels how Deloitte exposes their strategy (Figure 1.), it is the most convenient to use the strategic pillars further along in the process, since they are the most concrete and tangible.
1.2 **Health & Technology**

In this section some definitions will be introduced and the need for technology within health will be underlined. Besides, a consequence of healthcare will be mentioned.
Challenge
Healthcare is one of the biggest challenges of the future, since more people get chronic diseases such as diabetes and the world’s overall population is growing and getting older. This and many other factors will have an influence on health care in the future. The 2018 Global Health Care Outlook written by Deloitte (2018) states that we need to invest in technologies to reduce costs, increase access and improve care. For this reason, hospitals, care providers and new players in the market are developing health tech (Deloitte, 2018). Currently, the health tech market is growing every year, which is a good prospect.

Health tech
In this graduation assignment health technology or health tech will be defined using the definition of medical devices from the Eucomed Regulation: “The European Union defines medical devices as the following: ‘Medical device’ means any instrument, apparatus, appliance, software, implant, reagent, material or other article intended by the manufacturer to be used, alone or in combination, for human beings for one or more of the following specific medical purposes:
- Diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease
- Diagnosis, monitoring, treatment, alleviation of, or compensation for, an injury or disability
- Investigation, replacement or modification of the anatomy or of a physiological or pathological process or state,
- Providing information by means of in vitro examination of specimens derived from the human body, including organ, blood and tissue donation, and which does not achieve its principal intended action by pharmacological, immunological or metabolic means, in or on the human body.

but which may be assisted in its function by such means.”

Self-monitoring
Encouraged by both the government and care providers; consumers are taking their own health and wellness seriously (Deloitte, 2018). Nowadays, patients can easily do some internet research to find out about their disease and how it will develop, as well as the effectiveness of an intervention. This has caused the patient’s expectations of health care to grow. To stay healthy, people are spending time, energy and money. Besides that, there is also an increasing use of health applications and wearables (Deloitte, 2018).

Personal data
The different sources and different tools patients use to gather information causes a wide variety in types of information. Some patients will take a picture to their GP and others will come with articles. In this graduation project all those different types of information will be defined as personal data. The definition for personal data that will be used is from the European Commission (2018): “Personal data is any information that relates to an identified or identifiable living individual. Different pieces of information, which collected together can lead to the identification of a particular person, also constitute personal data”. This definition is still quite broad. To make it more concrete, one can think of the following types of data regarding this assignment: Articles, Papers, Data generated by wearables, smartphones, Apps, heart rate monitors, sugar level meter, pictures and similar types of data.

Consequence of health tech
Although health tech is seen as the future of healthcare and patients are adapting to it in their daily lives. The use of health tech has a downside. AN Ramesh et al., (2004) concluded that “Medical AI technology has not been embraced with enthusiasm. One reason for this is the attitude of the clinicians towards technology being used in the decision-making process”. This problem emphasizes the fact that doctors can show distrust towards health tech solutions. The distrust towards health tech applications will have an impact on the relationships between patients and doctors.
Figure 4: The value chain of the Dutch med tech system (KPMG, 2018)
In this section a market analysis of the health tech market was conducted. This analysis was executed to see how the health tech market is built up and to see if there are any opportunities to improve.

Market Size
The health tech market in the Netherlands was valued at an estimated €4.7bn in 2016, of which €2.3bn was spent on extramural care (outside of the walls of an institution/hospital) and that number is rising (KPMG, 2017). This is roughly 5% of the total Dutch healthcare system. Looking at the purchase of health technology devices it is remarkable to see that 85% of the purchases in the health tech market is reimbursed (most of the time by insurances) and 60% of the health tech market is purchased by care providers (KPNG, 2017).

Producers
In the Netherlands 500-700 health tech suppliers are active (KPNG, 2017). Of which 96% are small and medium enterprises. An example is the startup Somnox. Besides those small and medium enterprises there are big corporates active like Philips and Siemens. But there are also nontraditional players entering the market (Deloitte, 2018) such as the big technology corporates like Apple, Amazon, Google etc. (Gartner, 2018). The insurance companies are creating applications to gather data on their customers (Menzis, 2018) (ZilverenKruis, 2018). With the Menzis application the user is able to get a discount. The last new player in the health tech market are hospitals. Prof. Dr. Pim van der Harst started a research for creating a chatbot (hearttohandle, 2018).

Formal value chain
For health tech producers it is a long road to get their product to the end customer. Figure 4 show the formal value chain of the Dutch health tech system is shown (KMNG, 2017). A positive remark is the notified bodies in the beginning of the value chain. These two certifications ensure the quality of the health tech in the Netherlands. Nevertheless, those certificates cost a lot of time and slow down the process of getting the newest and finest health tech products on the market. J. Jagtenberg (personal communication, November 29, 2018), co-founder of Somnox, agreed on this. The second remark on the current formal value chain is the number of steps a health tech product has to make before reaching its user. Within those steps there are two different factors that can influence the user for using a health tech product. The first one is the certificate they have to get and the second one is the care giver. Following the interviews conducted for this graduation project, GPs tend to have their own opinion on what health tech products were reliable. This had an impact on their opinion about which products could and could not be used. Due to these two factors, health tech producers are reaching out to their users directly, which creates the informal value chain for health tech product.

Insights
For consumers (patients and doctors) the landscape of health tech is not clear. This is due to the different value chains how health tech is sold and the many different providers. Reducing the number of channels reaching toward the user is therefore an insight that will be used in this assignment. Another insight that could be concluded from this chapter is: accelerate adoption of health tech. This is based on the complicated value chain to get validated health tech products on the market. The personal communication of J. Jagtenberg was the basis of the last insight: Establish collaborations between different health providers. He told in that conversation the need for them as start up to collaborate with big cooperates. To be able to scale up.

Informal value chain
The co-founder of Somnox, J. Jagtenberg (personal communication, November 29, 2018), stated that they are trying to sell their product directly to doctors and patients. This is an informal way of reaching your customers. Informal due to the fact that they will reach the customers via the formal value chain. The use of mobile applications can be seen as a big part of the informal value chain. In 2017 there were already 325,000 health tech apps available (Research2Guidance, 2017). To guide customers through this huge number of mobile applications, the Dutch GGD (Municipal health service) created a special AppStore where health apps are placed validated by their organization (GGD, 2016).
In two health tech reports executed by NIVEL (2017) & Nicitz (2017). The number of chronic patients measuring personal data for health purposes was 55%. The most often measured values are weight, blood pressure and sugar level.

General Practitioners (GPs)
In the Netherlands there are approximately 11.500 GPs. A GP has three main tasks (Wessels K. 2017). First of all, the GP will be the first touchpoint of the patients with care. Secondly, the GPs can guarantee 24/7 care with general practice and General practice center. The last task of the GPs is to be the wait keeper for the rest of the health care system.

Work pressure
In 2016, 5.1 million chronic patients, or 30% of the Dutch population visited the GP. Following VTV aandoeningen (2018), this number of chronic patients will rise in the Netherlands, meaning that the GP visits will rise and that subsequently the work pressure of the GP develops further.
1.5 Relationship

It was mentioned in chapter 1.2 that the relationship between patient and doctor could be affected due to the distrust of doctors towards health tech. In this section, the definition of a relationship will be explained and different levels of a relationship will be defined.

**Relationships**

Relationships between two people are often seen as having a stable nature, but they can only exist through continuous behavior between partners (Duck, 1995). This definition by Duck underlines the importance of a continuous relationship. For this project we will use a more elaborate definition of a relationship by Koenders, J. (2018): a relationship is based on a continuous process of the strengthening and weakening of ties, with varying degrees of quality influenced by the behavior and perception of the partners. This definition makes it clear that not only the continuity is important but also how it is intended and received.

On the one hand, chronic patients thought GPs did not like it if they brought data. On the other hand, GPs told them that they like to see the patients’ motivation when gathering personal data. In this example conducted out of this assignment (appendix X.2) it is clear how important it is that two partners in a relationship interpret each other correctly.

