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Technology Legitimation of Electronic Medical Records in Dutch Healthcare Settings

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I would like to dedicate this thesis to my mother who unfortunately passed away before I was able to graduate. One of her last wishes was for me to get my master's degree and this is my way of honoring her dream. The process of writing my thesis was a challenging one, but I did not embark on this journey alone. Around me were great people who helped and inspired me to achieve this accomplishment. These include my supervisors, Prof. Dr. Ir. Joost Visser and Dr. Ramezan Zadeh, who were always eager and willing to help me out when difficult situations arose. They have my eternal gratitude. I also want to thank my friends and family who were there to help me during tough times. It would be impossible to list everyone but know that I appreciate each single one of you. I am fully aware of how blessed I am by having all of you in my life. Lastly, I would like to extend my gratitude to the respondents who lent their assistance and provided me with valuable answers. Without you, this thesis would not be possible.

Volim te, mama. Do neba i natrag.

ABSTRACT

This study examined the different legitimation methods used by actors in the field of eHealth (doctors, technology developers, IT executives, government agencies and other relevant parties) to promote the use of electronic medical records (EMRs) and eHealth within the healthcare sector in the Netherlands. We performed 16 semi-structured interviews with experts in the field and sent three questionnaires to different technology developers. Technology legitimation varied depending on the type and size of the organization. Organizations emphasized achieving cognitive legitimacy by improving patient perceptions of EMRs and eHealth. Organizations spent considerable time in engaging in dialogue with patients and using various tools to increase the usage of eHealth related technologies, such as patient focus groups, step-by-step learning and visual advertisements. A lack of knowledge regarding the rule of law, strict authentication methods, and lack of cognitive legitimacy are prevalent barriers to implementation. We recommend further familiarizing patients with EMRs and eHealth, establishing legal advocacy groups to increase compliance with the rule of law, finding more intuitive alternatives to DigiD or stopping the use of it when possible and a dashboard through which legitimacy can be measured. Finally, our contribution to the theory of technology legitimation includes a new model explaining the phenomenon behind the legitimation of EMRs and eHealth.

Key words:

- EMR
- Technology legitimation
- Legitimacy
- eHealth
- Privacy
- Data security

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1. INTRODUCTION

An increase of life expectancy due to advancements in the medical field is putting a large strain on the Dutch healthcare system (Mackenbach, 2012; Mot, Stuut, Westra, & Aalbers, 2019). Aside from the rising costs, the workload for medical experts is increasing due to various legislative changes (Batenburg, 2020; Erler, 2011; Lambregtse, 2020). It is expected that these issues will persist until serious action is undertaken (Faber & Van Geenhuizen, 2015). eHealth, which is the use of information and communications technologies (ICT) for health (WHO, 2021), has been identified as a possible solution to this problem (Stoffers, 2018). However, the adoption of eHealth is lacking (Van de Wetering & al, 2013; Huygens & al, 2015). Hospitals and general practitioners (GPs) encounter several barriers to eHealth adoption (Faber & Van Geenhuizen, 2015). Security is often mentioned as a barrier (Peeters & al, 2016). A number of studies have shown that users deem privacy and security important (Wilkowska & Ziefle, 2012). However, the introduction of two-factor authentication methods such as DigiD has had a negative influence on the usage of eHealth (Beekers & Krijgsman, 2015). Recent research has shown that medical experts have noticed a lack of eHealth usage as users (i.e., patients) experience the security requirements imposed on them as user-unfriendly (Versluis & al, 2020).

However, the adoption of technologies does not solely rely on technical aspects like the ones mentioned above. Ethics, morals and culture also play a big role. For innovations to be socially accepted, organizations and other parties must convince the general public that their innovation fits within the existing norms, beliefs and definitions (Onsongo & Walgenbach, 2015; Jansma, Gosselt, Kuipers, & De Jong, 2020). When an innovation is seen as desirable within existing norms and values, it gains legitimacy (Suchman, 1995). Attaining legitimacy for technologies is important due to number of reasons. Without gaining legitimacy, it becomes hard to mobilize resources and create demand for the technology; it also becomes difficult for actors to gain political strength (Bergek & al, 2008). Actors within this definition can be persons with specific job titles such as general managers, but also collectives, organizations, judicial interpretations, material objects and technological artifacts (Voronov & Weber, 2020). Within the context of this study, the term ‘actors’ refers to medical institutions, persons working within a healthcare setting (doctors, nurses, IT personnel and more) and organizations that have a vested interest in the use and promotion of eHealth and EMR related technologies such as lobby groups, (semi-)government agencies, technology developers and other parties. Moreover, the successfulness and the diffusion of a (novel) technology largely depends on the fit with existing cultural beliefs and institutions (Hargadon & Douglas, 2001).

The process where innovations and technologies acquire legitimacy is commonly referred to as 'technology legitimation' (Johnson, Dowd, & Ridgeway, 2006). Attaining technological legitimacy occurs through so-called 'legitimation strategies' (Ben-Slimane, Diridollou, & Hamadache, 2020). Legitimation strategies encompass all the different techniques, methods and efforts used by entities to legitimize their activities, organizational structures, and innovations (Vaara, Tienari, & Laurila, 2006). So far, the legitimation process has mostly been studied at the macro level (Geels & Verhees, 1986). Here, technology legitimation is often seen as the result of actors aggregating in an extended innovation development process (Hekkert, Suurs, Negro, Kuhlmann, & Smits, 2007); or as interlinkage between new technological fields in a broader institutional context (Markard, Steffen, & Bernhard, 2016). Nevertheless, technology legitimation remains a complex problem and research towards technology legitimation strategies is limited (Laïfi & Josserand, 2015). The literature tells us very little about how the legitimation processes work in a multi-stakeholder setting like the adoption of EMRs (and eHealth in a wider context). The way actors at the micro-level employ legitimation strategies to legitimize the value of a platform technology like EMRs remains unexplored. A case-study performed by Binz, et al (2016) focusing on potable water re-use in California showed how actors initiated legitimation strategies at various different levels. Similarly, a study performed by Paré, et al (2020) studied how IT-vendors employ legitimation strategies to legitimize EMRs to create value for GPs. However, neither of these studies consider the public or user perspective (patients) and tend to focus on a specific selection of stakeholder groups. The interplay between multiple stakeholder groups and how these together legitimize a platform technology has not been touched on. This study will therefore dive deeper in this phenomenon and seek to understand how individual actors do their part in legitimizing EMRs in a complex multi-stakeholder environment like the healthcare industry.

1.1 Research objective and aim

This study aims to find out how the value of EMRs are legitimized by healthcare actors through a multi-stakeholder setting. As the literature does not give many examples of actors actively dealing with probable legitimacy issues, but rather studies the outcome of legitimation (Binz & al, 2016), we will aim to address the following: *In this study, we will aim to find out how healthcare actors use technology legitimation methods in order to tackle legitimacy issues and therefore increase the usage and value of EMRs and eHealth among users*.

1.2 Research questions

In the previous section, we concluded that there are many unknown variables behind the legitimation of a platform technology like EMRs within a multi-stakeholder setting. Based on this information, we have formulated the following research question: *"How do healthcare actors legitimize the value of platform technologies like EMRs for their end users?"*

The research question is split up in several sub questions. Each of these sub questions will deal with a specific pillar of legitimacy, namely regulative, cognitive, pragmatic, and normative legitimacy (Binz & al, 2016). The first pillar of legitimacy is regulative legitimacy. Regulative legitimacy relates to the fulfilment of legal frameworks (Suchman, 1995). Technologies and organizations that abide by existing laws and regulations appear more legitimate in the eyes of the public than technologies that require legislative changes (Binz & al, 2016). For this pillar, we aim to find out what laws are linked to EMRs and how these laws impact the usage and the adoption of the technology. This leads to the following sub question: *"How are issues related to the regulative legitimacy of a platform technology like EMRs legitimized?"*

The second pillar to be investigated is cognitive legitimacy. Cognitive legitimacy deals with the users' (or in this case; the patient's) subconscious understanding of technologies. Technologies that have little to no relevance to the daily lives of users or their experiences in the past struggle with gaining legitimacy (Deephouse, Bundy, Tost, & Suchman, 2016). Here, we will determine patients' perceptions of EMRs. We will also study how medical institutions and other relevant parties try to cope with any negative views or concerns from patients. For this purpose, the following sub question has been formulated: *"How are issues related to the cognitive legitimacy of a platform technology like EMRs legitimized?"*

The third pillar relates to the perceived benefits of the EMR which is also known as pragmatic legitimacy. Technologies that have clear benefits for the user will have a higher chance of attaining legitimacy versus technologies where the benefits and utilities are not immediately obvious (Binz & al, 2016). We will study whether patients recognize the benefits of the EMR and the related eHealth applications. The sub question related to this pillar is as follows: *"How are issues related to the pragmatic legitimacy of a platform technology like EMRs legitimized?"*

Lastly, we conclude the sub questions with the last pillar, namely normative legitimacy. Technologies that fit within the norms and values of a certain society have a higher chance of gaining legitimacy (Binz & al, 2016). We will study whether EMRs are seen as a socially

accepted solution by the patients and which ethical considerations, if any, come into play. We will conclude the list of research questions with the following sub question: *"How are issues related to the normative legitimacy of a platform technology like EMRs legitimized?"*

1.3 Academic and societal relevance

This research further contributes to the theory of technology legitimation within the context of EMRs. As the theory towards this subject is limited, this study will help in building a better understanding of how technology legitimation is used in a field where adoption of technology has been rather slow (Huygens & al, 2015). To accomplish this, a theory and a model have been developed explaining the process behind technology legitimation. In addition, the study concludes with recommendations that can help with the further adoption of EMRs and eHealth in general. Firstly, we will explore the various legitimacy issues tied to a platform technology like EMRs; this will help actors in this (and possibly other related) field(s) to develop better insights in the existing obstacles. We will also examine the impact of security requirements on legitimacy and the need for privacy and security from the side of the patients. The recommendations based on these findings provide a way to combat these obstacles. Since the scope of this study is limited to the Netherlands, the recommendations listed in this thesis are mostly suited and only relevant to Dutch healthcare settings. Laws and regulations that exist in the Netherlands might not be relevant to other countries. The same applies to the norms and values of this country.

1.4 Thesis outline

This study examines the various ways in which actors who employ EMRs use legitimation methods in order to increase the usage of eHealth in Dutch healthcare. The next chapter focuses on the available literature on technology legitimation. Here, the theory related to legitimacy is further explained and the research gap is further explained. Subsequently, the research design of this study is explained in detail in the third chapter, along with the research methods used for collecting and analyzing data. The fourth chapter contains the results from the data collection consisting of both primary and secondary data sources. The conclusion can be found in chapter five. The discussion forms chapter six. In this chapter, the results from the data collection have been interpreted, a new theory and model are developed, the implications of the study are addressed, the limitations of the study have been highlighted, the recommendations are listed and ideas for future research are noted.

2. LITERATURE REVIEW

In this chapter, a selection of relevant theories regarding legitimacy and technological legitimation are highlighted. We have chosen a thematic analysis of the literature from Suddaby and colleagues as our main starting point since it provides a good overview of all the relevant theory. This thematic analysis highlights three ways in which legitimacy is described by scholars. Since this thematic analysis was published four years ago, we will supplement our literature review with additional sources written after 2017. In the following sections, these three configurations will be explained in detail. In the concluding section of this literature review, we will highlight the phenomenon behind 'technology legitimation', which can be characterized as a subset of legitimacy-as-process. Here, the focus lies specifically on the legitimation of technological innovations.

2.1 Three configurations of legitimacy

A thematic analysis of the literature performed by Suddaby, and colleagues reveals that the concept of legitimacy is viewed in three different ways by academics and scholars (Suddaby, Bitektine, & Haack, Legitimacy, 2016). The main difference lies in the way legitimacy is characterized. Most scholars see legitimacy as a 'thing', a non-tangible resource or property. In this way, it can be categorized as an 'asset' belonging to a firm or organization. A smaller portion of the scholars view legitimacy as a socio-cognitive evaluation or perception. Lastly, there is also a group of scholars who view legitimacy as a type of process; in this case, the term 'legitimation' is perhaps more fitting than the term 'legitimacy'. Suddaby and colleagues also examined for each configuration where and how these various types of legitimacy occurred.

2.1.1 Legitimacy-as-property

As previously mentioned, the most popular way of looking at legitimacy is through characterizing it as a property, resource, or a thing (Suddaby, Bitektine, & Haack, Legitimacy, 2016). A common definition given to this form of legitimacy comes from Suchman, who describes legitimacy as 'being perceived as desirable, proper, and appropriate within some socially constructed system of norms, values, beliefs, and definitions' (Suchman 1995; Deephouse, Bundy, Tost, & Suchman, 2016). Within this form of thinking, several 'subtypes' or 'pillars' of legitimacy can be distinguished. An overview of these legitimacy types can be found in Table 1. The basis for this information has been adapted from the theory of Scott

(2008), Binz & al (2016) and Suchman (1995). The top row of the table lists the various forms of legitimacy. The column for each row contains a general definition where each pillar of legitimacy is clarified in a few key words, a real-world example is then provided asl well as the basis of legitimacy is for each separate pillar.

	Forms of legitimacy			
	Regulative	**Cognitive**	**Pragmatic**	**Normative**
General definition	Fulfilment of legal frameworks	Subconscious understanding of technologies	Utility of using a certain technology	Being 'right' for society
Example	Self-driving cars	Mobile phones	Laptops	GMO-foods
Basis of legitimacy	Legally sanctioned	Comprehensible, taken-for-grantedness	Personal evaluation	Morally governed

Table 1: Forms of legitimacy

According to Binz & al (2016), regulative legitimacy relates to the fulfilment of legal frameworks. Technologies and organizations that abide by existing laws and regulations appear more legitimate in the eyes of the public than technologies that require legislative changes. In short, technologies must be legally sanctioned to attain legitimacy. A good example of a technology struggling with regulative legitimacy are self-driving cars because who carries the blame when a Tesla causes a deadly accident? Regulations are still lagging and would need to be changed which means self-driving cars cannot attain full regulative legitimacy until this happens. The next pillar is cognitive legitimacy. Cognitive legitimacy refers to users' subconscious understanding of technologies. Technologies that do not relate to aspects within users' daily lives or experiences in the past have more difficulty gaining legitimacy. Therefore, to achieve cognitive legitimacy, technologies must be comprehensible in the sense that the users understand how the technology works. This is also where 'taken-for-grantedness' comes into play as users must subconsciously feel that the technologies warrant usage. An example here would be mobile phones. Many people were not interested in having a mobile phone for various reasons as connectivity was not as important 30 years ago as it is now. There were only 34 million mobile subscriptions in 1993 compared to the 8.3 billion in 2019 (Statista, 2021). This means that finding a person with a mobile subscription in 1993 would be quite a rare occurrence

while now, it would be strange to meet someone (of age) who does not have one. This indicates that mobile phones are a form of technology which has attained cognitive legitimacy. The next form of legitimacy is pragmatic legitimacy. Pragmatic legitimacy can be described as the direct utility a certain audience derives from the usage of a certain technology. This means that innovations with clear and straightforward benefits are more likely to gain legitimacy in the eyes of the user. The basis of legitimacy for this pillar lies in the personal evaluation of the technology. Users will perceive a technology as legitimate if they have associate certain benefits with it. A good example would be laptops. It is very easy for users of these devices to point out the benefits of using them as they are lightweight, easily portable, and powerful enough to accomplish various tasks. Finally, the last pillar is normative legitimacy. Normative legitimacy relates to the moral practices of people. Users judge a technology on whether it is morally 'right' for the society where we live in. Technologies that clash with existing norms and values rarely attain legitimacy (Binz & al, 2016). GMO-foods are an example of a form of an innovation struggling to achieve normative legitimacy. As a society we have already accepted harmful foods like chips and sodas, but to genetically interfere with our foods is a bridge too far for many as research points out (Jansma, Gosselt, Kuipers, & De Jong, 2020).