**Type of encounters**

A good relationship was built up out of a stream of meetings between the different partners. These meetings could be divided into three different types following Cilpolla (2012): Acceptance (seeing benefits of a relation), attributions (creating an emotional connection) and confirmation (building a specific relation service).

**Quality of Relationship**

Besides dividing the different types of meetings could, there are also different divisions in the quality of a relationship. Bennet (1996) divided the qualities as follows: The first level is familiarity (I know you), the second level is identification (I recognize myself in you), the third level is reciprocity (we do things for each other), the fourth level is communality (we are friends) and finally, the fifth level is continuity (we go through good and bad together). Bennet (1996) argues that only a higher-level up can be reached if the lower-level quality is satisfied.
Problem Definition

In this section the problem definition for this assignment will be clarified.

Deloitte is the largest professional service provider worldwide, they are aware that standing still is not an option. They are moving their business model towards an asset-enabled business and are adapting their strategy to their customer’s needs. One of Deloitte’s growth areas is Health. This graduation project will give Deloitte Digital a new health use case. To show where the future of health is heading towards.

More people are getting chronic diseases, the world’s population is aging and growing. These factors make it hard for the health sector to meet the growing demand of care. A reliable solution could be health tech. Care providers are working hard to find the best suitable health tech solutions for their problems. Besides the health providers, the government and the patients are also paying attention to it. Patients are getting more self-aware and are putting more effort into staying healthy with all the available resources. This growing demand creates a validated opportunity for companies to create new health tech solutions.

This assignment will focus on the growing group of chronic patients and the overworked GPs. It is mentioned in the literature that doctors show distrust towards health tech and patients embraced the personal data generated by health tech. This different perception of personal data could have an impact on the quality of the relationship. A relationship is an ongoing process of strengthening and weakening of ties, in which the role of behavior and perception of the two partners can have an influence on the quality of the relationship. This assignment looks at whether this difference in perception has an impact on the relationship between GPs and Chronic Patients.

What is the impact of personal data on the relationship between General Practitioners and Chronic Patients?
1.7 Assignment

Designing for an enhanced relationship between general practitioners and chronic patients.

1.8 Approach

This graduation project will make use of design thinking. This methodology is suitable for designing innovations following Tim Brown (2008). The Design Thinking framework that will be used is Dan Nessler’s Double Diamond.

Deloitte’s position of being an innovative consultancy derives mainly from their ability to design cutting-edge technologies such as AI, IOT and Blockchain. However, lately Deloitte’s ability of using a human-centered approach is not staying unnoticed. To get more exposure they execute internal projects through which they show their abilities of solving future challenges such as the projects mentioned in chapter 1.2. Within these projects there is no clear pattern of steps that have been used, according to Tommaso Sarri, Service Designer from Deloitte Digital. He worked on both projects. Due to the irregular completion with this design thinking approach, we will dive deeper into the literature of this approach.

Design Thinking
Design Thinking is described by Tim Brown (2008), CEO and president of IDEO as: a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what is viable for the business. It can be seen metaphorically as a system of space instead of a predefined series of steps. All the different activities that happen in the space will form the continuum of innovation.

Double Diamond
To give this graduation a clearer direction, the Double Diamond framework by Nessler (2016) is based on the Design Thinking theory used. This framework consists of four stages: discover, define, design and deliver (figure 5).
Discover
In this phase multiple analyses are conducted to get a good overview of the problem that was defined in chapter 1.6. The analyses are on: chronic patients, general practitioners, external trends, the patient’s journey and finance. The whole discover phase can be found in chapter 2.

Define
In the second half of the first diamond, all the insights of the analyses will be emphasized. The design principles are created and Vision House is created. This can be found in chapter 3.

Develop
Chapter 4 will emphasize the third phase, Design. The design principles are used as a basis for the ideation. The ideas are then used to create concepts. Those concepts are worked out more so they can be validated by the different stakeholders of the project (Chronic Patients, General Practitioners and Deloitte Health Specialists). Thereafter, the final concept is created based on the recommendations received from the validation.

Deliver
In the second half of the second Diamond the concepts will be developed further in a proposition, that can be shown to potential clients of Deloitte and Deloitte Digital. This proposition will be validated by Deloitte partners specialist in health care. The outcome of the validation will conclude in some final recommendations.

Figure 5: Four stages of the Double Diamond framework by Nessler (2016)
Discover

In this part of the report different analyses will be executed to get a good overview of the users (Chronic Patients & General Practitioners), GP journey, External factors (Trends) and finances.
User analysis

How user insights were identified and how those insights lead to new opportunities will be explained in this section. Furthermore, the research conducted will give us an idea of what the impact is of personal data on the relationship between chronic patients and general practitioners.

Semi structured Interviews
To get a better understanding of personal data usage within the relation of chronic patients and GPs, we conducted qualitative research. This research consisted of semi-structured interviews. With the interviews we want to explore: how personal data has an impact on the relationship between chronic patients and general practitioners. The interview guides (appendix X.1) created for the interviews were based on “The path of experience”. This methodology created by Sanders & Stappers (2012) creates the possibility for participants to think of the future. This is made possible within the interview guide by first letting them answer questions on the basis of their previous experience. For the GP this will be their last patient that brought personal data to the consult. For the chronic patients this would be the last time they brought personal data to the GP. After asking in more depth about these situations, especially about their attitude towards this situation and how they feel about it. They were asked about how their relationship was, more general questions how personal data is used and what their role was. After those questions, some questions were asked about the future of health care. That is the last step of the path of experience model, see figure 6. The interviews were recorded, So they could be played back during the analysis.

Participants
For this graduation project we interviewed three different users’ groups: (1) Chronic patients that gather data (n=3), (2) patients that gather data (n=3) and (3) GPs (n=6). Two different types of patients are included within this research due to the lack of chronic patients that gather data. Out of the chronic patients interviews fifteen sub-categories could be formed. The interviews of the GPs led to thirteen sub-categories. The sub-categories then where substituted into categories. These categories are seen as the main insights. Figure 8 shows how the different sub-categories are sorted into categories. For both chronic patients as GPs four categories.

Analyze
To analyze the 12 interviews, the grounded theory model (Glaser, B. G. et al, 1968) is used (appendix x.2). The grounded theory model is an exploratory method that can be used to discover emerging patterns in data. The first step was to create codes. Codes are small rephrased parts of the interview that show interesting insights. With all those different codes, sub-categories are created by categorizing different codes on similarity in meaning. A convenient example is shown in figure 7. Out of the chronic patients interviews fifteen sub-categories could be formed. The interviews of the GPs led to thirteen sub-categories. The sub-categories then where substituted into categories. These categories are seen as the main insights. Figure 9 shows how the different sub-categories are sorted into categories. For both chronic patients as GPs four categories.

Figure 6: The path of experience

Figure 7: From code to sub-category example
Figure 8: From sub-categories to categories  GPs

Figure 9: From sub-categories to categories  patients
Outcome
Following the research conducted in this graduation assignment, the impact of personal data is visible in the relationship between chronic patients and GPs. Although both users have different opportunity areas, which will be explained later in more detail, it is clear that personal data increases the often-imbalanced relationship between the chronic patients and GPs.

“I only look to the data if it’s adding value to the cause”

There are three reasons for this. The first reason is the amount of ‘value’ the users attach to personal data. For chronic patients and patients that gather personal data before they go to the GP, this value is high.

“Data helps me to show what happened”

On the other hand, the amount of value GPs attach to it is low. This is because they attach more value to the holistic view on the patient. The second reason is the ‘reliability’ of personal data. GPs can hardly ever use any form of personal data because they do not know the accuracy of the measurements.

“If I want trustworthy data I have to measure it myself.”

For patients this is sometimes hard to believe. Lastly ‘accessibility’ of personal data. Due to the easy accessibility of personal data, it is more convenient for chronic patients to reach out for it. This can lead to a feeling of distrust for the GPs.

“I need to persuade patients that I know it better than all the data out there.”

Factors General Practitioners
After the use of the grounded theory model, four different key insights are discovered about how personal data had an impact on GP’s work (Figure 10). First, help patients to understand data. GPs try to find out what the patient’s expectations are and try to guide them into the interpretation of it.

“I always ask the patient: What do you want me to do with this data?”

Secondly, uncertainty on the data’s quality. GPs will not use the personal data generated by the patients although they will use it as a guideline.

“I will never trust the data completely but I will use it as a guideline.”

Due to the fact that patients trust the data this could lead to a difference in perceptions which can lead to an unbalanced relationship. The third key insight that was found is that the GPs have a restrained character. This restrained character is the effect of the shared decision environment GPs are trying to create and their role to find out whether a consult is unnecessary.

“I spent a lot of time on giving patients the feeling of comfort. So, they are free to speak.”

Lastly, the work pressure of the GPs has to be reduced. Due to the bigger role GPs get by taking over tasks from the hospitals, their work pressure is increasing. The increasing demand from patients also plays a part in this. This increasing pressure on the GP could be solved by technology following the GPs:

“Technology could help to eliminate the pressure on GP’s”

Factors Chronic Patients
The four key insights of the chronic patients are the following: I got support in my own ideas. These ideas are related to potential diseases the patient could have. This support originates especially from family and personal data and will make it harder for the GPs to convince the patient due to the fact they already think their problem is validated:

“Because I don’t want to visit the GP unfounded, I combine the data of the internet and of my family”

Secondly being in control, this key insight underscores the reason why people gather personal data. Patients have the feeling that although they are sick, data can give them the feeling of being in control of their body:

“I generate data, to be sure, if I’m not sure it gives me unrest.”

The third key insight is “how can I communicate in the right way with the GP?” Often, patients do not know how they have to communicate their story. Often this is done by narration, personal data could be an opportunity here

“I found it hard to explain what my experiences were.”

The last key insight is helping the GP to discover. What the research showed was that patients are willing to help the GPs do their job. The main reason for this was because they had a feeling of knowing more about themselves than the GPs do.

“I bring articles to the consult to accelerate the conversation”

Figure 10: Key insights conducted out of interviews.
Time Line Consult
Next to all those key insights, the research gave a clear view on the timeline of an average GP consult (Figure 11). Figure 11 shows that personal data is often mentioned in the beginning of a consult except for articles. Besides that, administration takes a lot of time in the end and during the consult. Technology could be able to support in this by automation.

Fidget Visit
Figure 12 displays a timeline about an average treatment plan of a chronic patient that I created based on the interviews. The fidget visits stand out. Fidget visits are visits that exist because chronic patients want to see their specialist.

“I trust the specialist, they have cool devices and know a lot about the topic and I distrust the GP”

This causes many unnecessary visits. They want to see their specialist because they don't think their GP is able to help them.

“It’s the handyman but not the bathroom specialist”

This will have an impact on their relationship.
2.2 Journey Perspective

This section will show how the relationship of general practitioners and chronic patients develop during a fidget visit. To be able to analyze this, the CRX framework, created by Koender, J. (2018), is used.

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Figure 13: The fidget visit journey mapped with the three meeting types of Cipolla (2012), in the as - is situation.

Relationship prerequisites
During this exercise, encounters are identified in the customer journey between GPs and chronic patients. By using the three types of meetings created by Cipolla (2012) (figure 13). After this exercise it became clear that in just one touchpoint of the fidget visit the chronic patients had contact with their GP. All the touchpoints before that moment will create a threshold for people to visit their GP.

Relationship Fostering
During the second assignment of this framework relationship qualities are identified. With the use of Bennet's (1996) relationship qualities (figure 14). Interestingly, the quality of the relationship stayed at the level of Familiarity. Besides this, there was a Reciprocity connection. This connection only existed due to the GPs carrying out a consult, which is their job, and chronic patients collecting personal data just for personal validation. The intention for doing things for each other is low. This could be an interesting opportunity to let this relationship grow by letting them share more (figure 15).

Conclusion
After conducting the CRX framework by Koenders, J. (2018). Three interesting insight appeared. First, only at one of the many touchpoints the chronic patient will have contact with the GP. As mentioned in chapter 1.5, a relationship is built up out of continuous process. If the patients only have contact with their GP once in this journey, this will not be positive for the relationship. Secondly, the number of touchpoints before visiting the GP could form a threshold for chronic patients. A faster way to validate your ideas is asking your friends and family what was mentioned during the qualitative research. The last insight gained from the CRX framework is that the current relationship quality is low. This means that the relationship is no more than knowing each other. These three different insights give a clear view.
2.3 Boundary Objects

In chapter 5.1 the misunderstanding that patients have of the GPs opinion on personal data was mentioned. The knowledge of this misunderstanding between GPs and chronic patients could be the solution. In this section, the use of boundary objects will be explained.

**Boundary objects**

When people work together despite having a different background and expertise it is important to translate different viewpoints by standardizing. This can be done by boundary objects (Star & Griesemer, 1989). Boundary objects are objects that maintain their identity and significance while functioning across different fields. An example of a boundary object is a prototype within multidisciplinary design teams.

**Personal data**

In this project general practitioners and patients have different backgrounds and expertise. This often makes it hard to communicate in the right way. Creating a boundary object by shaping a platform that could be used by both chronic patients and GPs in which personal data could be the tangible factor could be a solution.
2.4 Trend Analysis

An external trend analysis was conducted to get a good view on the fast-changing world of today. This trend analysis looked into the following five trend domains: demographic, economic, social, political and technology. The specific focus was on trends that could have an influence on healthcare. Healthcare differs a lot between different countries and this graduation assignment is specifically aimed at the Dutch Health market.

Demographic

The chance of becoming older than 95 will grow from 10% in 2015 to 20% in 2040 (VTV levensverwachting, 2018). It suffices to say that the population is clearly aging (Volksgezondheidzorg, 2018). As a result, people will live in their own homes for a long time (Ministerie van VWS, 2018). The healthy age expectancy of people will increase for both men and women (CBS, 2018).

Economical

Health care costs will keep increasing in the Netherlands (Ministerie van VWS, 2018). One of the main reasons for this is technology. Technology will take care of the biggest section of the increased health care costs (VTV zorguitgaven, 2018). Treatments can become more advanced with technology and, as a result, diagnosis will cost more (CDHC, 2018). With more and more money being invested into health technology, home care is becoming dominated by the big tech companies (Ali tech, Tencent, Amazon, Google, Apple, Microsoft and IBM) (Forbes, 2018).

The business models within health will change. By the end of 2019, up to 15% of the business models will be value based (Forbes, 2018). Insurers will also try to make a shift by investing 5-10% of their plans into lifestyle and health data driven interactions (Forbes, 2018).
Social

People feel more in control of their own body (VTV gezondheid, 2018). This feeling of being more in control is reflected in the habituation of people getting personalized content (Lowpost, 2018). By getting this personalized content they have the feeling of being in the center.

People are worried about the health care system due to the rising costs (Ministerie van VWS, 2018). Social services are going to give young people the opportunity to learn about health (Ministerie van VWS, 2018) and stimulate the increasing market of informal care by giving them more support (Ministerie van VWS 2018).

The turning point for the adoption of technology within healthcare will come soon (stFalcon, 2018). A new way in which healthcare is going to be implemented in our daily lives is by voice-controlled applications (Forbes 2018). This new way of creating touchpoint is in line with the trend of companies not only looking at the famous celebrity influencers, but are also going to invest in micro influencers (Lowpost, 2018).

Political

The access to affordable and quality care will be on the political agenda of 2019 (Forbes, 2018). The Dutch government want to deliver better care for less money (Ministerie van VWS, 2018). And there is a growing concern for how the personal data of people is used at companies (Gartner, 2018).