How is legitimacy-as-property operationalized?

Scholars who research legitimacy-as-property have found that legitimacy is gained by organizations from the public as a result of implementing legitimate structures, practices and symbols (Aldrich & Fiol, 1994). As such, there are broadly three ways in which scholars have sought to measure legitimacy in companies and organizations. The first form of measurement relies on **population density**. As mentioned, these scholars assume an organization can possess legitimacy. By using population density, scholars have developed a way of measuring that counts how many organizations are assumed to 'own' legitimacy (Suddaby, Bitektine, & Haack, Legitimacy, 2016). If an organizational practice, form or framework is seen as legitimate (by the organization itself and the market), it will be used more frequently. New and emerging organizations will be inclined to also adopt legitimate organizational practices. This results in an increase of these organizations in the population, which can therefore be used as a measure of the legitimacy. The second form of measuring legitimacy-as-property is using **media accounts**. In this measurement method, the focus lies on the number of times organizational practices are mentioned in the media. This indicates a certain measure of popularity. In their meta-analysis, Suddaby et al use the term 'media' in this form of measurement to refer to newspapers, journals and articles. However, it seems that social media

is gaining a more important role as popular platforms such as Facebook and websites containing blogs have allowed the average citizen to make legitimacy judgements public (Etter, Colleoni, Illia, Meggiorin, & D'Eugenio, 2018; Lillqvist, Fahy, & Moisander, 2019). Nevertheless, media accounts as a measurement seems to be sort of contested (at least on a macro level) as other research has pointed out that companies with the strongest media presence do not necessarily experience harm or benefit from their popularity (López-Balboa, Blanco-González, Díez-Martín, & Prado-Román, 2021). The authors state that organizations do not need to engage in expensive media campaigns in the hopes of bettering their reputation since performing the 'regular' company activities should suffice. The third and last form is **regulator authorization**. Regulators can have a substantial impact on organizations because they can force them to comply with laws and regulations through enforcement mechanisms (Zimmerman & Zeits, 2002). Whereas authorizations and fines have an immediate effect on the perceived legitimacy of a firm, approval by regulators is more indirect in nature. Research states that organizations can be negatively impacted if they have not met regulators' approval through positive assessments by government entities (Deephouse & Carter, 2005; Ruef & Scott, 1998). Another study points out that organizations who are willing to obtain licenses and appear in official government registrations can experience beneficial effects as opposed to those who do not (Baum & & Oliver, 1991). In conclusion, being on the 'good' side of regulators can positively influence the legitimacy of a firm or organization, and the opposite holds true if the firm does not meet certain standards imposed by regulators (Tankebe, 2019).

A different way of operationalizing legitimacy comes from Schoon (2020). According to the author, measuring legitimacy can be a challenge. Therefore, he has tried to find a way in which the concept of legitimacy can be carried over to various different contexts. He has identified a relationship between three elements, namely that there's always an *object of legitimacy,* a certain *audience* that attributes legitimacy and a *relationship* between these two aspects. These elements or aspects form a dyad which is a relationship between two nodes and a tie linking them. Furthermore, he identifies three conditions which impact the behavior of the dyad. These are *expectations* which tell us about the meaning of the relationships and its purpose, *assent* which relates to the approval of the relationship between the nodes by the audience and *conformity* meaning legitimacy can only be built up when the object conforms to the *expectations*.

Another way of measuring organization legitimacy as opposed to the measurements highlighted by Suddaby et al (2016) and Schoon (2020), is described by Díez-Martín, Blanco-González, & Díez-de-Castro (2021). Since measuring organizational legitimacy has proven to be quite a challenge due to the various different terminologies and approaches mentioned in the literature, the authors developed a general process of measuring organizational legitimacy which aims to be generalizable to different contexts. The authors developed three phases through which several key decisions have to be made in order to select the most accurate form of measurement. The forms of measurement used within this approach are based on the previously discussed literature.

- **Phase 1. Research objectives**: In this phase, the idea is to determine the relevant research objective. Since organizational legitimacy can be measured in various different ways, it is important to determine the right context and goal of measurement. Researchers or managers could select specific departments to be included in their study or measure the organization as a whole.
- **Phase 2**. **Identification of relevant stakeholders**: In this phase, the relevant stakeholders are selected. Since these evaluators have an interest in the organization, their judgements could potentially influence the performance of the organization. The choice for a specific stakeholder will largely depend on the research objective.
- **Phase 3**. **Design of the measurement instrument**. After a choice has been made for the research objective and the stakeholders, it is time for the researchers or the managers to select the right evaluation criteria and the sources of information.

Choosing the evaluation criteria depends on whether the researchers or managers are interested in exploring the various legitimacy dimensions (which will be explained later on) or whether a broader assessment is sufficient. If the former is true, then researchers could opt to investigate whether the organizational legitimacy is driven by the evaluator's interest in different dimensions of legitimacy. Díez-Martín et al (2021) identify seven dimensions of legitimacy. These also include the four pillars that have been discussed before (regulative, moral or normative, pragmatic and cognitive). The other three dimensions are:

1. **Emotional legitimacy**: Emotional legitimacy relates to legitimacy based on individual feelings. Emotional legitimacy consists of three parts, namely: sense of belonging, affective emotions and relational identification. Stakeholders must identify with the

values of the organization in order to have a sense of belonging. Organizations are impacted and supported by emotions. It is important for researchers to determine which emotions the stakeholders are dealing with. Relational identification is when employees build up friendly ties with their co-workers, management, suppliers and customers. This in turn creates a positive working environment. The employee will then associate these positive feelings with the organization they are working for.

2. **Technical legitimacy**: Technical legitimacy is described as a form of legitimacy from a tactical point of view. Legitimacy is built up when an organization carries out their activities in the best possible manner; the newest technology is used, the quality of the workers is high, the personnel is properly trained, novel management practices are created and procedures for quality assurance are put into place.
3. **Managerial legitimacy**: Managerial legitimacy can be explained as legitimacy of the management within an organization from a strategic perspective. Senior executives are tasked with certain responsibilities like creating strategies to achieve the mission of the organization, keeping the stakeholders content and displaying leadership. This form of legitimacy can be hard to measure, but several instruments exist to make this process easier. An example would be independent certifications showcasing the skill and quality of management.

If the aim is to have a more general evaluation, researchers and managers could choose to evaluate the global legitimacy instead. Global legitimacy is defined by the authors as follows: *"Organizational legitimacy is a favorable judgment on the acceptability of an organization's actions, based on their utility, justice, and appropriateness"* (Díez-Martín, Blanco-González, & Díez-de-Castro, 2021). Global legitimacy can be evaluated through two aspects, namely 'actions' and 'reflected info'. Actions is the most commonly used aspect. As the name implies, the actions of the organization become the main point of focus. Organizations build up legitimacy when their actions are deemed appropriate and desirable by stakeholders. Organizations are judged whether their actions are desirable, proper and appropriate (Suchman, 1995). Reflected info relates to building legitimacy through certain characteristics that reflect upon the organization itself. For example, if an organization is led by a charismatic CEO or has business ties with other prestigious firms, this will reflect well on the image of the organization thus legitimacy can be built up. Reflected info can be measured through four ways:

1. **Properties**: Properties relate to the specific characteristics organizations need to have in order to attain legitimacy. Properties can be split up in three different aspects. The first one is isomorphism. Organizations that adopt strategies and business practices of other succesful and legitimate firms will gain legitimacy. The second one is the legitimacy treshold. When a point is reached where organizations no longer struggle with facets like financing, sales and integrating their employees (HR), legitimacy is gained as a 'minimum' standard of quality has been established. The third aspect is neo-isomorphism. This aspect refers to a range of characteristics organizations must have in order to be perceived as legitimate. These include motivating leadership and transparency with regards to information sharing.
2. **Links with other organizations**: Legitimacy can also be acquired when organizations engage in (long-term) commitments and partnerships with firms or organizations which are legitimate in the eyes of the public.
3. **Exceptional leadership**: When an organization has exceptional and charismatic leadership, the general public will be sooner convinced that the organization has the capabilities to achieve their business goals.
4. **Media**: Legitimacy through media accounts has already been discussed before. While researchers often use media accounts to measure legitimacy, a study has shown that this measure may not be accurate on a macro level (López-Balboa, Blanco-González, Díez-Martín, & Prado-Román, 2021).

The last important step is determining the sources of information. These consist of individual perceptions and secondary data. Individual perceptions are the judgments about legitimacy that an individual may develop. One part of these judgments is based on knowledge, and the other part is based on emotions. Organizations should try to focus on influencing the part of knowledge as this requires more effort to change. Secondary data is less preferred when establishing legitimacy, but can be preferred when emotions play a smaller role. In that case, organizations could use methods like algorithms to determine legitimacy. Figure 1, taken from the work of the scholars, displays a model of this process (Díez-Martín, Blanco-González, & Díez-de-Castro, 2021).

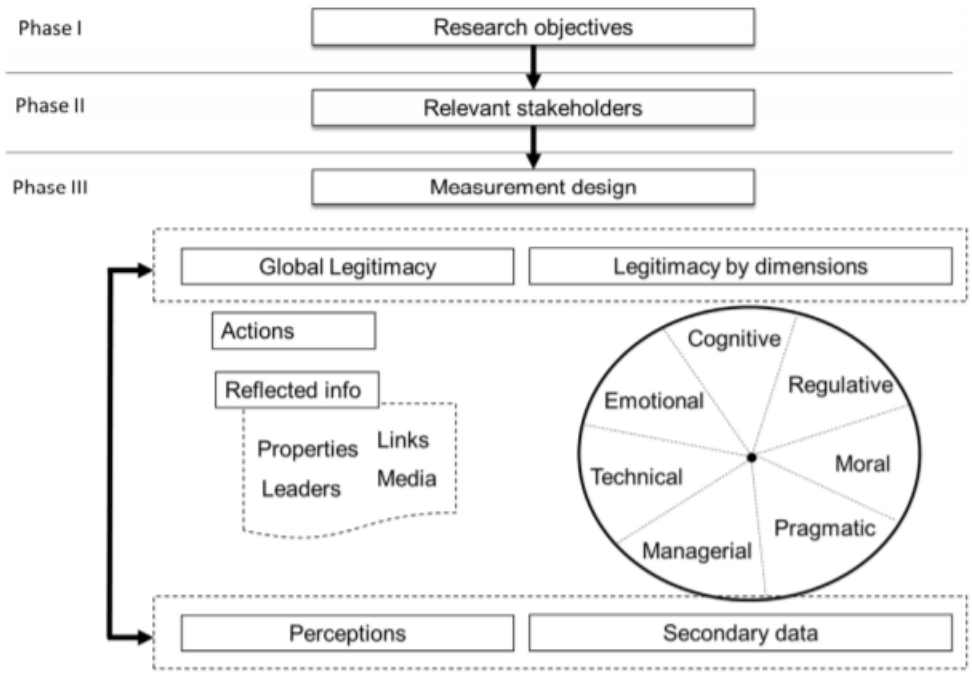

Figure 1: General process of measuring organizational legitimacy (Source: Díez-Martín et al, 2021)

Processes to attain legitimacy-as-property

Legitimacy is described here as a degree of 'fit' between a legitimacy object such as an organizational practice and the context (Suddaby, Bitektine, & Haack, Legitimacy, 2016). To reach this fit, companies use three distinguishing strategies, namely conforming, decoupling and performing/learning. **Conforming** is the act of adopting or implementing organizational practices and forms that are produced through regulations, standards, and norms within a specific organizational field. The main objective of conforming is to appear legitimate by conforming to various social and cultural pressures. As more and more organizations conform to these existing standards and norms, homogeneity among the organizations increases. An example would be companies using raw materials that are proven to be better for the environment so they can meet certain environmental standards. **Decoupling** is a process by which organizations supposedly conform to social pressure in order to maintain a level of legitimacy in the eyes of the public. An example of this would be Amazon receiving praise for raising the wages of their staff in 2018, while having many other unaddressed workplace issues. In a sense, these firms try to relieve public pressure by initiating a change to highly visible policies so that their actions appear socially wanted. The move will appear to be significant in nature, but usually, it only scratches the surface of the real problems underneath. The final strategy is **performing**. Organizations sometimes aim to create legitimacy by showcasing the (technical) superiority of their products over those of rivals and competitors. This strategy is

often seen in highly competitive fields, such as the smartphone industry where big players such as Apple and Samsung continuously try to outperform their direct competitors by implementing the latest chips and software in their smartphone models. To conclude, legitimacy-as-property is the most well-known and researched configuration of legitimacy. Legitimacy-as-property describes legitimacy as a tangible 'thing' that organizations may possess. As such, legitimacy is mostly influenced by the organization's own actions. Organizations can influence legitimacy by imitating firms who are already legitimized, employing high quality staff, being transparent in their communication and maintaining an edge over their competitors through technical superiority.

2.1.2 Legitimacy-as-perception

The theory of legitimacy-as-perception also views legitimacy as a property, but in the sense that it can be viewed as an assessment or judgment that the public makes about a certain organizational practice or form (Suddaby, Bitektine, & Haack, Legitimacy, 2016). Legitimacy-as-perception also incorporates elements of legitimacy-as-process (discussed below), as this theory focuses on the processes of making judgements. Contrary to legitimacy-as-process, however, legitimacy-as-perception puts the focus on individuals. According to the literature, individuals make judgements about the legitimacy of organizations; they then act on these judgements, which in turn produces effects on the macrolevel (Hoefer & Green, 2016; Derakshan, Mancini, & Turney, 2019). Macrolevel in this context relates to industries or large group of organizations.

Where does it occur?

Whereas the focus of the first configuration lies on the organization, legitimacy-as-perception puts the individual evaluator at the center of the process of legitimacy judgement formulation. Evaluators are actors that attribute legitimacy to objects and organizations. These can be individuals or collectives such as groups and organizations. Media and regulators can also assume the role of evaluator (Stratoudakis, 2021). Trost (2011) developed a model in which the cycle of these legitimacy judgements is showcased (see figure 1). The process starts with the formation of a judgement. Here, the individual decides whether a certain entity is legitimate or illegitimate. The judgement then reaches the use phase, where it helps to guide the behavior of the evaluator. The behavior is dependent on the generalized legitimacy judgement that was formed in the first phase. If an entity is seen as legitimate, the individual will support the entity

and resist any attempts to change or alter the entity. On the other hand, if the entity is deemed illegitimate, the individual may engage in behavior to change the entity so that it becomes legitimate (Lenz & Viola, 2017). During the use phase, the individual goes through a process of assimilation, in which cognitive legitimacy is built up. This phase continues to exist until contradicting information comes along, which forces the individual to reassess the previous legitimacy judgement. In this reassessment phase, the individual judges the entity along various sorts of dimensions (moral, instrumental, and relational). It is in this phase that an illegitimacy judgement is most likely to emerge. When this happens, the individual will seek to instigate institutional change. A visual overview from Tost (2011) pictures the legitimacy judgement cycle (see figure 2).

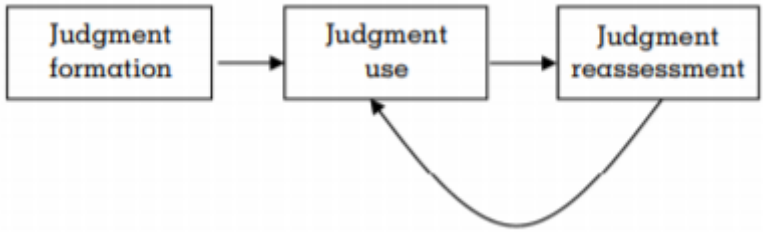

Figure 2: The Legitimacy Judgment Cycle (Source: Tost, 2011)

This process is further broken down in figure 3, where the phases from the cycle are explained in a more detailed manner (Tost, 2011).