The Dutch government will take their responsibility within healthcare. First of all, it will invest in making it easier for people to pursue a healthy lifestyle (Ministerie van VWS, 2018). By reducing diabetes, alcohol consumption and smoking. Secondly, the government wants to stimulate the education of understanding medical information by getting people to adapt to it (Ministerie van VWS, 2018).

Technology

What will be seen more often is that humans can be replaced for specific tasks (Health data management 2018). Artificial Intelligence (AI) is a technique that is often used to make these specific tasks autonomous (Gartner, 2018). And with the (AI) market within health rising to $1.7 billion (Forbes, 2018), this is likely to be happening.

More immersive experiences (VR & AR) will be seen within health. These could be used for surgery, education, prevention and diagnosis (stFalcon, 2018). As well as smart spaces in which people are able to interact physical or digitally with the environment will become more advanced (Gartner, 2018).

With the large amount of data generated by every individual, more companies will be able to generate Digital Twin (Gartner, 2018). A Digital Twin is a digital copy of the real world that can be created by the use of the right data sets and visualizations. This can be used for prediction models.
2.2 Financial Analysis

One of the insights that occurred after conducting the analysis of Deloitte was that Deloitte finds it important that there is a right client fit. This fit is partly determined through the estimation of whether money could be earned for Deloitte. This section will give an overview of what the market size is of GP care within the Netherlands.

Money flows
In 2017 4% of the total health care costs were spent on GP/first line care in the Netherlands. The care budget for GP care was €2.8 billion (Ministerie van VWS, 2016). The budget for GP care in the Netherlands is divided into four different segments. These streams can be seen in Figure 6 (Wessels K. 2017). The money out of the first segment (1.927 million) is earned by the number of people subscribed at a GP and by the committed consults. Segment 2 (546 million) for chronic patients that get care from a pre-arranged care budget. Segment 3 (146 million) is a budget that a GP could receive for innovative initiative and good performances. The last segment is called the outdoor segment (356 million). This segment is for everything that cannot be placed in the other segments. An example is the modernization and innovation operations.

The third and the outdoor segments have space for innovative initiatives and with that create an entering point for projects supplied by Deloitte or other companies. To prescribe for those budgets, the initiatives have to be validated by the insurance companies.

Insurance
The insurance companies in the Netherlands have the opportunity to stimulate innovative ideas. Not only can they support projects intended within the segments, they also have innovation funds (Zorg voor Innoveren, 2018) from which they can fund innovative projects. The initiatives in which insurance want to invest have to serve six criteria (Zorg voor Innoveren, 2018). The first criteria is that the initiatives need the support of patients and care givers. Secondly, the initiative has to provide health benefits. Third, the healthcare cost has to be reduced. Fourth, the initiative has to lead to substitution of health instead of more actions. The fifth criteria is the reduction of absenteeism. The last criteria for the initiative is that it has to lead to image improvement. This means that the end solution has to meet those different criteria, to give it a better chance for insurance to invest in the project. For this project we will not consider the first criteria because we are design thinking which will ensure this is covered. The last criteria will also not be considered further in the process since there is no insurance company for which this project is executed.

Corporates
Although the Dutch health technology market covers only 1% of the world market, the providers of the Netherlands compete with the world market (KPMG, 2017). With €13 billion dollars, Philips is the second biggest med tech producer in Europe (KPNG, 2017). This could also be an opportunity for Deloitte.
In this section we will dive into the most important insights from the analysis. Besides that, we will look at how all the different analyses have an impact on the research question:

2.6 Conclusion

I What is the impact of personal data on the relationship between General Practitioners and Chronic Patients?

During the user analysis it became clear that personal data has an impact on the relationship between GPs and chronic patients. Eight different insights have been found that have an influence on this relationship: (1) GPs help patients to understand data, (2) data generates uncertainty, (3) GPs have a restrained character, (4) GPs’ work pressure has to be reduced, (5) patients get support in their own ideas, (6) patients want to be in control of their body, (7) patients don’t know how to communicate and (8) patients want to help the GP to discover. Most of the insights that were caused by the use of personal data have an impact on the relationship due to the different perception of the particular issues.

Besides those eight insights, it also became clear that chronic patients prefer to see their specialist when a new issue occurs rather than their GP first, this caused the so-called fidget visits. From the journey of these fidget visits, three different insights were conducted. (1) chronic patients only see their GP at one touchpoint of the journey. This has a negative impact on the continuity of the relationship. Another factor which influences the continuity of the relationship negatively is: (2) the many touchpoints before the chronic patient can finally see the GP. (3) The quality of the relationship is low, which is very likely to be a result of the difference in perception of the GPs and chronic patients and the lack of continuity in their relationship.

The trend analysis that was conducted to get a good external overview of what is happening in the fast-changing world. The following trends show the need that the use of personal data will be implemented well in healthcare: People feel more in charge of their own lives, shortage of personnel within care, elderly will stay in own home for longer and more informal care. The feasibility of this project could be supported thanks to the following trends: Investments in patients understanding care, insurers focus on lifestyle and data. Four trends that could protentional advance this use of personal data are: Micro influencers, voice control, smart spaces and data ethics and privacy.

The last financial analysis was done to see whether it is feasible for Deloitte to have a proposition inside this area of healthcare. It can be concluded that it is feasible and that the insurers are the best opportunity to be the client within this concept. But to ensure that insurance companies do like this project it has to meet the following four criteria: (1) Substitute health, (2) Provide health benefits, (3) Reduce healthcare costs and (4) Lead to absenteeism reduction.
Define

In this chapter of the graduation project, the insights gathered during the discovery phase will fuse into focus areas and will be used to shape the vision house. This will form the base of the next phase, design.
Focus Areas

During the analysis phase many different insights were gathered. In section 2.1 User Analysis, eight different insights were deduced from the research. These eight insights were divided into four insights specified for the GPs and four for chronic patients. Because the goal of the design is to strengthen the relationship, similar focus areas have to be created. The four different focus areas were created by matching the insights of the GPs and chronic patients. They were matched based on the meaning of the insights. In this section the four common focus areas that were created are clarified.

Education
The first focus area is education. This focus area is raised out of the following two insights. Uncertainty of data and being in control of my body. The core of both these insights is learning. The GPs have to learn how to deal with the data that will come in and patients have to learn how they can use their personal data properly.

Communication
Most/many GPs have a restrained character, which makes it hard for them to clarify themselves. Additionally, patients find it hard to communicate their personal data in the right way. The combination of both insights results in a poor communication between GPs and chronic patients.

Interpretation
This focus area was formed with two insights that supplement each other. Patients get support in their own ideas by personal data and family. This can have bad influences, since they don’t have the medical knowledge like GPs have. GPs on the other hand want to help the patient to understand the generated data correctly. So, the bottom line for this focus area is ‘collaborative interpretation of personal data’.

Support
The last focus area is formed out of the following two insights. Reducing the work pressure of GPs and the demand of patients to help the GP to discover solutions for the occurred issues. The focus of both the insights is on supporting the GP in their work.

Time
The four different focus areas described in this section are in connection with each other by the definition of time. Education in personal data need to be conducted first. Then it is important to communicate it clearly. Thereafter, personal data has to be interpreted in the right way. That will end in delivering support.
3.2 Vision House

In this section a Vision Statement is created about the future relationship between GPs and chronic patients. This vision statement is made to create a purpose to the existence of this project. This is done by using the Vision House of Cascade Strategy (2018). The vision house in this graduation assignment (Figure 17.) is built up out of strategic objectives, focus areas, values and the vision statement.

Creation
The vision house is built up with all the previous knowledge from the introduction and discovery phase. First, the strategic objectives have been formulated. After that the focus areas created in chapter 3.1 were added. Thereafter the values and vision statement are made.