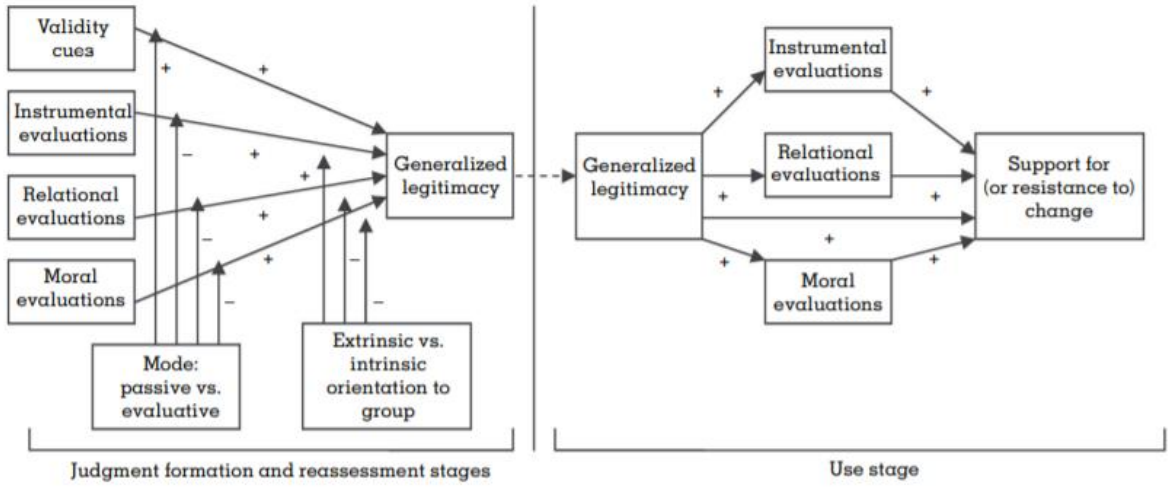

Figure 3: Model of the Legitimacy Judgment Process (Source: Tost, 2011)

At the macrolevel, validity forms an important factor for the formulation of the judgements of individuals. Validity can be described as a general consensus on the level of a group (of people) or society wherein a certain entity is deemed proper within its social context (Bitektine & Haack, 2015). The theory of legitimacy-as-perception acknowledges differences in legitimacy judgements on a microlevel. Although many of the observations on the variety in judgements is restricted to differences within large stakeholder groups, research suggest that a deeper breakdown of stakeholder audiences can result in a better understanding of variety in legitimacy judgements. Essentially, a crucial consequence of this configuration is that research towards legitimacy does not have to assume microlevel isomorphism in opinions of individuals. This means that if complete unanimity is observed within judgements expressed at the macrolevel, the reasons for adopting this judgment may differ among individual evaluators. Evaluators could end up being less outspoken if they believe that they differ too much from the rest. Fear of possible sanctions also plays a part. In this case, they may end up adopting the opinion of the rest of the group, because they deem themselves not knowledgeable enough to form their own opinion or simply because they accept the opinion of the group (Weber, 1978). To summarize, legitimacy-as-perception studies the perceptions and judgement of individual evaluators and acknowledges the variety of evaluators and their different motives, even when faced by strong institutional pressure.

Processes to attain legitimacy-as-perception

The question of how legitimacy-as-perception operates can be split up into two parts: how individuals form their legitimacy judgements, also referred to as propriety (Haack, Schilke, & Zucker, 2020), and how judgements of individuals aggregate to form a legitimacy judgment on a macrolevel, also known as validity (Suddaby, Bitektine, & Haack, Legitimacy, 2016). The formation of individual legitimacy judgements has been the subject of decades of psychology research into forming judgements, as well as research on cognitive heuristics and social conformity. This research suggests that the formulation of legitimacy judgements happens not just through active cognition, but also through intuition (Tost, 2011; Haidt, 2001; Kibler, Mandl, Kautonen, & Berger, 2017). Researchers suggest that the spread of legitimacy judgements happens through a perceptual process (Haack, 2012; Crandall & Beasley, 2001). During this process, a person who is making a judgment will use cognitive heuristics in order to decrease the mental effort needed to judge an unknown target (Suddaby, Bitektine, & Haack, Legitimacy, 2016). The aggregation of individual judgements into macrolevel legitimacy opinions is more difficult to describe because the topic of micro-to-macro transition remains

relatively unexplored. However, a recent attempt has been made by Arshed, Chalmers, & Matthews (2019). Their study investigated how enterprise policy has sought to increase the quality and quantity of women-owned business in the UK. Specifically, they looked at how individuals evaluate and influence the legitimacy of women's enterprise policy. Their findings reveal that there are four tactics used by individual evaluators in the policy ecosystem to externalize their judgements. The first tactic is referred to as the 'suppressed judgment' tactic. Here, individuals may have negative views on women's enterprise policy, but may experience a strong normative pressure to support the initiative. The second is called the 'championing' tactic. When certain individuals feel that the collective validity of the enterprise policy is under threat, they will champion the policy in the form of non-contracted support and assistance so that its legitimacy gets restored. The third tactic is referred to as the 'playing-the-game' tactic. Here, individuals will openly ridicule enterprise policy, but still use the services provided through it as they are seen as beneficial (subsidies, networking, and other forms of assistance). The last tactic is the 'guerilla' tactic. Although rarer, this tactic sees female entrepreneurs who are eligible for help and assistance through the program, purposely reject in favor of going their own way (Arshed, Chalmers, & Matthews, 2019). To conclude, legitimacy-as-perception can be summed up as the creation of legitimacy judgements by individual evaluators (propriety) which then aggregate to form a collective evaluation (validity) through which the legitimacy of an object is shaped (Bitektine & Haack, 2015; Haack, Schilke, & Zucker, 2020).

2.1.3 Legitimacy-as-process

The configuration of legitimacy-as-process is different from legitimacy-as-property in the sense that legitimacy is seen as a variable attribute that is under constant change and needs to be continually negotiated. Because of this, the focus lies not on the end result of the process, but rather on the process itself. Legitimacy starts from scratch and is built up until a certain point is reached where legitimacy is finally achieved (Suddaby, Bitektine, & Haack, Legitimacy, 2016).

How is legitimacy-as-process operationalized?

In contrast to legitimacy-as-property, in which the focus lies on an organization, practice or form, legitimacy-as-process has a much broader scope. The entire process in which stakeholders work together in order to create meaning, becomes the unit of analysis rather than the result of organizational practices leading to the creation legitimacy itself. In this line of thinking, the

term ‘legitimacy’ is often replaced by ‘legitimation’ or ‘legitimizing’ (Suddaby, Bitektine, & Haack, Legitimacy, 2016). Legitimacy, in this vein of research, is not a fixed equation but rather something which must be repeatedly captured and attained (Hallstrom & Bostrom, 2010).

How is legitimacy-as-process attained?

There are three ways in which legitimation is achieved as a process, namely persuasion/translation/narration, theorization, and identification/categorization (Suddaby, Bitektine, & Haack, Legitimacy, 2016). The idea behind **persuasion/translation/narration** is that legitimacy is formed through a process of communication, translation of text, and language. Within this stream of thought, there are two main schools of thought: researchers who believe legitimacy is formed through ‘discourse’ and those who believe it is formed through ‘rhetoric’. Scholars who have studied the role of discourse in legitimacy-making argue that the process of legitimacy is profound on a microlevel, but individuals have little to no effect beyond this at the collective level (Vaara & Tienari, On the narrative construction of multinational corporations: An antenarrative analysis of legitimation and resistance in a cross-border merger, 2011). They argue that through a convincing text for example, a conversation can spring up about important social matters (like climate change). However, *one* single actor is not powerful enough to simultaneously get other actors to form a certain opinion and also influence their texts in such a way that (de-)legitimation occurs. In essence, they argue that the process of interpretation can never be manipulated by a single actor. Scholars of the rhetoric line of thinking believe that communication is indeed key, but that the process of legitimacy is largely strategic (Suddaby & Greenwood, 2005). As such, they argue that there’s a higher degree of agency present when using language to build up legitimacy. Agency refers to the ability of individuals to act according to their own free will (Emirbayer & Ann, 1998). **Theorization** can be described as the process in which existing norms and beliefs are made abstract and then sorted along different categories or standards. Theorization can aid in delegitimizing existing norms and beliefs, while legitimizing others by presenting them as a possible solution for current problems. For example, the weakness of a current organizational norm can be laid out (delegitimization) to justify the use of a new norm (legitimization). The last form of achieving legitimacy-as-process is through **identification/categorization**. Many organizations experience a need to be different from each other while also being similar. Organizations are expected to be similar to one and other in order to appear legitimate, yet at the same time, they also strive to be unique in their own way. Essentially, this means that companies should uphold certain standards and norms that are the same across the industry, but also look to distinguish

themselves from others by continuously coming up with ways to gain an edge over their rival competitors. For this reason, scholars from this perspective have recognized that legitimacy revolves closely around identity.

2.1.4 Summarizing the three configurations

To conclude, we have highlighted three configurations of legitimacy. All of them are different from each other, but they also share many similarities. Legitimacy as a tangible resource or 'thing' possessed by organizations is the most used and researched definition of legitimacy. Made popular by Suchman (1995), this configuration focuses on how organizations seek to establish legitimacy in the eyes of the public through their organizational practices. The second configuration, namely legitimacy-as-perception, relates to the creation of cognitive judgements by individual evaluators which are then aggregated to form a collective opinion about a certain object (Tost, 2011). This configuration seeks to understand how perceptions are made in the mind of the individual and how these can subsequently be influenced in order to form new legitimacy judgements. Lastly, we discussed legitimacy-as-process. The focus of this configuration is not to study legitimacy itself, but rather the process(es) that are necessary and required in order for legitimacy to be attained (Haack & Sieweke, 2018). In this vein of research, legitimacy is often replaced by terms like 'legitimation'.

There's no right or wrong when it comes to any of the configuration; rather, one configuration will simply serve a given research objective better than the others. For this study, we have determined the last configuration, legitimacy-as-process, to be the best suited form of thinking. Reasons for this include, first, the fact that we will not be studying legitimacy as a specific resource possessed by organizations or in this case, medical institutions. Instead, we focus on exploring how existing legitimacy issues related to the theoretical puzzle (the paradox of users valuing privacy and security while being discouraged by measures ensuring these aspects), are tackled or solved. Based on this reasoning, legitimacy-as-perception also becomes less suited. Naturally, perceptions of patients are an important aspect in determining the legitimacy of EMRs and eHealth, but the goal of the research is not to investigate how patients specifically form legitimacy judgements about these forms of technologies. This leaves us with one remaining option which is legitimacy-as-process. However, this configuration alone will not be enough to help us answer the research questions we have formulated. The research described in the previous chapters tells us little about what role technology occupies in the theory of

legitimacy. In order to learn more about how technologies are legitimized, we need to delve deeper into the available literature. In the following chapter, technology legitimation as a subset of legitimacy-as-process is further examined and specified.

2.2 Technology legitimation

Technology legitimation can be seen as a subtype of legitimacy-as-process. For new technological innovations to gain legitimacy, they must be accepted and become a part of the daily lives of its intended users (Johnson, Dowd, & Ridgeway, 2006). Innovations do not acquire legitimacy from the moment they are introduced to the world. Rather, this is a process that develops over time. This process can be referred to as technology legitimation (Johnson, Dowd, & Ridgeway, 2006). Technology legitimation has been recognized as a complex problem, with little research being done to understand the process (Laïfi & Josserand, 2015). However, there are several scholars trying to gain a better understanding of this phenomenon. Three forms of technology legitimation will be explained in detail down below.

2.2.1 Three streams of technology legitimation

An early example of research into the process of (technology) legitimation comes from Tolbert and Zucker (1996). They identified three stages in the process of institutionalization, which they compared to legitimation. The first stage is called the theorization stage. This stage consists of two components. The first one revolves around acquiring pragmatic legitimacy. This means that the utility, functions, and economic benefits of the technology become recognized. The second component revolves around the so-called ‘appropriateness’ of the proposed solution. This relates to the moral legitimacy (Tolbert & Zucker, 1996). From there, the technology moves to the diffusion of innovation stage. The technology spreads through various channels (e.g., important actors and media) to a wider audience, where eventually a social consensus is gradually built up. In the last stage, the technology becomes embedded in the social system and thus attains cognitive legitimacy (Tolbert & Zucker, 1996). Figure 4 shows a model created by Lawrence and his colleagues. The model breaks down the steps within the process of institutionalization (Lawrence, Winn, & Jennings, 2001). Here, legitimation is recognized as one of the key steps and occurs mostly after the technology has been adopted (Lawrence, Winn, & Jennings, 2001). Scholars have argued, however, that legitimation is key in getting innovations accepted by the public (Raffaelli & Glynn, 2015). This would mean that legitimation follows soon after an innovation is introduced.

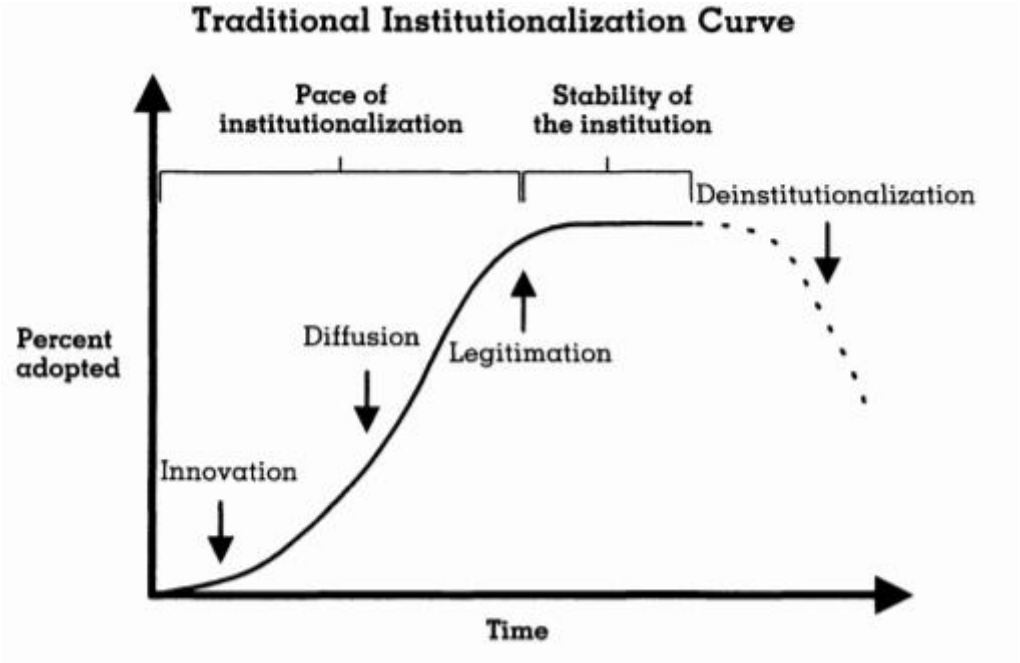

Figure 4: The process of institutionalization by (Source: Lawrence & Winn, 2001)

The perspective of Greenwood, Suddaby, & Hinings (2002) differs slightly from that of Tolbert and Zucker, as they focus more on the impact of professional associations in the institutionalization of new practices. As is the case with Tolbert's and Zucker's perspective, Greenwood and colleagues also describe legitimization as a three-stage process. In the first stage, the theorization stage, the goal is to build moral legitimacy through justifying the appropriateness of the technology. Professional associations and other regulatory bodies are the main drivers to attaining this form of legitimacy. In the second stage, pragmatic legitimacy is acquired as a social consensus starts developing. During this stage, cognitive legitimacy is also slowly attained as new norms become routine. In the last stage, full institutionalization is reached as the innovation becomes widely used and new concepts are taken for granted.

A more recent view comes from Johnson, Dowd, & Ridgeway (2006). According to these authors, the process of technology legitimation can be divided in to four parts or stages, namely innovation, local validation, diffusion, and general validation (Johnson, Dowd, & Ridgeway, 2006). During the first part of the process (innovation), an innovation is introduced, and the local actors (institutional entrepreneurs) determine whether this innovation fits within the existing institutional framework (Zelditch, 2001). If the innovation passes this test, it attains local legitimacy and gains acceptance by the actors in the local situation (Johnson, Dowd, & Ridgeway, 2006). After the initial local validation, the innovation diffuses further into additional local situations. Here, it becomes increasingly entangled in existing beliefs, norms,

and values. Due to this entanglement, actors come to the belief that the innovation is indeed legitimate (Binz & al, 2016). The diffusion phase is followed by the last phase: general validation. During this last step, the innovation is deeply rooted within the existing norms and values of the social system. This is where actors start to 'take the innovation for granted' and cognitive legitimacy is achieved (Suchman, 1995).

Summed up, the three streams of technology legitimation all have their own view on how technologies are legitimized. A notable difference is the order in which legitimacy is gained. In the theory of Tolbert & Zucker (1996) pragmatic legitimacy and moral legitimacy are shaped first, before cognitive legitimacy is attained in the last phases of institutionalization. Looking at the theory of Greenwood, Suddaby & Hinings (2002) however, we see that not pragmatic legitimacy, but rather moral legitimacy comes first, and pragmatic legitimacy only appears after a social consensus has been developed. This difference is also reflected in the way innovations are introduced across the three streams. Tolbert & Zucker (1996) put an important emphasis on the usability and economic advantages of the proposed innovation while the other two groups of authors seem to agree that the 'appropriateness' of a technology is the first step in the legitimation process. Nevertheless, views on who the main drivers are of this process step are conflicting. Sudday & Hinings (2002) attribute this role to professional associations and regulative bodies while according to Johnson, Dowd, & Ridgeway (2006), it is the institutional entrepreneurs who judge the appropriateness of the innovation. Aside from the differences, there are also similarties among the three streams; all three concepts seem to 'end' in the same way with cognitive legitimacy, or 'taken-for-grantedness', being the last form of legitimacy to be acquired. For the purpose of this study, the last step in the legitimation process where cognitive legitimacy is built up is the most relevant one. EMRs are not a new technology and therefore, they have had time to acquire legitimacy. Since we have established that all three streams share the same line of thinking with regards to this aspect, there's no need to make a deliberate choice between them. Rather, all three streams can provide an interesting outlook on the findings of the study. Next, we will explore the strategies behind technology legitimation.

2.2.2 Technology legitimation strategies

As mentioned before, the available research into legitimation strategies is still very limited (Paré & al, 2020; Laïfi & Josserand, 2015). However, the importance of these studies is recognized, because the literature shows that strategies are crucial for the success and the diffusion of an innovation (Binz & al, 2016). Several scholars have written about legitimation strategies used

by organizations and entrepreneurs alike (Ben-Slimane, Diridollou, & Hamadache, 2020). Hargadon & Douglas (2001) explain that entrepreneurs embed their innovations in established institutions by forming alliances with influential parties in the market. Therefore, they argue that the success and diffusion of an innovation are most impacted by the extent to which an innovation fits into existing institutions. Network lobbying also has a profound effect on the legitimation of technologies (Bergek, Jacobsson, & Sandén, 2008; Bunduchi, 2016). An example would be the company Sun Microsystems, which won a lawsuit over Microsoft due to the support of freelance developers. Emerging technologies in particular benefit heavily from lobbying of resourceful actors (Bergek & al, 2008). A paper studying the legitimation strategies of IT vendors with regards to EMR solutions has shown that a lack of communication with family physicians may be the cause of slow adoption of EMRs in primary healthcare (Paré & al, 2020). The IT vendors focused mostly on the operational value and the technical details of their products. This approach was unsuccessful since physicians have limited technical knowledge. Choosing the right legitimation method is therefore crucial to achieve the adoption of a specific technology. Although this study yields interesting results, it is mostly focused on the supplier side (Paré & al, 2020). As far as we know, no studies have focused on the user perspective.

2.2.3 Conclusion

We have identified several research gaps. The theory reveals that research towards technology legitimation and strategies is scarce. It has therefore been identified as a complex problem by scholars (Laïfi & Josserand, 2015). The processes behind technology legitimation in a multi-stakeholder environment like eHealth remain unclear. A study researching legitimation strategies used by IT vendors gives some insight in the way EMRs are legitimized. However, these studies focus mostly on single stakeholder groups and do not incorporate the views of end-users. As such, the interaction between multiple stakeholders attempting to legitimize a platform technology like EMRs is unknown. Moreover, the link with security requirements poses an interesting paradox which can help us to better understand impact of authentication methods on overall eHealth usage. This study will explore how technology legitimation is used by healthcare actors to overcome legitimacy issues related to EMRs. Also, we will examine how legitimacy is built up in the context of EMRs and eHealth by developing a new theory and model. To accomplish this, we have developed the following research question: *"How do healthcare actors legitimize the value of platform technologies like EMRs for their end users?"*

3. RESEARCH METHODOLOGY

This chapter will cover the research design used during the study. This chapter also includes the sample, the list of respondents, the procedure, the method of data collection and analysis, and finally, the validity and reliability of the study.

3.1 Research design

This study focuses on how different healthcare actors legitimize a platform technology like EMRs to provide value for its end-users. Specifically, we will explore how technology legitimation strategies are employed to deal with challenges and issues related to the four pillars of legitimacy. Because little to no information is known about this subject, we have opted to use a qualitative research approach. In general, the aim of quantitative studies is to test pre-formulated hypotheses so that generalizable results can be generated. Usually, quantitative studies aim to answer the 'what' question. Qualitative studies, on the other hand, are more suited to answer questions starting with 'how' (Marshall, 1996). This study is qualitative in nature because it seeks to understand *how* technology legitimation is used to overcome challenges in the legitimacy of EMRs and eHealth.

3.2 Sample

Sample sizes in qualitative research are usually small, because the main goal is not to provide generalizable data. Rather, the aim is to capture the perceptions, motivations, thoughts and attitudes of people through in-depth data collection methods such as interviews (Fossey, Harvey, McDermott, & Davidson, 2002). According to research, a sample size of at least 12 is recommended in order to reach data saturation (Vasileiou, Barnett, Thorpe, & Young, 2018; Boddy, 2016). Data saturation refers to a point in the research process where no longer new data is gained through sampling (Favourate, 2020) Within this form of research approach, three sample strategies can be identified (Marshall, 1996):

1. Convenience sample: In this form of sampling, the researcher tries to gain access to the most readily available subjects. Convenience sampling therefore requires the least amount of effort and is the most cost and time effective sampling strategy. However, it may also result in poor data quality as respondents may not have sufficient knowledge on the subject to provide satisfying answers.

2. Judgement sample: This is the most commonly used sampling technique by researchers performing qualitative research. In this form of sampling, the researcher tries to select the most productive sample based on their own knowledge and professional judgement.
3. Theoretical sample: This is the most 'rigorous' form of sampling as the goal of the data collection is to develop a theory as the data collection progresses. As the researcher collects data, they will analyze this data and make decisions on who to interview next.

For this study, we have opted to use judgement sampling as our sample strategy. Firstly, we wanted to ensure that sufficient quality data would be gathered. This practically rules out the usage of convenience sampling as it is difficult to randomly select people with enough knowledge on EMRs (not every healthcare worker understands the workings of these information systems). Secondly, due to time constraints (the research needs to be completed within a reasonable time period of 9 months), the use of theoretical sampling is also ruled out. The pandemic caused by COVID19 has made it difficult to find respondents within the field of healthcare. Therefore, the decision to base the order of contacting respondents on developed theory was rejected as there was a serious uncertainty over reaching a sufficient number of interviewees.

3.3 Data collection

We chose to use interviews as our main way of collecting data. For qualitative research, interviews form the most commonly used way of data collection (Cassell, 2005). Interviews exist in several forms: unstructured, semi-structured and structured (Alsaawi, 2014). Unstructured interviews are flexible interviews in which the participants generally decide what direction the interview goes in. Although unstructured interviews may result in large amounts of data, it is more difficult to focus on a specific subject. Structured interviews lie on the opposite side of the spectrum. Here, a researcher uses pre-formulated interview questions. This type of interview works well to maintain control over the topic that is discussed. However, this can limit the richness of data and generally prevents in-depth data from being gathered. Semi-structured interviews form the bridge between structured and unstructured interviews. This type of interview is commonly used because it gives researchers a way to formulate pre-determined questions which means it is easier to steer the interview in a certain direction unlike with unstructured interviews. At the same time, semi-structured interviews leave more room for the participants to provide in-depth information about the topic than structured interviews do

(Alsaawi, 2014). We have chosen to use semi-structured interviews, because this gives us enough flexibility to engage with the participants and ensures that enough information is provided to answer the research question. In total, we have interviewed a total of 18 respondents resulting in 16 semi-structured interviews. Two interviews were held with two respondents at the same time (respondent 2 and 3 formed a pair as well as respondent 16 and 17). The interviews were performed between September 2020 and February 2021. Aside from interview data, we have also looked at existing laws and frameworks related to EMRs, proposed regulations for the exchange of medical data, and current ways in which technology legitimation strategies are used to overcome obstacles related to legitimacy issues. The sources we have used for this data are the official websites from the House of Representatives and the Senate as well as surveys and studies performed by Nictiz and Nivel (eHealth monitor).

3.4 Respondents and setting

We have used a combination of our own network and snowball sampling. Figures 5 and 6 showcase how contact was established with the respondents of the study. A part of the respondents was found through information sources. This means hospitals and other relevant (lobby) organizations were contacted by browsing and reading through websites (belonging to these organizations), articles or other sources where EMRs were mentioned.

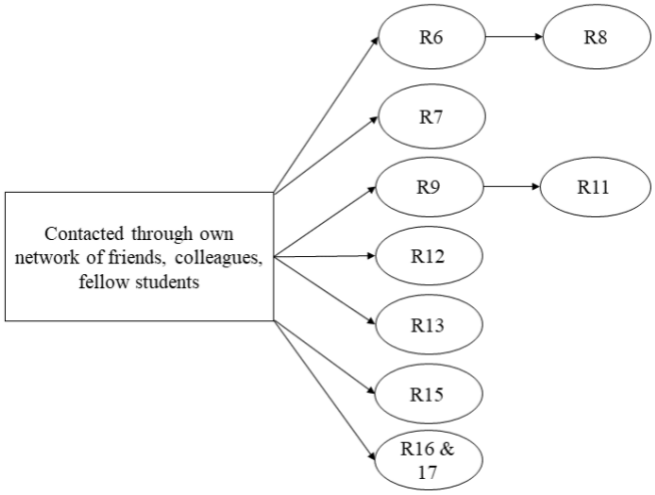

Figure 5: Respondents gathered through researcher's network

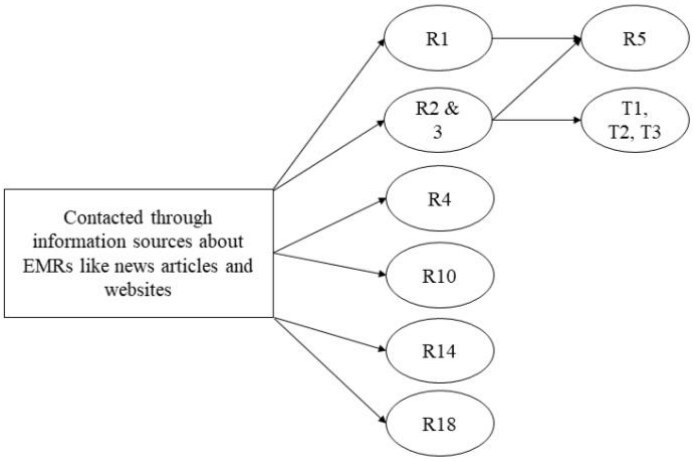

Figure 6: Respondents gathered through information sources

After every interview, the respondent was asked if they knew any other institutions, organizations, or persons that had sufficient knowledge regarding the subject and were willing to be interviewed. This ensured that enough respondents from different industries and organizations were interviewed. Through the sampling method we have managed to get in touch with IT personnel, policy officers, pharmacists, IT managers, GPs and other medical experts originating from various sorts of organizations (hospitals, mental health clinics, umbrella organizations and more). For privacy reasons, only a general description of the company/organization they work for is provided. The names of the respondents have also been left out (see Appendix A: List of respondents).

Due to the COVID-19 pandemic, close contact with others was prohibited at the time of the interviews. Therefore, the interviews were performed using digital videocall services such as Microsoft Teams, Skype, or Zoom. The longest interview was one hour and five minutes and long with the shortest being 15 minutes. The average length of the interviews was 34 minutes. For this study, the original plan was to also interview technology developers of EMRs. However, when the first technology developer was contacted, they made the decision to not go through with the interview on the basis that the questions were rather user-centered (i.e., focused on the patient) and that the themes of the interview did not belong to the 'expertise' of the organization. Subsequently, a decision was made to change the questions and instead send them through email (see Appendix D: Questions for the technology developers). The decision to send them through email was to provide a lower threshold in order to cooperate with the research. After the first technology developer answered the questions through mail, the other two technology developers were approached via the same manner to ensure consistency in the

data. In the end, three out of five technology developers responded to the list of questions (see Appendix B: List of technology developers).

3.5 Procedure

The data collection began in late September after the interview protocol was approved by the university a month earlier (see Appendix C: Interview protocol). As previously stated, the respondents for this study were contacted through the researcher's own network and by snowball sampling. First, an email was sent out with a short description of the research to potential respondents. A total of 26 organizations and persons were contacted of which 16 agreed to an interview (this excludes the three technology developers). The goal and objective of the study were explained in the email and a formal request was made for an interview. When contacting organizations, we specifically asked for people who had sufficient knowledge regarding EMRs. When contacting individuals, we first established whether they had sufficient knowledge regarding the subject, demonstrated through work experience related to EMRs or familiarity with the concept of the technology. This was done after establishing initial contact; the respondents were made aware of the goal of the research and told what sort of questions they could reasonably expect (the main themes were explained). When the participants agreed to the interview, a date and time was decided based on the schedule of the participants. Due to the COVID-19 pandemic, the interviews were performed through digital means (Microsoft Teams, Skype or by phone call). Before the interviews started, we introduced ourselves and reiterated the topic of the research. At this point, participants were able to ask questions regarding the research or express any doubts or concerns they had. After answering any questions from the participants, we obtained permission to record the interviews. we explained the purpose of recording the interviews and underlined the fact that the respondents would be provided full anonymity. The first few questions served as an introduction into the topic. The respondents were asked if they could discuss the history of EMRs and state the most common obstacles related to data security. The question regarding the history of EMRs was later removed from the interview protocol, after it was no longer deemed necessary to answer the research questions. Then, the first questions regarding the regulative legitimacy were asked. The respondents were asked what the most important laws are linked to the usage of EMRs and eHealth and what sort of an impact they had on the adoption of the technology. The second theme was cognitive legitimacy. Here, the respondents were asked how patients perceive the technology and how they dealt with any negative views. The third theme was pragmatic

legitimacy; we wanted to know whether patients recognized the benefits of EMRs and eHealth. The last theme was normative legitimacy. The respondents were asked if there were any ethical considerations tied to information sharing and how patients felt about their data being stored by hospitals and the likes. After the main themes were wrapped up, respondents were asked to address any other points they felt were important to include. Subsequently, we asked about helpful materials in the form of documents, possible contacts, and whether it was possible to stay in touch through email should new questions arise. After the interviews were completed, the respondents were thanked for their time and answers.