Strategic Objectives
The four strategic pillars that have been placed inside the vision house are derived from the market, financial and company analysis and suited the best with the intention of this vision house to develop the future relationship between general practitioners and chronic patients. In the vision house of Cascade Strategy (2018), strategic objectives are similar to company goals. So, for this assignment what are the most important goals of the insights that were created? I chose the following four strategic objectives: (1) substitute health and (2) provide health benefits are to objectives derived from the financial analysis. They were chosen to be in the vision house due to the fact that it’s important to keep the criteria of potential clients in mind. These two objectives were more likely to use than the other two insights of the financial analysis. Due to that fact, these objectives fit the human centered side of the approach of this assignment better. (3) Accelerate health tech adoption, was originated from the market analysis. This is an important goal for Deloitte because of this concept the health tech will accelerate. More demand will appear for new health care projects. (4) Create an impact on society. Is the last strategic objective that derived from Deloitte’s strategy in chapter 1.1. This insight is chosen as strategic pillar due to the fact it is important to have an impactful concept in the end.

Focus Areas
The focus areas in the vision house are the same as introduced in the previous section. These four focus areas; education in personal data, communication with personal data, interpretation of personal data and support by using data shape a solid ground for the values to be created.

Values
The values were created by first highlighting the values that fit the project the best. To do this, a list of 232 values was used. The 45 values that fit the project the best then were clustered into groups. The six clusters were: moving, inclusiveness, certainty, contribution, accessible and recognition. These six different values were then categorized into the final three values: curiosity (contribution & certainty), continuity (moving & accessible), openness (inclusiveness & recognition). The last step was to make them active by adding a verb. (appendix x.3). This resulted in the following three values: ‘to enhance curiosity’. This value represents the intention of people to go off the beaten track and stay motivated. ‘to enable continuity’, this value resembles not only the continuity of life but also resembles the continuity of the care journey. ‘to cherish openness’. This value will give the feeling of making new steps and being open towards each other.

Vision Statement
The vision statement was created through a few iterations (appendix x.4). The first version of this iteration was ‘We aspire to shape a flourishing and rewarding relationship.’

This vision was validated with a consultant Florian Verhoeven of Deloitte Digital. She had the following feedback. Do you really want your values to be part of your vision? It’s not utopic enough but make it more concrete as well. After this feedback we also had a look at visions of large corporates to see what we liked. Apple: ‘An apple computer on every desk’. Nike: ‘To bring inspiration and innovation to every athlete in the world’. Cola: ‘To refresh the world, To inspire moments of optimism and happiness, To create value and make a difference’. This resulted into the vision statement of:

‘We want to unleash a flourishing relationship between GPs and chronic patients by enabling continuity, deepen commitment and cherish openness.’

This vision will form a roof on the whole vision house. The core of this vision statement is the establishment of creating a relationship between general practitioners and chronic patients. This relationship has to be flourishing. Flourishing, in this case, means that the core of the relationship is growing and it has a smooth course. The relationship has to be rewarding in order to create an incentive for both users to participate naturally.
Our mission is to shape a flourishing and rewarding relationship.

Values:
- to enhance curiosity
- to enable continuity
- to cherish openness

Future Areas:
- Educate
- Communication
- Interpretation of personal data
- Support

Strategic Objectives:
- Substitute Health
- Provide Health benefits
- Accelerate health tech adoption
- Impact society

Figure 17: Vision house of the future connection between GPs and Chronic Patients
This chapter will be about creating. In the first part of this chapter, the starting point of the ideation will be shown and the elaborated concepts. The second half of this chapter will show two different validations executed on the concepts. The first validation is based on all the insights gathered during the analysis. The second validation is executed with the end users. In the last section of this chapter, the insights will be combined into a recommendation of the concept.
### 4.1 Starting Point

The starting point of the design phase is all the knowledge gained in the previous chapters, with as core the vision house. But besides the vision house, all the different insights gathered from the company, user, trend, market and finance analysis have been used as a source of inspiration.

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<th>Interpretation</th>
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<tr>
<td>Education</td>
<td>Establish collaboration between stakeholders</td>
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<td>Communication</td>
<td>Accelerate adoption health tech</td>
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<td>Support</td>
<td>Micro influencers</td>
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<td>Substitution health</td>
<td>People feel more in charge of own life's</td>
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<td>Provide health benefits</td>
<td>Investments in patient understanding care</td>
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<td>Reduce healthcare costs</td>
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<td>Lead to absenteeism reduction</td>
<td>Insurers focus on lifestyle &amp; data</td>
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<td>Impact on society</td>
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<td>Client portfolio fit</td>
<td>Smart Spaces</td>
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<td>More efficiency for professionals</td>
<td>Elderly will stay longer in own home</td>
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<tr>
<td>Asset enabled business</td>
<td>More informal care</td>
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This section will show six concepts that were raised after several brainstorm sessions (appendix x.5). The first brainstorm session was exploratory and conducted with Deloitte employees. Thereafter, a How Might We brainstorm was conducted with the focus areas of the vision house, followed by an idea generation session to come up with ideas based on the outcome of the How Might We brainstorm. During this idea generation session 16 ideas were created. The last creative session was conducted to cluster the 16 ideas into the six concepts presented in this section.

1. **Sprekend**
   - on going health through voice
   - ‘Sprekend’ is a voice service that enables chronic patients and GPs to be in contact with each other. The GP can tell the voice service to ask questions to the chronic patients. The voice service will also keep track of the patient. This will be done by regularly asking how the patient is doing and scheduling an appointment with the GP if things are not going well for a while.

2. **The Word**
   - educate the influencer & show
   - ‘The word’ is a strategy to give influencers a role in health care. With this concept, GPs will advise influencers on a regular basis. Influencers will then discuss this knowledge with their followers. These can be the influencer’s personal issues, trends of complaints that occur frequently at the GPs or subjects that are important to discuss.

3. **Next**
   - upload see & predict
   - ‘Next’ is an online platform consisting of an app and a website. The app is primarily intended for chronic patients to create different measurement overviews. The website is linked to the patient’s app and means more for the general practitioner. On this website, the GP can see exactly what the patients are measuring and with which equipment. On the basis of this information, the general practitioner can give advice during his consultation. With the generated data the system would later be able to make a prediction.
‘Co Health’ is a digital platform where GPs and chronically ill patients will co-create treatments. Patients can create their own projects. They can share these with their GP and make it public. GPs and patients can both comment on the treatments or add cases. This creates a validated ecosystem.

‘Health Data Guide’ is a mobile platform to strengthen the contact between general practitioners and patients. The contact will be strengthened by having the first validation of chronically ill patients not done by their family but by the general practitioner. The GP will train the system so that simple validation will eventually be automated.

‘= Health data’ is a marketing campaign that will be led by SIRE. SIRE is concerned with social problems. This campaign is dedicated to making patients more aware of their health data. With the emphasis on that it is very valuable and that you should not ignore it. In addition, online guidelines will be created with which people themselves can generate health data in a conscious manner.
4.3 Harris Profile

Methodology
The six concepts created in the last section will be judged on the basis of criteria. The criteria that are used in the Harris Profile (figure 18) were derived from the vision house. The criteria used are the focus areas and strategic objectives. The order of the criteria is important. The higher the order, the more value a criterion has. The order of the different criteria for the Harris profile used is: Focus areas first because in the end people have to use the product/service. Secondly, the strategic objectives. The four strategic objectives are ordered as follows: substitution health and provide health benefits on top. These two are important for Deloitte in order to sell the proposition. Then accelerate health tech adoption can have an impact on future opportunities for Deloitte. The last criteria is impact on society.

Conclusion
Looking at the outcome it is clear that the concept 'health data guide' and 'co health' are the best concepts to continue with. This thanks to the good score of co health for the user analysis criteria as well as the above average positive score of the health data guide concept.

For the first validation the Harris Profile methodology is used. This methodology is used to choose and evaluate ideas for new business activities (Roozenburg, N. 1998).
Stakeholder Validation

4.4

In the previous part a validation was conducted based on methodology. In this section, a validation is executed in the form of a questionnaire (appendix X.6). This questionnaire was done by six general practitioners, six chronic patients and six health specialists at Deloitte. During the first part of the questionnaire, the respondents had to give their opinion on the six different concepts. In the second part the respondents were asked to rank the different concepts on which ones they found the best. The conclusion of the outcome will be highlighted in this section.

General Practitioners
There were three interesting comments from the GPs after analyzing their results. First, one of the GPs thought that making use of social media could be the right way of connecting with young people. Unfortunately, the concept ‘the word’ was not ranked very highly, since this way of communicating health related information is too complex. The second comment worth mentioning was placed at the ‘co health’ concept. A GP mentioned turning the concept around, making the GP the owner of the timeline. This was in line with another GP who thought that they had to stay the experts about what could be added to a potential patient timeline. The last comment worth mentioning was underneath the concept ‘health data guide’ in which machine learning plays a role. The GP worried that the concept wasn’t able to track down the right information, since patients will not tell all their struggles right away.

Chronic Patients
The first comment at the first concept ‘sprekend’ was: that chronic patients find that they do know their body better than their GP. “I’m the expert” This gives a clear picture of a chronic patient’s mind. The second comment worth mentioning was placed at the concept ‘next’. Here, one of the chronic patients responded with the feedback that filling in numbers every day would be too much work. An important comment that was placed underneath the ‘co-health’ concept was: it feels like being taken seriously. This gives a feeling of the chronic patient’s willingness to have a more pro-active attitude.

Health Experts
The last respondent group was the health experts from Deloitte. One of the comments on the concept ‘next’ was that there are already similar concepts on the market, even from Deloitte, but it would always be good to expand that dossier. As one comment on the concept ‘co-health’ suggested that this concept could increase the engagement. It could also increase the work load. A final interesting comment made under the concept ‘health data guide’ was that data must not be leading. Besides those remarks the health experts sometimes mentioned that the concepts could fit Deloitte’s strategy. These comments were often related to the techniques that a concept used. For instance, the concept ‘next’ looks like salesforce health cloud. The use of chatbots and Artificial intelligence was mentioned as well.

Conclusion
The result of this questionnaire showed a clear preference for three of the six concepts (Figure 9). The preferred concept for the GPs, chronic patients and health experts were: ‘next’, ‘co-health’ and ‘health data guide’. What is remarkable is that all three types of respondents did have concerns on the time consumption of these concepts (for both the GPs and chronic patients). It is also noticeable that both GPs and chronic patients expressed being the expert. Therefore, it would be crucial to give them both an active role in the end concepts. These issues of the different concepts have to be solved. Combining the concept could be a good solution.

Figure 19: Overview of the most preferred concepts of GPs, Chronic Patients & Health specialists.
4.5 Concept Recommendations

In chapter 4.2 I created six concepts. Next to the creation of these six concepts, the concepts were validated by using the Harris Profile and a questionnaire executed with GPs, chronic patients and health experts. In this section recommendations will be made for the second iteration of the concept.

Three concepts
Not one but three concepts turned out to be interesting for this project. Due to that insight, the decision has been made to merge these concepts. The three concepts that will form the basis of the concept will be: ‘next’, ‘co-health’ and ‘data health guide’

Recommendations
The recommendations are based on the three concepts and the outcome of the two different validations.

- The concept has to be connected to both patients and GPs digitally
- The concept has to give a good visual overview of the data collected by the patient
- Collecting data must not take much time for the patient
- Both the GP and the chronic patient must be able to give input
- A digitalized fast validation tool based on machine learning
- The need to validate predictions of machine learning parts of the concept
- The concept has to reduce work and consider the incentive of both GPs and chronic patients.
- Data must be shown as a clever tool but not as leading.
Figure 20: Impressions of the concept Meer
4.6 New Design

In this section the new concept ‘Meer’ will be introduced. The introduction is done by explaining its purpose and by a scenario of how Meer will be used.

Meer
Meer is a digital environment that will stimulate an ongoing relationship between the GP and chronic patients. Meer is the Dutch word for lake. This name is given to the concept because it is a metaphor of the concept. Meer will be used to generate a data lake of the chronic patients to which both the chronic patients and GPs have access to. This environment is an extension of the current KIS (GP information system for chronic patients). ‘Meer’ is a twofold digital application that creates an ecosystem both for chronic patients and GPs, including a shared view to use during consultations. These three different views (figure 20) will work together seamlessly to create the best experience for both general practitioners and chronic patients.

Meer (GP view)
This view for GPs will give them the ability to get an elaborate overview of their patients, including generated personal data. The smart reply tool answers messages from chronic patients. This tool has to stay up to date, therefore GPs will have to train the system. Furthermore, Meer will create automated consultation reports for GPs.

Meer (chronic patient view)
Within the application, patients are able to create their own digital lake. By uploading personal data generated by other validated applications. They can share personal data with their GP. Besides that, they can read back consultation reports and are able to validate issues by sending a message.

Meer (consult view)
This view will give a clear overview of the patients generated data and file. This part of the concept will be the boundary object between the GPs and Chronic patient.

Benefits of ‘Meer’
The concept is designed to enhance the relationship between chronic patients and general practitioners while using personal data. I did this by keeping their hurdles in account during the design and letting them validate during the process. According to Kearley, et al. (2001), a good relationship between GPs and patients will provide: Increased patient satisfaction, improved enablement and compliance of medication by patients, easier clinical decision making for GPs, making it easier for GPs to reveal psychological problems and the interaction between patients and GPs itself can have a therapeutic value.

Figure 20: Impression of data lake created by chronic patients uploading personal data.
1. Setting up

In the first step of the chronic patient’s journey they have to set up their account. In this step they have to fill in their personal information, link the account to their GP and connect health tech applications they already use.

2. Upload issue

If a new and unfamiliar issue occurs, the chronic patient can make a notation of it by taking a picture, writing a short text, adding an article or uploading some numbers.

3. Smart reply

This issue will be validated with the use of a smart reply tool. This tool will give the chronic patient advice based on the personal data. It can give the advice to make an appointment immediately or it can advise you to measure certain values. The GPs have to train the smart reply tool by judging a few cases themselves every day.
4. Measuring

This time frame is created for the patient to gather more personal data and to see whether the issue will stay. The data generated within this step and other steps will be saved which will create a more mature lake.

5. Make online appointment

If the issue is validated, an online appointment can be created. This will be linked to the view where the GP is already able to see some information about the patient before they enter a consultation.

6. Consult

During the consult, Meer (consult view) will create a voice record which will be transcribed and summarized with the use of machine learning tools. The consult view will show the patient’s supplied documents on-screen. The GP can teach the chronic patient how to interpret the data. The consult view will also show a live view of the GP’s tablet. On this tablet the GP can choose to show the patient’s history files, other personal data generated by the patient and an overview of medication that could be prescribed.
7. **GP highlight document**

After the consult is finished, Meer will create a summary of the consult that will be reviewed by the GP. This report will be sent to the patient.

8. **Feedback on document**

The chronic patient is able to give feedback on the summary and will be asked by Meer how he/she feels after some days have passed.

9. **GP can make a new decision**

The GP will receive a notification if the patient feedback is worrisome (determined by a machine learning tool). The GP is then able to decide if the patient needs a new consult.
4.7 Details

In this section the three different views that form the ecosystem of Meer will be explained in more detail.

Meer (Chronic Patient view)

The chronic patient view consists of five functionalities.

1) New issue

The main functionality is the creation of a new issue function. This is due to the validation in chapter 4.4 showing that not all chronic patients want to measure personal data continuously. This button gives them the freedom to also start gathering data after a new issue has occurred. Pressing this button will guide them through different steps of registering a new issue.

2) Timeline:

This functionality shows a timeline of all the GP visit reports and registered issues. They could select different keywords to filter; for instance, only on their chronic illness. By tapping on a box they will read all the information.
3) Data:

to be able to form the data lake of a chronic patient data must be collected. This data can be uploaded by connecting different apps to the platform. The apps that can be connected can be found in the GGD Appstore which is integrated in Meer. As this concept could work better with more personal data, an incentive is created for the user in the form of an interactive visualization of their data lake on the home screen. This visualization will feel better if more up-to-date personal data is collected.