3.6 Data analysis

We have recorded the interviews to ensure data reliability. The audio files were then transcribed. The interview transcription file had a total word count of 48597. We then performed a thematic analysis of the transcriptions. Thematic analysis can be described as "a method for identifying, analyzing, and reporting patterns (themes) within data" (Braun & Clarke, 2006). Thematic analysis offers great flexibility and accessibility and can provide a way into research topics that can be seen as vague or complex. For this reason, it works well with studies of an exploratory nature, such as this one (Braun & Clarke, 2006). For the purpose of this study, inductive coding was used, as there was not a pre-determined codebook available. Inductive coding, also known as open coding, refers to developing codes from raw qualitative data. Unlike deductive coding where pre-defined codes (based on previous research for example) are attributed to pieces of qualitative data, codes in inductive coding are developed from the data itself (Thomas, 2006). The data analysis was performed through three phases of coding: open coding, axial coding, and selective coding. Open coding refers to the attachment of concepts to pieces of data during the analysis of interview data. The aim of open coding is to describe, name or classify certain phenomena. A so-called code is usually a single word or a (very) short sentence. The next step in coding is axial coding. Axial coding refers to the development of themes related to a series of codes. This process is done by way of inductive and deductive thinking. The final step in coding is selective coding. In this part of the process, the themes or categories derived from axial coding are grouped into core concepts. The goal here is to explain the phenomenon which has been observed. The data analysis resulted in 178 initial (open) codes being identified. The data analysis eventually revealed seven overarching themes. Using this method, we have developed a new theory and model based on the identified concepts.

3.7 Validity and reliability

There are many factors which can influence the reliability and validity of qualitative research (Brink, 1993). Reliability with regards to qualitative research refers to producing results that are consistent over time. Validity relates to the accuracy in which what is studied or measured reflects the real meaning of the phenomenon which is researched (Golafshani, 2003). In order to preserve the trustworthiness of the findings, several steps have been undertaken, which are discussed below:

1. We have used thick description and requested feedback from the respondents when there was doubt surrounding the meaning of their statements to boost the validity of our analysis (Langley, 2007);
2. We have used interview data and data from existing sources (surveys, regulations, legislative proposals and reports about the usage of eHealth) to include multiple outlooks in the study (Flick, Van Kardorff, & Steinke, 2004);
3. We have received feedback from peers and the university to reduce bias and increase the quality of the model and the theory which have been developed (Galdas, 2017);
4. The usage of an interview protocol serves to increase the quality of the interview data by maintaining a certain level of consistency throughout the data collection phase (Gugiu & Rodriguez-Campos, 2007).

4. FINDINGS

This study focused on investigating the usage of technology legitimation to overcome legitimacy issues related to EMRs. In order to accomplish this goal, we have formulated the following main research question: "*How do healthcare actors legitimize the value of platform technologies like EMRs for their end users?"* In this chapter we will examine the results of the data collection and use it to answer the sub questions. Firstly, we will take a closer look at some of the security challenges related to EMRs. After that, we will examine how regulations impact EMRs and eHealth. The chapter following this focuses on the patients' perception on EMRs. Next, the perceived benefits will be highlighted and finally, the ethical considerations will be discussed. This chapter will be wrapped up by summarizing the results from the data collection.

4.1 Security fundamentals

An important part of EMRs and the patient data they contain is data security. EMRs and other eHealth application face substantial security challenges. We have identified a number of issues related to data security ranging from the threat of hackers to identity fraud. A total of 19 codes originating from the statements of nine respondents were attributed to this theme. In this chapter, we will take a closer look at the security challenges.

The threat of hackers is one such challenge. There are state actors like Russia and China who engage in cyber activities with the hack of SolarWinds being a recent example (Jibilian & Canales, 2021), and regular 'black-hat' hackers which are (cyber) criminals with malicious intent (Norton, 2017). Respondent 10, an IT manager working in a Leiden hospital, mentioned the following: *"Right now, we're experiencing some pretty advanced cyber-attacks like SolarWinds which has been in the news lately. So, you have a supplier who's hacked and the products you use are therefore automatically compromised."* The same respondent remarked that the security issues lie with the fact that an EMR is part of a wider IT infrastructure, susceptible to human led errors: *"With the EMR itself, I don't really have many concerns. Rather, you're more worried with people clicking on various links and bringing in dangerous ransomware and stuff. So, those are things that aren't directly linked with the EMR, but more so because an EMR is part of a bigger IT environment that could be vulnerable due to human errors and hackers from the outside world."* The threat of hackers was mentioned by two more respondents. Based on these quotes, respondent 10 seems to imply that although hackers are a serious threat, the actual security risks are not the EMR itself, but rather the employees who

have access to an EMR. Through their access to the system, they can (unknowingly) introduce the entire IT infrastructure to potentially malicious software.

Aside from the threat of hacking, there are concerns related to the quality of the data, as mentioned by respondent 13, an IT professional in a Hague hospital: *"The doctors need to put the data into the EMR the correct way. So, if I don't put the values of the blood pressure where they belong […] then blood pressure won't end up in the patient portal."* This means the data should not only be accurate and put in the correct location, but also be safeguarded from the view of people who are not relevant for the care the patient is receiving. The same respondent adds: *"Then, you have security on the level of information. So, you're sending data with your app to the hospital and then we have to make sure that a) no one else gets to look at this information, so you have to have security there and b) if that information arrives, then we have to be assured that the blood pressure we're measuring is really yours […] but the third aspect is, that the measurement you do is accurate."* Based on these statements, we can conclude that confidentiality and integrity of data is very important. People who are not relevant to the treatment of a patient should not have access to data pertaining to that patient. Moreover, inaccurate health measurements from the wrong person can lead to problems in diagnosing illnesses. The importance of accurate information was mentioned by one more respondent.

Respondent 13 added how identity fraud is still a prevalent issue in healthcare. To mitigate the risks of identity fraud, verifying the identity of the patient becomes an important task: *"On one hand, I think, the main point is, who are we dealing with? If a patient comes to our hospital, then we know who it is […] and since a few years we have the photo we make in the EMR, so we take the photo from the passport, so you have multiple ways to verify the patient."* Summed up, if we look at the security on the level of data, we can see that four aspects stand out. Firstly, the identity of the patient needs to be verified so that during the exchange of information, only medical data from that specific patient is communicated to the hospital. Secondly, this communication 'path' needs to be secured so just the patient and the relevant care provider(s) have access to the sent data. Thirdly, any information that is sent to the hospital by the patient needs to be accurate. Fourthly, once the information reaches the hospital, doctors and other medical experts need to make sure the information ends up where it needs to be. Figure 7 shows a very simplistic view of how this process could look like.

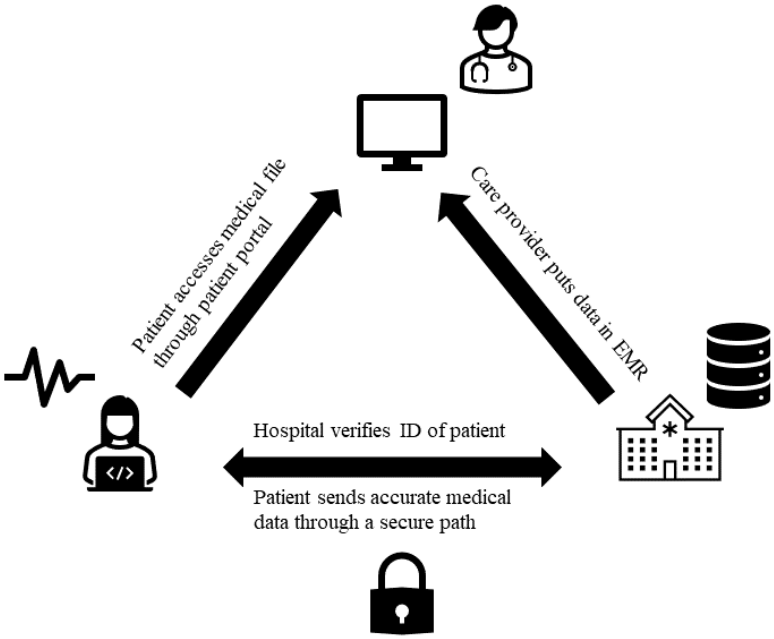

Figure 7: Information exchange process

4.1.1 The effect of two-factor authentication

Because hospitals and other medical institutions deal with highly sensitive data, measures must be employed to ensure that whoever accesses the data is allowed to do so. This calls for a secured log-in system. The most common way to secure a log-in system is through two-factor authentication. Two-factor authentication is a security system where two ways of identification are needed before an account can be accessed (Kenton, 2020). An example would be the use of a password in conjunction with receiving a code through a text message. DigiD is the most widely used two-factor authentication application in the Netherlands and is used by hospitals, insurance providers, the Dutch Internal Revenue Service (Belastingdienst) and other government agencies including municipalities. Based on the examined literature, it seems that this form of two-factor authentication hampers the usage of eHealth related applications (Versluis & al, 2020). We asked the respondents whether they recognize this phenomenon. Six respondents who have experience with the use of DigiD for patients answered this question; three of these respondents confirmed that DigiD forms a barrier. The most important reasons were complexity of the log-in system, user-unfriendly design and the involvement of 'too many steps'. Respondent 1, a policy officer, mentioned the following: *"Well, two-factor authentication is a way to improve privacy, through DigiD, but this isn't really a user-friendly solution. So, yes, we do find ways to solve these issues, but it slows things down."* The

respondent seems to agree with the findings of the literature and adds that the usage of two-factor authentication can slow down the log-in process.

Sharing some resemblance with the previous statement, respondent 8, a GP in Amsterdam, said that two-factor authentication is widely used within their clinic (93% usage among patients), but that they do not use DigiD, because it is described as 'complicated' by the respondent. Therefore, the problem is not so much two-factor authentication, but rather the specific solution: *"We don't use DigiD and I find it pretty complicated […] But it does take a lot of steps before you arrive where you want to be, and this isn't really suited for our branch of business."* The respondent states that DigiD is not only complicated, but also requires a lot of steps to go through. They then mention how this is not 'suited' for their branch of business. This statement seems to imply that patients either want quick and easy access to their medical information or that there are many people having trouble using DigiD within the patient population (or perhaps both). Respondent 13, an IT professional in a Hague hospital, gives a similar statement to respondent 8, but mentions that although two-factor authentication can be a barrier to some, this usually relates to people that are not used to working 'digitally': *"You see that the people who are used to working digitally don't have any issues and the people who aren't used to working digitally do have a problem. And that problem isn't so much as the website and looking at data, but more the authentication. These people can't get through DigiD, they can't get past it."* In their statement, it becomes clear that while simple internet usage does not seem to be an issue (browsing a website and looking at data), the real problem is getting through the authentication process.

Other respondents recognized the complaints associated with DigiD but argued that this was a problem belonging more to the past. Respondent 5, a manager of digital healthcare, said: *"Currently, the only service being provided that ensures this is DigiD and we hear two different stories about this service from patients. But this phenomenon that you mentioned regarding the fact that eHealth usage goes down when you're using DigiD, is for me, something that was more relevant 5 years ago than it is now."* When the respondent was made aware of the fact that the article which was referenced was published this year (Versluis & al, 2020), the respondent reiterated that they 'understood the signals' adding that balancing security and user-friendliness is always a 'tricky' task. Respondent 10, an IT manager in a Leiden hospital echoed the same views from respondent 5, also noting that these problems '*aren't that relevant anymore*'. While it seems that respondents 5 and 10 acknowledge the complaints regarding

DigiD and its potential problems, they also agree that these issues are not relevant anymore. Interestingly, respondent 10 mentions how doctors have issue with DigiD while respondent 5 mentions the viewpoint from patients.

Compared to the previous statement pointing out the issues related to DigiD, respondent 14, a senior staff member of a Groningen hospital, was more cautious in their response: *"Two-factor authentication is something that precedes our patient portal so it was implemented along with two-factor authentication, so I haven't seen any changes in that so I can't say whether two-factor authentication has been an obstacle. An obstacle in the sense of, do people want it. […] Depending on how you organize the two-factor authentication, it does require a digital know-how."* This statement echoes in many ways what respondent 8 mentions; the problem may not be two-factor authentication itself (as evidenced by the high number of users in their clinic), but rather DigiD as a specific solution. Depending on how two-factor authentication is organized, the experiences of users may differ, and therefore by definition, its usage.

Based on these responses, it remains true that DigiD can form a barrier when it comes to the usage of eHealth. However, it is not clear what the characteristics are of these patients aside from the fact that they may suffer from a lack of digital know-how. Respondent 6, also a GP in the Amsterdam region, suggests that socioeconomic status can have an impact on the usage of eHealth: *"You can imagine that in some neighborhoods, that number [of patients who are less digitally savvy] is higher than in other neighborhoods."* Based on this statement, it seems that the number of patients who do not have enough skills to use eHealth related applications is more prevalent in neighborhoods with a lower socioeconomic status.

To conclude, the respondents have named several security issues and challenges related to EMRs and eHealth. Hackers, phishing, the security challenges related to the information itself and identity fraud were named as concrete examples of issues that medical institutions deal with. Furthermore, we have also checked whether DigiD forms a barrier to eHealth usage as the literature suggests. We can conclude that this is mostly the case with both doctors and patients voicing the same concerns. All respondents have stated that they recognize the potential problems with DigiD, but only three out of the six respondents clearly stated how it can be a barrier to patients. Two respondents were of the opinion that while they are certainly aware of the possible shortcomings of DigiD, effects like lower eHealth usage were phenomena

'belonging to the past'. In the next chapter, we will discuss the impact of regulations on EMRs and eHealth.

4.2 The impact of regulations on EMRs & eHealth

The first pillar of legitimacy to be discussed is regulative legitimacy. As explained before, a technology must abide by the existing legal frameworks in order to be perceived as legitimate by the public. Laws and regulations have a profound impact on the way EMRs, and eHealth are shaped within the Netherlands. The purpose of this section is to uncover legitimacy issues related to the laws and regulations and ways in which technology legitimation is used to overcome these issues. Related to this theme, we have identified 29 codes originating from statement given by practically all the respondents. During the interviews, we asked the respondents what the most relevant and important laws are linked to EMRs and eHealth and what impact they have on the adoption of the technology. Regarding the first question, not all respondents were able to answer as not all of them were aware of the relevant laws and regulations. The pie chart below shows how many respondents were able to give a clear answer to the question:

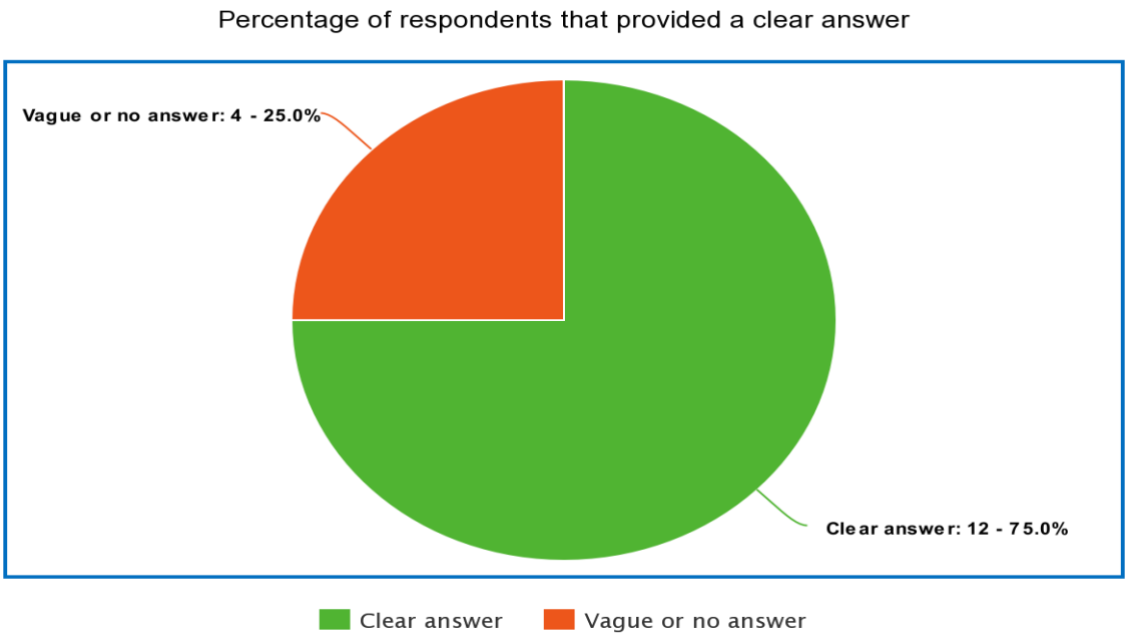

Figure 8: Percentage of respondents that were able to give a clear answer

The respondents that did manage to answer the questions, mentioned two or more laws, and could clearly explain the impact of said laws. The chart below shows the various laws and regulations that were referred to and the number of times they were mentioned by the respondents:

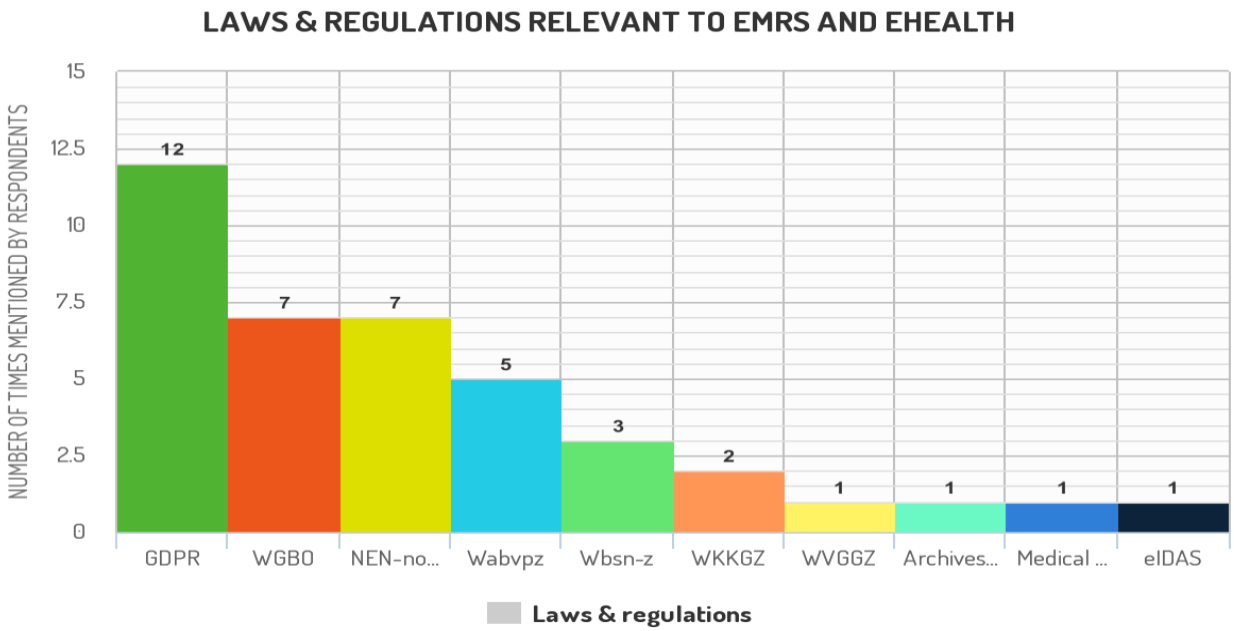

Figure 9: Chart displaying the relevant laws and regulations

Regarding the impact that these laws have on the adoption of technology, this impact is two-fold. On one hand, the laws and regulations make it so that EMRs are, for all intents and purposes, a necessity for medical institutions. Respondent 1, a policy officer, when asked whether security risks related to EMRs can impede the adoption of said technology, made the following statement: *"Because it's simply required by law. We have no option but to use these systems in order to provide the care we want."* It is implied here that hospitals and other medical institutions have no legal way to avoid the implementation of EMRs as the requirement of using them is written in the laws.

Legal frameworks are not the only driving force in the widespread adoption of EMRs as pointed out by respondents 2 and 3, a spokesperson and board member respectively: *"Right, so because documentation was put in law, the need for information sharing came into existence. The need for information sharing became bigger and bigger. This resulted in a centralized system, but there are many more systems."* However, their statement does seem to imply that changes in regulations were the root cause of this development. These changes in regulations refer to the introduction of the WGBO (Wet op de geneeskundige behandelingsovereenkomst [Medical Treatment Agreement Act]), which mandates the documentation of medical data by healthcare providers. Respondent 4, a senior advisor, further elaborated on this: *"We had the WGBO, which dates from '95, wherein the responsibility is handed to the care provider to document*

medical information." We can therefore deduce that the WGBO was an import driver in the adoption of EMRs as care providers were tasked with documenting medical information about their patients. This in turn increased the need for information sharing which further facilitated the adoption of the technology.

Indirectly, pressure from insurance companies also causes medical institutions to store the data of their patients electronically and introduce eHealth applications. Respondent 6 remarked the following: *"Plus the rule of law and this new law which has been in effect since July with 6 months of transitions so in January every doctor has to do it, then coupled with the fact that insurers give you money for this or punish you then the conclusion is that there's no way around it. You don't have a choice."* The word 'punish' here seems to imply that insurance providers will hand out fines or employ similar strategies; this is not the case as insurers will simply not form contracts with medical institutions who do not employ EMRs. Another respondent has also mentioned that eHealth usage is promoted by insurance companies through the form of incentives. Moreover, laws and regulations do not just impact the adoption of EMRs, but also influence the way they are built. Technology developer 2 stated that EMRs are built with certain regulations in mind: *"EMRs are first and foremost built to support the care provider in the context of the WGBO [Medical Treatment Agreement Act]."* Once again, there's a reference being made to the WGBO as a key regulation that care providers must abide by.

To summarize, we can conclude that regulations and indirect pressure from insurance companies have resulted in a 'forceful' adoption of EMRs in the healthcare industry. However, this is only one side of the story; the respondents also remarked that the laws and regulations can have a detrimental impact on both the usage of EMRs as well as the adoption of newer functionalities. We will cover this in the following section.

4.2.1 The effect of regulations on daily processes

A number of respondents mentioned that certain regulations have a negative impact on the daily processes. These include the day-to-day activities of treating and helping patients. The laws are often described as being inflexible and outdated. Respondent 8, a GP in Amsterdam, remarked that communication with patients was easier before GDPR was implemented: *"It's just that you have to be aware that things have to be organized well. So, before the arrival of GDPR, it was*

easier to communicate with patients." It seems that the introduction of the GDPR has made communication with patients safer while also increasing the difficulty in doing so.

Aside from changes to the communication itself, checks to ensure that the communication is compliant also take up extra time, as mentioned by respondent 14: *"With the privacy law, with the GDPR, there are a lot of regulations linked to the usage of an EMR and the access to an EMR. […] This sometimes makes it complex. A lot of these rules existed before, but in the past, we had a nice physical thing, a patient file made out of paper, where you knew exactly where it went to and this is maybe harder in a digital age. The sharing and gaining access has become much easier. You can check that, but that costs more time."* It seems that the regulations and laws have had a more difficult time adapting to the digital age. The same respondent also mentioned how authentication can sometimes stand in the way during emergency situations. Similar to how the GDPR has made communication safer, regulations have also made the authentication process stricter. However, this means that during acute situations, care providers need more time to access the systems.

Technology developers are also familiar with the issues stated in this chapter through their communication with the care providers. Technology developer 3 stated the following: *"Aside from the added burden of explicitly asking for permission from the patient to share information, you also have certain laws that stand in the way of daily activities. At least, the care providers seem to think this way."* The technology developer here adds the need of explicit permission as another burden to the work of care provider. The laws and regulations have made communication, authentication and information sharing stricter. This was done to better ensure the privacy and safety of the patient's data. However, based on the statements from the respondents, the effects have also had a negative impact on the daily processes. The interviewees have noted that laws and regulations sometimes stand in the way of daily activities. The impact of laws and regulation is not just limited to the daily activities. In the next chapter, we will discuss the effects on the innovation processes.

4.2.2 The effect of regulations on innovation

Technological innovation plays a part in the process of adopting technologies. Whereas the EMRs themselves are (practically) made mandatory by laws and regulations, hospitals and other medical institutions are still in charge of the functionalities they attach to patient portals

and other forms of eHealth. The data that is collected, stored, and exchanged through these pieces of software is highly sensitive; therefore, additional precautions must be taken to safeguard the data in an optimal way. These security precautions take time to implement and use; they therefore slow down the innovation process. Respondent 13, an IT professional, made the following statement: *"Looking at it from my role as project lead, it causes things to slow down, which sounds silly. There are a couple things. We innovate and you see that the regulation is always lagging."* The regulations seem to be constantly one step behind the innovations. Before new functionalities are introduced to patients, they must go through various quality and privacy checks to ensure the safety of the medical data that is handled through these applications. Respondent 18, an ICT consultant, noted: *"If you want to implement certain functionalities, then it has to get passed through various departments, privacy, quality, patient safety, those are all laws you have to test".* Based on this statement, we can conclude that these quality and privacy checks can take up substantial periods of time before a new functionality or application is finally approved. The same respondent went on to say that complex apps involving larger quantities of sensitive data require more intensive privacy checks. Thus, while every newly released application or functionality goes through the same quality and privacy checks, bigger and more complex projects take up significantly more time. They then subsequently concluded the following: *"Right, so how these things influence the adoption of the technology? In a negative sense. But you can't avoid it because there's also the rule of law which you have to abide by […] And perhaps you should look at the root cause, which is the rule of law, to formulate it in a way so that certain obstacles are removed."* The respondent implies that the laws and regulations have a negative effect on the adoption of new technology, but that it simply cannot be avoided.

To conclude, while the rule of law helped to spread the adoption of EMRs as a technology, innovation is actually hampered because of the strict privacy and security requirements. The regulations also have a noticeable impact on the daily activities. Employees of medical institutions across all disciplines (IT professionals as well as medical experts) have complained about the rule of either slowing down certain processes (like authentication) or making certain communication more difficult. In the following chapter, we will examine how actors in the healthcare setting try to overcome these issues and obstacles.

4.2.3 Overcoming the issues related to regulative legitimacy

Because medical institutions have no direct influence on the creation of new laws, overcoming issues related to regulative legitimacy is naturally more difficult, especially since interpretation of the laws can differ. Respondent 14, a senior staff member, mentioned the time it takes hospitals to adopt a uniform approach to deal with certain regulations: *"Especially with new laws there's always a difference in interpretation, so, the more generic way of handling, so every hospital doing it the same way is something that develops over years."* Hospitals often work together when it comes to developing treatment for certain diseases. However, establishing best practices related to the rule of law seems to be a more difficult task. A possible explanation for this problem is given by technology developer 3 who comments on the lack of knowledge regarding laws and regulations: *"There's a lack of knowledge when it comes to the rule of law in healthcare."* Respondent 18 mentions how the implementation of the regulation takes up resources: *"To also implement the regulations for example […] you also have to have resources for this like lawyers, people who know the law well."* It could be that the lack of knowledge regarding the rule of law stems from minimal resources being dedicated to hiring legal experts who could help with the interpretation of laws and regulations. However, changes in the law are possible when the situation requires this. During the current COVID-19 pandemic, the pressure on the healthcare system was larger than usual. This caused the government to temporarily suspend specific paragraphs of healthcare acts to promote more rapid and efficient decision making. Respondent 3, a board member, mentioned the following: *"If you use an information system to exchange information about the patient, you will need permission from the patient, and this is a hindrance in these times of a pandemic. So, right now there has been a measure being implemented from the Ministry of Health, Welfare and Sport that allows for article 15a paragraph 1 to be bypassed by care providers."* The pandemic has shown that during difficult times, the law and policy makers can be flexible. This means there's the ability to suspend certain regulations should the situation call for it.

The same respondents called for re-defining certain regulations, similar to respondent 18: *"But the best thing would be if we look at the exchange of information and to carefully examine what laws are exist from the analog era and what laws derived from the digital age where digitalization is becoming more apparent. Because there are laws which sort of contradict each other."* Similar to a statement made previously by respondent 14, we can see that more interviewees share the opinion of certain laws and regulation being outdated and possibly in need of changing. These proposed changes in the law can be made known through lobbying.

The literature has shown us that these effects can be quite beneficial when trying to achieve change (Bunduchi, 2016). An example of lobbying being performed by actors in the healthcare is given by respondent 5: *"So, we're also involved with law making where we give advice and consultation."* However, it should be noted that this practice is not usually done by individual institutions themselves, but rather through larger umbrella organizations or interest groups.

To conclude, laws and regulations can be hard to change once they have been implemented. Since regulations have sometimes shown to be abstract or vague when they are newly introduced, it can be useful for hospitals (and other medical institutions) to coordinate best practices. By sharing knowledge with each other and working together, it will become easier to conform to the rule of law which in turn increases the regulative legitimacy. Consequently, the risk of getting fined or punished by regulative bodies will also be lower as it will be easier to be fully compliant. The Barbie case was mentioned by five different respondents as an example of how it is vital to abide by existing laws and regulations (NOS, 2018). Aside from cooperation between medical institutions, lobbying is another way in which healthcare actors can overcome regulative legitimacy issues. Changes in the laws could positively influence the regulative legitimacy as it allows medical institutions to better adhere to newly formed regulative frameworks. These changes can be implemented through advice and consultation with policy makers. Lobbying as a legitimation strategy is often performed by umbrella organizations or other interest groups. In the next chapter, we will discuss how patients perceive EMRs and eHealth.

4.3 Patient perceptions of EMRs & eHealth

The second pillar of legitimacy is cognitive legitimacy. This pillar revolves around the way the technology is perceived by the wider public. In the case of EMRs and eHealth, we have focused on the perception of patients. We have identified 26 codes related to this theme.

4.3.1 Wide acceptance from patients

Nine respondents specifically remarked that the majority of patients have accepted the use EMRs and are fine with medical institutions using their data in order to provide the best possible care. Based on the responses from the interviewees, it seems that the majority of patients understand the implications of not sharing data. In the interview with respondents 2 and 3, respondent 2 remarked the following: *"Well, let me put it carefully, 14,5 million have given*

permission for others to exchange medical data about them. So, at least one care provider, be it a pharmacy or a GP, but a majority of the Netherlands has given permission. So, it's not like there's a wide objection or fear towards sharing medical information." Going by the numbers given by the respondent, most of the population has given consent to share data with one or more care providers. The same respondent believed that trust is a key factor in reaching this high adoption of data-sharing: *"I hold the belief that this sector is in some ways already associated with safety and reliability, because they are very careful with your personal information. So, that means there is already a form of acceptance."* This statement seems to imply that trust plays a big role in getting people share their data. Another figure is provided by respondent 5: *"Then we have numbers saying 70% and some even 90%, that patients agree with the idea of their information being exchanged for the purpose of providing them care."* Going by these statements, patients seem to realize that information sharing is a necessary procedure in order to receive optimal care. It does appear that a significant minority does not share this opinion, as between 10% and 30% reject the notion of sharing data depending on what estimate is provided. None of the respondents provided sources for their exact numbers, but they all seem to agree that a high percentage of Dutch healthcare users agree to data sharing. To make accurate statements regarding the actual numbers, database research and quantitative research would be needed.

Other respondents remarked that patients' acceptance of information sharing is to be expected, citing everyday life involving smartphones, applications, and other web services as an example of similar technologies that are already in use with patients. Respondent 8, a GP, states: *"Patients have been ready for this technology for a very long time, I think. I think it's mostly the systems we use in healthcare that are outdated. But if you look at how people function in their daily lives and how many things they do online, then it's pretty weird how they can't have the same understanding with their doctor."* The respondent seems to imply that everyday internet usage does not differ much from using eHealth related application.

To conclude, it seems that the respondents are in agreement regarding the high acceptance of data sharing by patients. While exact sources were not provided during the interview itself, estimates from the respondents seem to indicate that between 70% and 90% of the patients have agreed to sharing their data.

4.3.2 Healthcare technology as a familiar concept

According to multiple respondents, patients experience healthcare technology used in healthcare as a 'familiar concept'. Respondents refer to the fact that the use of computers is normalized within the minds of the patients. Respondent 5 made the following statement: *"I think that patients find it very normal that everywhere, including in healthcare, computers are used. So, you have a doctor taking notes and he's saving these in his computer, that's very logical."* Respondent 6, a GP, also mentions how the use of computers is very familiar to patients: *"So, for them it's not much different from before I think, and even more convenient because a computer is a computer. They don't see the difference and diversification of all those systems, and that there's no link, a large part doesn't even know that."* However, it is notable that patients do not realize there is more involved than just the computer of the doctors. This could explain some of the misconceptions patients have regarding EMRs. Two respondents have stated that patients seem to believe that their medical data is accessible by every care provider in the country. This means that care providers have to spend more time explaining how these systems work. This familiarity also extends to the usage of eHealth related applications. Respondent 8, a GP, stated that their clinic could easily introducing technology, because the concept behind EMRs and eHealth is already known to patients: *"I feel like you don't have to do much, it mostly happens naturally. In the beginning we had to spend a bit more time introducing it of course, but now it's just the standard."* This comment is similar to the statement provided by the same respondent in the previous chapter regarding the wide acceptance from patients. They argued that since their everyday life involves the usage of smartphones and the internet, patients will quickly adopt to using eHealth related applications.

To conclude, the respondents have noted that EMRs and the technology surrounding them are familiar concepts to patients. While they do not necessarily understand the details of these information systems, they do realize that computers and other IT systems serve an important role in healthcare.

4.3.3 Lack of knowledge about EMRs

The majority of patients has agreed to sharing their data and has no objections towards the usage of EMRs and similar technologies. However, patients seem unaware how this technology is used. Although the previous section showed that the use of computers is normalized in patients' minds, the concept of an EMR can still be unfamiliar to them. When asked about patients'

perceptions of EMRs, respondent 11, a pharmacist, remarked the following: *"To be honest, I think my patients aren't really aware of that. So, they know that we give them their medication and that's it. It's not like we document everything, just the important things of course. But I haven't experienced somebody asking me whether they can get a copy of the information we have about them."* This principle also seems to be related to information sharing as respondent 6 noted that patients are very 'easy-going' in that regard: *"Patients in general are ignorant plus they're almost easygoing if you will, it's not the right word maybe, but very easy. In terms of safeguarding medical data, they very easily share information."* This 'easygoingness' could relate back to a statement from respondent 2 who mentions in chapter 4.3.1 that the field of healthcare is often associated with 'trust'.

Respondent 14, a senior staff member, noted how patients have expectations regarding the information an EMR contains: *"I think that people are indifferent towards it in the sense that they expect the doctor to have all the information readily available when you visit him or her. And the EMR supports this."* Patients seem to hold the belief that all the information systems in healthcare are interconnected even though this is not the case. Three respondents have stated how the lack of connectivity between healthcare systems causes many issues in the communication of patient data which can lead to patients becoming frustrated as they have to re-tell their story multiple times. This development also has to do with the increasing need and demand for strong security requirements (initiated through the government and the patients).

To summarize, while patients have grown accustomed to the usage of ICT in healthcare, there are many details they do not understand. This can lead to misconceptions and frustration. The lack of connectivity between healthcare systems is a problem which is also experienced by the staff of medical institutions. The databases of medical institutions containing the medical data of the patients are set up like silos. This is a direct consequence of the failure to implement a nation-wide EMR. Now, in order to communicate medical data, care providers need the permission from the patients to share any data. In practice, this often leads to frustration among patients and medical staff.

4.3.4 The struggle of elderly patients

Although almost everyone has had to visit a hospital at some point in their lifetimes, elderly individuals are often overrepresented in hospitals and in healthcare in general. These older generations grew up prior to the digital age and the arrival of smartphones, internet, and eHealth

(McGaughey, Zeltmann, & McMurtrey, 2013). This can make it difficult for them to keep up with their younger peers when it comes to technology. As such, the elderly is usually the patient group that struggles the most with using eHealth related applications. This group, along with other socially vulnerable groups such as people with a low language proficiency, are more likely to build up an information disadvantage. Respondent 14 stated: *"Yes, but it's something you always have to take into account, that there'll be a group, be it elderly or other people who aren't tech savvy, who because of these technical limitations can build up a disadvantage when it comes to information."* Three other respondents also noted how older patients often struggle to understand and use eHealth related technologies.

4.3.5 Ways to positively influence the perception

Medical institutions and the relevant stakeholders employ many measures in order to positively influence patients' perceptions of EMRs and promote the usage of eHealth within their respective organizations. During this study, two overarching concepts were found related to this aspect with 20 codes being attributed to influencing the perception of patients.

Importance of dialogue

One of the key elements in changing the perception of patients towards EMRs and eHealth is engaging in a dialogue with the patients. Several respondents stated that informing the patient, being transparent, and using clear communication are effective ways to remove doubts about privacy concerns, clear up misunderstandings regarding data usage, or promote the usage of eHealth related applications. Based on the interview data, it seems that the care providers have an important role in the communication with their patients. Respondent 1, a policy officer, noted: *"…the best way of communicating to the patient is through individual hospitals. And the way this can be done is by providing clear information about their rights, about the use of information, and where they can go for help if they feel something is wrong. Be transparent is something we like to advice."* Respondents 2 added the following statement: *"And your care provider who you trust is the one who has this information. So, an important link in the communication with the patient is the care provider."* Going by this statement, the care providers have an important role in the diffusion of technology, because they are often the main point of contact for patients. Respondent 4, a senior advisor, provided a similar statement: *"What you see is that the most effective way is the communication via the care provider. So, it works best when a care provider advises the patient in doing something."* Thus, patients listen

to advice regarding eHealth coming from care providers, and this is not limited to direct health concerns only. Respondent 14 expressed the following: *"A lot of it has to do with communication, explaining, giving people space to express their concerns and to address these seriously. Trying to fulfill the needs and wishes of the users and the patients as much as possible."* Here, the importance of communication with patients is once again highlighted.

Tools to increase eHealth usage

Aside from dialogue, other tools are also available to increase the usage of eHealth. Based on the interviews in this study, we compiled a list of techniques and methods that are employed by medical institutions to positively influence the perception of patients towards EMRs. For instance, smaller clinics commonly use visual advertisements in the form of posters and flyers. Respondent 9, a pharmacist, said: *"We have posters, we have small business cards, because of corona we make a lot of deliveries and if someone isn't at home, I made a folder saying they missed a delivery and on the backside there's a bit of advertisement for the app. […] We have a TV screen with an advertisement on it."* Visual advertisements (posters and TV screens) in combination with business cards are used to highlight the benefits of the application and the other eHealth services which are provided.

Another way to increase the usage of eHealth is by actively including the patients in the decision making through a customer co-creation. Respondent 14 mentioned patient focus groups as a way to accomplish this: *"Yes. For example, we have a group of patients for the patient portals who help decide over that, regarding what you will or won't do in the patient portals."* Allowing patients to have a say in the decisions that are made will increase their sense of ownership, thus contributing to the overall usage of eHealth. Respondent 18 mentioned a similar tactic, namely the use of step-by-step learning to teach patients to use eHealth applications: *"With video consult for example, you try to find obstacles people experience, so then you try to help them or set something up without an actual video consult happening, and then you go through all the steps which helps with trusting the service. And based on that, they have a success story which makes it more likely that they'll use a certain eHealth service. And informing obviously which is also very important, highlighting the value of an eHealth service."* Allowing patients to get familiar with the technology will help them build up a sense of familiarity and know-how, which can normalize the use of the technology.

Customer co-creation is not only used by medical institutions, but also by technology developers. They use this technique to create products that better fit the needs and wants of their end-users which are mainly medical experts. An example was given by technology developer 1: *"Patients are definitely important stakeholders as they are the primary focus in all the processes in the healthcare world. With every iteration and innovation concerning EMRs, the patient's involvement and usage of the system is taken into account as well as information updates. Our end users, who are mostly doctors and nurses, are very close to the patient so they are able to tell us very accurately what the needs are of this particular stakeholder group."* Technology developer 3 added: *"The patient expresses input to the developers of the portals, the focus groups, the UX-experts, peer supporters, patient focus groups stemming from the medical institutions themselves. These are the parties where the development teams remain in close and frequent contact with."* However, this practice is not standard for all technology developers. Technology developer 2 stated: "*Patients are naturally very important stakeholders, but they are rarely if ever involved in the development phase. EMRs are first and foremost built to support the care provider in the context of the WGBO [Medical Treatment Agreement). The patient is in this situation the 'customer behind the customer'. This doesn't mean they're not important in the wider context, but in the same way a seller of building materials for contractors knows that the contractor builds structures for different people without directly knowing who these people are, and what their needs are, a developer of EMR works according to the same principles. We know what interests are at stake with the care providers. We are also aware of the rights of the patients, but the actual way in which the care providers deal with the EMR in relation to the patient is not up to us."* However, it does appear that the interests and rights of patients are considered, even without direct input from patients.

Based on the responses from the interviewees, a large part of the population has accepted and given permission for care providers to share their medical data. Many patients are also familiar with the usage of ICT in healthcare settings, although the finer details are mostly lost on them which can lead to misconceptions and misunderstandings. We have also seen how the elderly and other groups (those with low language proficiency) struggle with the usage of eHealth related technologies. To combat these issues, healthcare institutions focus a lot on engaging in a dialogue with their patients as evidenced by the interview data. Care providers have been identified as a key factor in diffusing the technology by the respondents. Aside from communication-based solutions, we have seen how hospitals try to appeal to patients directly. Examples of this technique are patient focus groups or step-by-step learning. Through these

processes, the patients become more accustomed to the usage of eHealth and increase their comprehensibility of the technology. These effects serve to improve the cognitive legitimacy of the technology which can ultimately lead to developing a sense of 'taken-for-grantedness'. In the next chapter, we will examine the perceived benefits of EMRs and eHealth.

4.4 The perceived benefits of EMRs & eHealth

The third pillar of legitimacy is pragmatic legitimacy. With regards to this pillar, we researched whether patients are aware of and recognize the benefits of EMRs and eHealth. During the interviews, we asked respondents whether patients acknowledge the benefits of EMRs, and the related eHealth applications offered to them. Six codes were linked to this theme.

4.4.1 The positive aspects of EMRs

The transcriptions reveal that a majority of patients recognize the benefits of EMRs and eHealth. This may be tied to the wide acceptance of EMRs and eHealth from patients, as discussed above. Patients by and large recognize the benefits of the patient portals and the eHealth applications offered to them. These benefits are quite diverse in nature. Examples of benefits cited by the respondents range from the ability to look up past medical data, accessing their medical file, requesting refills, engaging in e-consults with their care providers, viewing test results and many other benefits. For instance, respondent 14, a senior staff member, remarked the following: *"I think the majority of the patients recognize the benefits. Especially the people who actually use the patient portal, who register for it. They always ask for more, like I said, they always ask for more functionalities, for more data in those patient portals. So, in general, I think people definitely recognize it and that even, people sometimes need to be slowed down."* An interesting point which is brought forward here is the explicit mention of active usage of EMRs and eHealth applications as (close to) being a prerequisite to recognizing the benefits of these technologies. Respondent 1, a policy officer, provides a similar statement: *"Every hospital in the Netherlands uses an EMR so every patient is able to access their medical files […] I think the people who use it certainly recognize the benefits."* Another respondent made a similar remark, referencing the use of an application within their respective organization that allowed patients to have greater control over their care. Respondent 9, a pharmacist, commented: *"But I think the people who do have it, who use it, they do get the benefits out of it, because you have control over your own medical file, power in your own hands basically instead of being reliant on the pharmacy […] so it does have its benefits, absolutely."* As with

the previous statements, an important emphasis seems to be placed on the active usage of eHealth.

Technologies usually need some time before they are accepted by users, the same seems to apply to eHealth as well. Respondent 18, an ICT consultant, mentions that every eHealth application follows a certain curve with regards to acceptance: *"What you see is that in the beginning there's always a bit of resistance, so that's a certain curve which you can plot with any eHealth service. In the beginning a bit of resistance and eventually people recognize that it can help."* This seems to imply that there are rarely eHealth applications that are met with immediate positive feedback when they become available to the public. It should be noted, however, that this statement was not put forward by any other of the respondents. In fact, respondent 13, an IT professional, mentioned that any eHealth application undergoes a pilot first where the effectiveness has to be proven before it is released to the wider public: *"So, the tests are proving that people find it easier, however, you have to make sure that you don't generalize the patients and the person. A large part will, and those are the people we do it for, so if a pilot proves to be successful then we do it."* It could be the case that this practice is not shared by every medical institution.

The interviewees make it clear that the patients recognize the benefits of EMRs and eHealth related technologies. However, they also state that the recognition of the benefits usually follows after using these technologies. This seems to imply that pragmatic legitimacy is built after patients have had time to experiment with the technology.

4.4.2 Social aspects

Social aspects form an important consideration when rolling out new eHealth related applications. Although the benefits of a self-measurement device may seem obvious (e.g., no travel time, more autonomy, 24/7 monitoring), the lack of contact with a doctor or another care provider may cause patients to reject the technology in favour of physically going to the hospital. Respondent 13 mentioned the following: *"We also had, that with a pilot, heart revalidation, then we let people do heart revalidation at home, and there were meters put on them, which allowed us to look at the values so that they didn't have to go to the hospital, and then we don't have to call anymore. But patients found this annoying because they were used to the contact with the doctor with a white coat so to speak, and they said they preferred that*

over numbers going up and down because they also wanted to tell the doctor how they felt. So, the personal aspect of an eHealth service versus a meeting with the doctor, you have to take that into account." Respondent 18 also mentioned how the application of eHealth technologies may differ depending on the illnesses of the patient. Though, the emphasis here was placed on practical matters (e.g., video calling is less suited for disciplines like dermatology than psychiatry), social aspects could also be an important pre-condition.

4.4.3 Increasing the recognition of benefits

The strategies to help patients recognize the benefits of certain eHealth applications are similar to the strategies to influence their perception in general. By engaging in discussions, listening to the needs of patients, and making proper adjustments, patients' recognition of benefits can be achieved. Respondent 18 noted that it can be difficult to get people to focus exclusively on the benefits of an application, as downsides are usually amplified in the minds of patients: *"Yes, the point however is that a disadvantage carries more weight than an advantage. A big advantage can disappear if there's a minor disadvantage. So, people are more likely to remember the negative things even though there are many positive things. So, that's something you have to carry with you, the human factor."* This so-called horn effect or reversed-halo effect can be mitigated by amplifying the positive effects a functionality or application can have on the situation of a patient. Respondent 6, a GP, mentioned how GPs showcase the positive aspects of eHealth to help them reach eHealth user targets set by the insurers: *"The healthcare insurer sets up a sort of minimum so 1 in 3 patients has to be connected to that digital portal, otherwise you don't get any money. So, what I notice from GPs is that they think: "Oh well, I'm past the limit so it's fine now". Before they reach this minimum number, they do try to mobilize people by showing them how to request e-consultation, how to see their test results, blood work, skimming over your medical file from a certain date. So, then the positive aspects are highlighted."* This suggests that GPs neglect further mobilization after the minimum number of users is reached although this could not be confirmed. It remains unclear whether hospitals or other medical institutions follow the same practice as stated here.