4) App store:

in the Appstore all apps validated by the GGD Appstore can be found. This will give a guidance for both GP and patient with apps they can and can’t use.

5) To do:

this is a functionality in which new notifications occur. These notifications are originated from the other two applications. This could be a feedback form of a consult sent by Meer, the feedback on an issue from the GP/Meer (that could result in creating an online appointment, that will stay visible on the home screen). Or a notification will appear that the report of the consult is ready to read.
Meer (GP view)

The GP view consists of five functionalities. The functionalities differ from the functionalities of the chronic patient view.

1) Agenda
The agenda functionality gives the GP a clear overview of the patient that will visit him that day. By tapping on the appointment, the issue for which the chronic patient will come by will appear with the uploaded personal data.

2) Search:
The GP's application will have a search function in which he can search for profiles of patients.
3) Medicine:
the medicine button is used to look for suitable drugs for the chronic patients.

4) App store:
the GGD Appstore will have the same function as for the chronic patients. It will show the GP all the validated health applications out there.

5) Notification:
this functionality will form the biggest task for the GPs. It will show the cases reviewed by the smart reply function that have to be validated by the GP. Next to that it will show a bar with different tasks that have to be completed. The tasks in that bar are transcribed consults that have to be finalized, giving feedback on the reactions of the chronic patients and making decisions on whether the patient has to come for a second consultation.
Meer (consult view)

The consult view is kept as simple as possible. It can be seen as more of an extension of both the GP’s view and the chronic patient’s view.

When the consultation begins, all the information will arise on the screen and a pink dot will appear if the digital assistant will start recording. The screen is divided in four different sections. In the top left, the chronic patient’s personal information is shown. Beneath that section all the generated personal data for this consult will be displayed. At the bottom of the screen, the history of the treatment is shown. The last section of the screen is a flank on the right side which shows extra information such as your total history profile or medication options which your GP is considering. This is because of the research conducted in chapter 2.1 showing that chronic patients are suspicious if the GP is doing things on their computers.

Conclusion
The concept Meer is an ecosystem consisting of three views. The GP’s view, chronic patient’s view and the consult view. The three views are armed with cutting edge technologies like machine learning to be able to perform all the functionalities. The functionalities of the three different platforms are seamlessly connected. This seamless connection between the different platforms will create the feeling of openness.
The last phase of the Design Thinking approach is Deliver. This phase will be described in this chapter. In the first part of this chapter, I will elaborate on what the deliverable will be. In the second half of this chapter the final deliverable will be validated by partners of Deloitte.
5.1 Proposition Design

This section will clarify the end deliverable of this graduation project. Besides that, it will explain the principle that I have used and how I have executed it.

Proposition
The end deliverable of this project will be a proposition, because Deloitte is familiar with making propositions and this way it will have the greatest impact. The proposition I created for them will be about what the impact is of personal data on the relationship of GPs and chronic patients. The proposition has to be understandable and tangible for the target audience, insurances. This is quite difficult after spending half a year on a project. Because of that, the format of the proposition will be a poster. The format of a poster ensures that the story has to be concrete and to the point.

Coat Rack
How am I going to determine what is important to put on the poster? Masha Srectenatovic, business analyst at Deloitte Digital who is currently working on two different propositions for Deloitte, helped me with that. She advised me, based on her experience, to start with the problem statement that had to be supported with arguments. Besides that, the target audience had to be introduced. The second step is solution, this section has to address how you are going to solve the given problem. What are the features of the solution and how does it work. The third section has to display the benefits for the stakeholder. The last step shows the effects that is based on assumptions and numbers. These four steps form the coat hanger for the proposition created in this assignment. Due to the fact that I didn't have the chance to observe any effects of the concept, I will not make use of that within my proposition.

Occum’s razor
Now I had the structure of the proposition, I had to get the story straight. After pitching my project to multiple people at Deloitte. It was still hard for me not do dive into details. At a certain point someone recommended me to research Occum’s Razor.

Among competing hypotheses, the one with the fewest assumptions should be selected.

Occum's Razor is a line of reasoning to slice through a specific problem and eliminate all the unnecessary elements that can't be observed (Samuel, N. 2017). In this graduation assignment it is used as inspiration to cut all the side issues and to only keep the important content that could be filled into Masha Srectenatovic's Coat Rack. The result is presented in the next section.
In this section it was important to attract the attention of the viewer. They have to start here with reading about what the problem statement is. The statement is supported by the four hurdles (mentioned in the report as focus areas).

Some facts on the target group are placed in the left corner, to show how big the target group is and how big the proposition’s impact could be.
The relationship between GPs and their chronic patients has been impacted by the proliferation of devices and trackers that has put data in the hands of patients. The main hurdles that influence the relationship are:

1. lack of knowledge on the trustworthiness of data sources,
2. lack of guidelines on how to share personal data and associated concerns,
3. complexity around data interpretation and
4. lack of support to enable a fruitful relationship between patients and doctors.

Beyond Health Tech
A proposition to enhance the relationship between General Practitioners (GPs) and their chronic patients

'Meer' is a twofold digital application that creates an ecosystem both for chronic patients and GPs, including a shared view to use during consultations.

With 'Meer', chronic patients and GPs can explore the possibilities of devices and trackers to generate personal data by being exposed with a set of validated apps.

'Meer' generates a better overview on the chronic patient health data for GPs and patients, by collecting all the personal data in one application that is easily accessible.

More frequent contact with chronic patients is established digitally. This results in the opportunity for GPs to validate new issues more often.

'Meer' enables chronic patients to support GPs by generating the right personal data at the right time.

In the end, 'Meer' will strengthen the relationship between chronic patients and general practitioners. This enhanced relationship will lead to:

- Added value for healthcare
- Increased satisfaction
- Improved enablement and compliance of medication, making psychosocial problems easier to reveal
- Easier clinical decisions
- A therapeutic value by the interaction itself

"I generate data to be sure, if I’m not sure it gives me unrest."
5.3 Proposition Validation

In this section the end deliverable of this graduation assignment will be explained. Words used could be different to in the report. This is done to make it more understandable / readable for the client.

I conducted semi-structured interviews with the three of Deloitte’s partners. The interview was built up in three different parts. First, I asked them questions about what they thought of all the propositions that were created and what has to be in a proposition. I asked prior to showing my proposition, to be sure they wouldn't be biased. The second part of the interview guide was meant to show the proposition. The last part of the proposition questions were asked about their general opinion and whether the proposition fits the company, client and market. These three factors were mentioned by Jenny Tsay, senior consultant at Deloitte Digital, to ask if you validate a proposition. The interview guide can be found in (appendix X.7)

Analysis Proposition Design
The use of proposition design is important for Deloitte. This is because the market on the one hand is asking for it. They want Deloitte to have an interesting opinion on the industry to shape their company. John Kok thought that Deloitte was beyond every company with their vision of the Digitalization of healthcare. On the other hand, propositions add value for Deloitte as well. It gave them the opportunity to be added earlier on in the process.

“So, if you want to build something cool you will also want to be the architect”
- Abby Godee

Besides these positive opinions introduced in chapter 5.2 will be executed. First the importance of this validation will be explained and thereafter it will focus on the interviews themselves.

Propositions are created to show potential clients what the future of certain industries look like and how the proposition could help the potential client. Therefore, it would be interesting to validate the proposition I created with the potential client (insurance companies). Unfortunately, I couldn't contact them myself. However, what I could do is validate my proposition with some of Deloitte’s partners.

Partners
Deloitte is a partner-based company in which the partners determine the strategy of the company. Every partner is specialised in a certain industry. Because of this, partners based in the health care industry are the ultimate persons to validate my proposition with. They not only know a lot about the strategy of Deloitte, but they work closely together with potential clients.

I was able to validate my proposition with the following three partners: Abby Godee (Partner Deloitte Digital / Market Gravity), Mathieu van Bergen (Partner Health), John de Kok (Partner Lifesience). All three are specialized on healthcare within the public domain.

Semi-structured interview
For the validation of the proposition
about propositions design there are as well important things to keep in mind. First of all, the business model. According to Abby Godee, this is the most important to keep in mind. Secondly, be aware that your proposition will not scare your client.

"Nobody wants you to come in and say this is the solution I have thought about, then you push the proposition inside"
-Mathieu van Bergen-

Besides that, John Kok argued that it is important that your proposition encounter the now, a future vision and a concrete concept. If we look to the proposition those three factors are included.

Analysis proposition poster
The general opinion about the proposition was very positive. I will briefly describe the feedback in the four different pillars on which the interview was built up.

General
Mathieu van Bergen was very relieved that the proposition was designed out of the patient perspective.

“What is very strong about your proposition is that you have used the patient as starting point”
-Mathieu van Bergen-

On the other hand, Abby was worried on how the concept would be used in the daily lives of the GPs.

“You need to show more the day in a life”
-Abby Godee-

This shows that both partners think that one of the two users is more important. They mentioned as well that the platform had to be made in a way that can easily connect with other systems, so that synchronizing with other care provider systems will not be a hurdle afterwards.

“If you can't say that your application is GDPR approved, then you can't do anything”
-John Kok-

The last point of general feedback I want to mentioned. Is related to this quote of John Kok. He saw the danger of the personal data communication through the internet. He even mentioned that this proposition can't be pitched to client if the data safety wasn't carefully thought through.

Market
All the partners recognized the hurdles that were mentioned within the problem statement area. The GPs are behind if we talk about digital platforms. The problem according to the partners is that the GPs are not joining in the conversation when the future of digital systems in healthcare is being discussed. On the other hand, the partners also saw the problem of the expanding group of chronic patients. Mathieu van Bergen mentioned that he also stated this in an interview recently.

Client
The added value for insurance was clear according to Mathieu van Bergen. He thought that the concept could be interesting for insource if it could decrease chronic patients' accompaniment and if the monitoring of patients would be more streamlined. The other partners found it hard to estimate. Abby wanted to see more KPI's that could be measured.

Company
The partners said this proposition gives a good overview on what we are currently doing within Deloitte. Mathieu van Bergen thought it would fit Deloitte Digital especially and the services Customer Solutions is currently creating around salesforce platforms. John Kok was enthusiast and said he was looking forward to further development of this proposition.
Conclusion, Discussion & Final Recommendations

The first part of the last chapter will give a brief conclusion on the research question and it will discuss some limitations and future research opportunities. The second part will elaborate on the final recommendations for Deloitte Digital to use the proposition design.
6.1 Conclusion & Discussion

In this section the conclusion of the research question (What is the impact of personal data on the relationship between GPs and Chronic patients?) will be executed. Besides that, this section will contain a brief discussion on the limitations of the research.

Conclusion

Within this assignment the impact of personal data on the relationship between general practitioners and chronic patients was explored. To do so, a qualitative research was conducted. This resulted in the conclusion that the impact of personal data is visible in the relationship between chronic patients and GPs. The main hurdles that influence the relationship are: 1. lack of knowledge about the trustworthiness of data sources, 2. lack of guidelines on how to share personal data and associated concerns, 3. complexity around data interpretation and 4. lack of support to enable a fruitful relationship between patients and doctors.

To overcome those hurdles, I created a proposition. This proposition was made for Deloitte as they are focusing more and more on projects within the emerging health tech industry. This proposition could help Deloitte exhibit to potential clients: their strengths, their capabilities of being involved early on in the process and their opinion on how the expanding health tech market could create an impact on the chronic patient and GP relationship.

The goal of the proposition is to shape a flourishing and rewarding relationship between chronic patients and their GPs, enhancing curiosity, enabling continuity and celebrating openness.

The concept created for the proposition is ‘Meer’. This concept was created through multiple validation and conceptualization sessions. ‘Meer’ is a twofold digital application that creates an ecosystem both for chronic patients and GPs, including a shared view to use during consultations. Four different functionalities of the ecosystem are designed to overcome the four hurdles: 1. With ‘Meer’, chronic patients and GPs can explore the possibilities of devices and trackers to generate personal data by being exposed with a set of validated apps. 2. ‘Meer’ generates a better overview of the patient’s health data for GPs and patients by collecting all the personal data in one application that is easily accessible. 3. More frequent contact with chronic patients is established digitally. This results in the opportunity for GPs to validate new issues more often. 4. ‘Meer’ enables chronic patients to support GPs by generating the right personal data at the right time.

In the end, ‘Meer’ strengthens the relationship between chronic patients and general practitioners. This enhanced relationship will lead to: increased satisfaction and improved enablement & compliance of medication for chronic patients; easier clinical decision making and easier reveal of psychological problems for GPs; and it will generate a therapeutic relationship for the chronic patient.

This proposition shows how the four different hurdles in the relationship between general practitioners and chronic patients caused by the use of personal data can be solved by...
the concept ‘Meer’. The proposition is valid according to different partners of Deloitte and shows potential for the future of chronic patient care.

Discussion
During the research conducted in this assignment there are two limitations. First of all, the limitations on the number of participants. This research was done with: (1) Chronic patients that gather data (n=3), (2) patients that gather data (n=3) and (3) GPs (n=6). Ideally this would be (1) Chronic patients that gather data (n=12) and (2) GPs (n=12). The second limitation of this assignment was that there is limited research done on the effect of an enhanced relationship between GPs and chronic patients. The literature used for this assignment emphasizes that generating a relationship will be beneficial for GPs and patents.

For further research it would be interesting to interview more participants. With the knowledge from this research, a quantitative research could even be conducted. A quantitative research could be useful to give more validity to the propositions by finding statistics. Besides that, it would be useful to conduct more research on whether the benefits of an enhanced relationship between chronic patients and GPs differ much from the benefits of a relationship between patients and GPs.
6.2 Final Recommendations

In chapter 5.2 I created a proposition. This proposition was validated by three partners in chapter 5.3. In this section the final proposition recommendation will be created for the future development of this proposition. Beside that an overview will be given on how the proposition could be developed further based on the recommendations.

Proposition recommendations
The recommendations are based on the validation by three of Deloitte’s partners on the proposition poster created for this project and the discussion of the research.

- Elaborate further on the user flow for both the GPs and chronic patients
- Create the first estimation of the business model. (Values are not concrete enough)
- Emphasize the importance of both users within a relationship (this will prevent one user being seen as more important)
- Investigate how the system could be connected to other platforms
- Investigate further how this proposition could be GDPR compliance
- Execute a quantitative research to strengthen the proposition
- Doing more research on the impact and consequences of an enhanced relationship between GPs and Chronic patients.

Future development
Before Deloitte could use this proposition for external purposes, certain parts of the proposition has to be elaborated a bit more. I would suggest that a Multiciliary team have to be created with a Strategist of Deloitte Digital that could look at the business. A service designer can look at the blueprint that clearly shows which users have to spend time with the concept and for how long. This will give clear idea of the user flow of both GPs and chronic patients. I would also recommend executing a more elaborate research on the effects of this enhanced relationship for insources. An engineer at Deloitte Digital and Customer Solutions has to be included to look into what kind of platforms would be suitable for building this concept. And people of digital health compliance have to look how the concept could guarantee safe data traffic.

After those different analyses, a slide deck has to be created that showcases the proposition in a clear manner. It will be very important to validated this proposition again with both GPs and chronic patients. This validation could lead to a new iteration of the concept or to valuable quotes that could be used when showing the proposition to clients. Besides this validation, I would recommend executing a quantitative research that strengthens the proposition. First, I will make sure to only show the proposition internally to create support and inspire colleagues. Later on, when it has internal support and got more mature the proposition can be shown to potential clients.
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