Summed up, in almost all cases, eHealth provides the patient a form of autonomy through which they can complete certain (medical) tasks without being dependent on their care provider. It allows patients to measure certain values and then communicate this information to their doctor without having to be physically present in the hospital or elsewhere. eHealth allows patients to

monitor their own health through various smart devices without having a medical expert nearby. This means that patients have become better equipped to deal with their own health situations. Technology developer 3 specifically mentions how the introduction of eHealth technologies has increased the self-reliance of patients. The respondents note that many patients recognize the benefits of eHealth, although this recognition is more prevalent in those patients who actively use eHealth. It seems that some benefits only become clear once patients have built up some experience with eHealth. Healthcare providers communicate these benefits through several ways. The most common one is showcasing the benefits of eHealth. Pragmatic legitimacy is therefore gradually built up by highlighting the specific benefits of the technology which motivates the patients to use eHealth. Then, after using the technologies and experiencing the benefits themselves, patients come to fully recognize the benefits and pragmatic legitimacy is acquired. In the next chapter, we will examine the ethical considerations of EMRs and eHealth.

4.5 The ethical considerations of EMRs & eHealth

The final pillar of legitimacy is normative legitimacy. This pillar deals with the norms and values of the society in which the technology is used. During the interviews, we asked the respondents whether patients experienced any ethical dilemmas with regards to data sharing. A total of 11 codes were found linked to this theme.

4.5.1 Privacy-related patient views

In our study, respondents indicated the importance of privacy to patients. Respondent 10, an IT manager, mentions the following: *"We hear the one about privacy a lot, so people who are just very concerned with the information that is stored about them. But again, it's not mandatory so people have a choice in this. It's not a requirement. So, you can definitely have cases like these and of course, we always try our best to better educate people about what we do."* The statement implies that privacy related concerns are often noticeable, but that hospitals try to address them at the same time too.

However, in other cases, it seems that while a majority of patients view privacy as a crucial aspect, only a small group of patients refuses to let their data be shared by care providers. Respondent 2 commented: *"There are patients who value their privacy so much that they won't give permission (to share data). However, a majority does. They value good health care and*

believe that the privacy aspect is taken care of." This statement relates back to a comment given by the same respondent in chapter 4.3.1, where even though the majority of patients have consented to data sharing, a significant minority has not. It could be that the patients who are referred in that quote are the same group as the ones being talked about here. Respondent 6, a GP, provides a similar statement implying that not only hospitals, but also GP clinics deal with patients who are very strict on their privacy.

A possible explanation for these privacy concerns is shared by respondent 18. They mention that patients are especially concerned about data leaks to third parties that might take advantage of their medical history, such as mortgage suppliers: *"People don't want their data to get leaked, it's pretty sensitive after all. And even organizations, that for example provide mortgages, I believe you can't use it, I believe it says in the law that you can't use certain data in an assessment like with a mortgage, but even then, people are biased if they have certain data of you. So, people are pretty wary of this which is the main reason."* These fears also extend to other organizations, such as the governmental employee insurance agency UWV. In that case, patients' fears do not relate to the storage of medical information, but to sharing it through the LSP. Respondent 11, a pharmacist, remarked the following: *"With regards to information being saved, they have no objection because like I said, they don't know about it. But they do have fears when it comes to giving permission for the LSP. You have a lot of people who in the first place give permission, but later on, retract it because they're worried that certain information could be sent to organizations like the UWV."* This means that the patients are less concerned with their data being misused by healthcare professionals; instead, they are worried about their data being misused to potentially impact their financial situation.

Respondent 8, a GP, had a different experience with regards to privacy concerns from patients. They stated that their patients have little concern for their own privacy: *"But in general, people aren't that strict when it comes to their privacy. I sometimes have to remind my patients that it's better to be safe with certain things. I have a feeling that most people would even be fine with sending information over through email. But obviously, this isn't preferable so that's why we have our own secure channels."* Patients may be more willing to share information once a trusting relationship with their healthcare provider is built up. However, to reach this point, effort is needed in convincing them that data sharing is safe and necessary for optimal care.

To summarize, patients can experience serious privacy concerns related to their medical data as some might even go so far as to not share their data. Patients are scared that their medical data is accessed by people who have no relevance to their treatment or that their information might be used against them by third-party organizations. However, as explained by the respondents, this group is a minority and not represented everywhere as evidenced by the statement of respondent 8.

4.5.2 Information paradox

An interesting phenomenon that was uncovered during the interviews is a paradox with regards to the availability of information, which we will refer to from here on as the 'information paradox'. A few respondents pointed out that privacy is a bigger and more important issue to patients when they are healthy than when they find themselves in an urgent medical situation. Respondent 1 mentioned a group of patients who are naturally suspicious, but change their outlook depending on the state of their health: *"Then you have a group who is suspicious of this technology and refuses to work with it. These people also have to option to limit the exchange of information about themselves and then, most people are naturally concerned about their privacy except when they're ill. When they're ill, they never have any qualms about privacy."* Respondent 4 pointed out that it is difficult for care providers to gain permission for information sharing when they must do so prior to the development of a potential bad scenario. This is because patients worry about their data so long as they are in good health: *"When you find yourself in a critical and acute situation, and you ask the same question, then it's obvious many people will say 'yes' because they want the doctor they're going to, to be aware of their situation. But the moment you ask that question in anticipation of a possible situation, then patients start worrying about what will happen with the data."* Respondent 14 provided a similar statement to the two statements above: *"So, it's a bit double, on one hand they expect all sorts of information to be available and on the other hand, they are very suspicious of the situation. Depending on the situation you're in."* It seems that patients worry about the usage of their data unless their situation becomes (medically) critical. Respondent 3 mentioned that the availability of information during emergencies is widely seen as important: *"I think the availability of relevant medical information in case of emergency, to provide the right type of care, is unquestioned and everyone thinks that's important."* This also implies that patients value the availability of information and not just the care providers.

Thus, based on the available interview data, it seems that privacy and the security of data is indeed important for patients. However, their current physical well-being seems to be an important factor in patient concerns about the security of their information. Patients are generally more careful with their medical data when they are healthy than when they find themselves in an urgent medical situation. Figure 7 showcases how these two variables may correlate to each other.

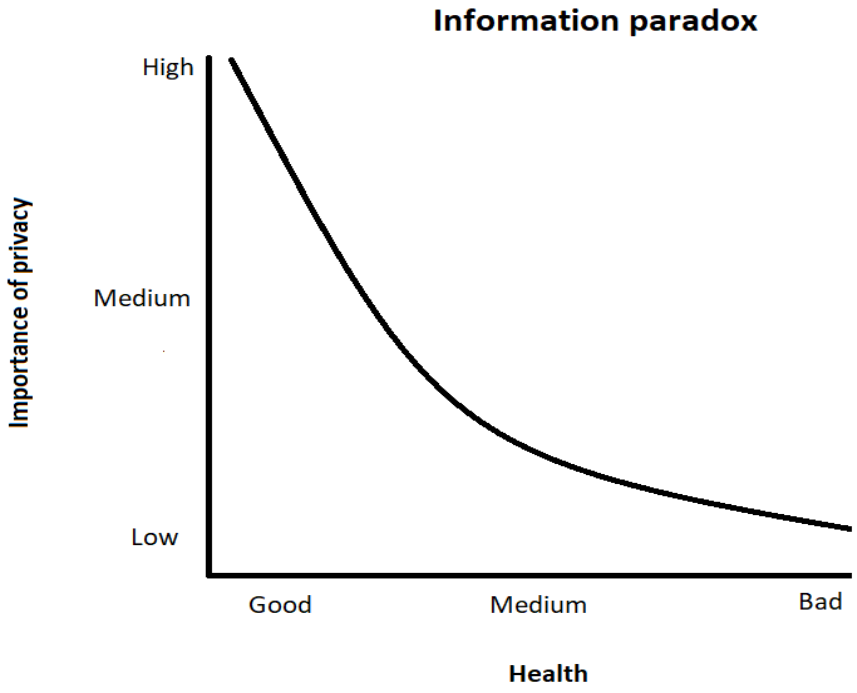

Figure 10: Information paradox

4.5.3 Normalizing data sharing

Privacy is becoming increasingly important and with more data being created every day, patients will undoubtedly place stricter conditions on the way their medical data is handled. Such developments are already noticeable in the healthcare sector. Respondent 14 noticed an increased privacy awareness among patients: *"I think a lot of people are only partly aware of how much information gets stored of the information they release. I do think that's changing. In the last two years we see more people who are fine with information going to the hospital, but not to quality registers. So, that's a development that I'm seeing."* Therefore, in order to make sure that the patients feel safe when sharing data, healthcare providers must be in full compliance with the existing privacy laws. In this sense, normative legitimacy is closely tied to regulative legitimacy, because abiding by the laws and regulations can be seen as the 'right

thing to do'. Communication with not only the patients, but also the outside world, must be transparent and honest to reach the desired effect.

4.6 Summary of results

Table 4 (see Appendix F: Overview of technology legitimation strategies) shows an overview of the various forms of technology legitimation employed by healthcare actors, as discussed in the previous sections. Based on the results, it can be concluded that the involved parties placed the greatest emphasis on improving the cognitive legitimacy. In total, roughly 20 codes were found to be related to changing the perception of the patients. Although 5 codes were also present in the other pillars (these were mainly related to communication with the patients), the difference was still notable. With respect to the security paradox, we can see that healthcare actors try to circumvent low eHealth usage through various methods. An example would be introducing different forms of authentication. This ensures that the privacy standards and the patients' need for strong security requirements are met while also maintaining an easy level of accessibility to the eHealth applications. Different strategies rely more on the patients to take the initiative. An example would be information desks where patients can reach out for help should they have difficulties logging in. More indirect methods include highlighting the positive aspects of EMRs and eHealth. By presenting the benefits of eHealth related applications, healthcare actors seek to offset the negative experiences a patient may have with DigiD or other forms of two-factor authentication. These spill-over effects were also noticeable in other areas of legitimation. We have seen a possible relation between legitimation strategies related to regulative and normative legitimacy. Compliance with the rule of law is important to build regulative legitimacy as this prevents legal punishment from regulative bodies. However, we have also seen that compliance with regulations also positively impacts the normative legitimacy. Doing what is considered *right* is directly tied to the norms and values of a society. Therefore, patients may expect that medical institutions do not break any laws as this is seen as the morally correct thing to do. We have seen similar spill-over effects with pragmatic and cognitive legitimacy as well. Engaging in a dialogue with the patients is used to provide more insight in the workings of eHealth, therefore promoting cognitive legitimacy. However, the same methods are also used to communicate the benefits of eHealth resulting in the increase of pragmatic legitimacy. The next chapter will dive deeper in the conclusions of the study.

5. CONCLUSION

This chapter contains the conclusion of this study based on the most important findings.

Main findings

During this study, we investigated how technology legitimation is used by various actors in the healthcare sector to legitimize EMRs. Our main research question was: *"How do healthcare actors legitimize the value of platform technologies like EMRs for their end users?"*. Based on the interview data, we conclude that medical institutions and other relevant organizations spend a considerable amount of time and effort on technology legitimation. Moreover, we uncovered various legitimacy issues when analyzing the data from the interviews.

Firstly, with regards to regulative legitimacy, we showed that lagging and outdated regulations can have an impact on the daily processes and innovation phase of medical institutions. Regulations sometimes lack flexibility, which hampers medical experts in their daily work. Respondents pointed out issues with regards to authentication and having to gain explicit permission from the patient before they can share necessary data. Many patients do not understand the workings behind these regulations, which puts the burden on care providers to explain why certain actions are performed. In terms of innovation, respondents noted that due to the quality and privacy checks they must perform, introducing new functionalities or applications can take a few years. Tackling these legitimacy issues seems to occur primarily through lobbying. As medical institutions have limited influence on the decisions made by lawmakers, this process is usually done through umbrella organizations that represent individual hospitals, GPs, and other medical institutions. Because newly introduced laws are often open for interpretation, hospitals attempt to coordinate uniform approaches to dealing with regulations. This is another way to uphold regulative legitimacy.

Moving on to the second pillar, cognitive legitimacy, we found that most patients have accepted the concept of information sharing in order to receive quality care. This indicates that the majority of patients has at least some knowledge of the concept of the technology and its usage. Patients understand the need for doctors and other medical experts to document information about their health issues. However, there were also many misconceptions and ignorance stemming from the patients related to EMRs. Although patients appear to be aware that there is

an information system working in the background, the details are mostly unknown to them. This may result in patients struggling to understand what EMRs and eHealth are about, what they are used for, or what these systems can mean for them. This may result in long-term harm because information disadvantages can build up in patient groups that are not digitally savvy or otherwise have means to devices with access to internet. An important emphasis seems to be placed on direct communication with patients. Care providers especially appear to have a crucial role in the diffusion of technology, because they are the main point of contact for many patients. Patients look up to their care providers to not only help them get better when they are ill, but also to guide them in the usage of patient portals and other eHealth applications. Aside from direct verbal communication, healthcare providers use various tools, namely visual advertisements, help desks, step-by-step learning, and patient focus groups to influence patient perceptions.

Pragmatic legitimacy is the third pillar of legitimacy. We asked respondents whether patients recognize the benefits of EMRs and eHealth. The participants stated that patients who are actively using these eHealth-related applications do recognize these benefits. Medical institutions use pilots to ensure that the products they put out are relevant to the patient's needs and wants. This ensures that the software is used in the intended way. We also found that the benefits of certain technologies are sometimes immediately visible, but they may be outweighed by aspects that could be characterized as a downside. Patients have rejected eHealth apps that provide medical monitoring in the comfort of their own homes, in favor of going to the hospital so they can see and speak with their doctors. The social aspect of medical care should therefore not be underestimated. Issues related to pragmatic legitimacy are tackled by making sure the needs and wants of patients are taken into account when new functionalities and products are released. By doing this, the benefits become immediately clear to patients, because they themselves have been involved in the innovation process. Another tactic is showcasing the positive aspects of eHealth. By communicating ways in which eHealth can help patients with their specific situation, the benefits are highlighted and become more easily identifiable.

The final pillar in our list is normative legitimacy. We asked the respondents whether any ethical considerations are related to EMRs. An important aspect for patients is their privacy. Some patients fear that their data might get leaked, and others are worried that organizations that provide their mortgage or their benefits might use information from their medical files against them. An interesting finding was that the importance of privacy seems to be directly

tied to patients' health status. Numerous respondents mentioned that in the case of a serious illness or emergency, patients are far less hesitant to share their medical data than when they find themselves in periods of good health. Patients appear to have difficulty anticipating potential negative future scenarios. Legitimation with regards to normative legitimacy seems to be closely related to legitimation related to regulative legitimacy. Patients have clear privacy concerns, and medical institutions try to tackle any issues by making sure they adhere to existing privacy laws. Aside from that, clear communication to the patients is very important in order to normalize data sharing as this removes possible fear, concerns over privacy and other misconceptions they might have. Patients are informed of their rights regarding data sharing and can always opt out of sharing data.

Combining the answers to the sub questions, we can conclude that there are various ways in which legitimation is put to use by stakeholders in the healthcare sector. Depending on the size and type of organization, legitimation techniques and strategies may differ. For example, hospitals seem to place a higher importance on regulative legitimacy, due to the impact of data leaks on the reputation of these organizations. Legitimation strategies can also differ depending on the resources an organization has access to. Respondents noted that the knowledge regarding the rule of law is lacking in healthcare, but acquiring legal experts is expensive, sometimes prohibitively so. Also, eHealth-related projects can take a long time to come to fruition. Projects with complicated functionalities may take years to complete. This makes it more difficult to implement new eHealth technologies or spend time trying to motivate patients to use them. Another factor relates to socioeconomic reasons. Patients in neighborhoods that rank lower in terms of wealth are more difficult to motivate compared to areas where people enjoy a higher standard of life. People from poorer areas often struggle to understand the workings and benefits of eHealth. These patients may not have the money to afford devices such as smartphones, tablets, and computers, which are needed to use these technologies. Medical institutions in poorer neighborhoods therefore must spend more time and effort in making people aware of the existence of these technologies, for instance using flyers, posters, business cards, TV advertisements, or even informational seminars. In wealthier neighborhoods, such measures are not required because eHealth is already known to the patients. Finally, we have also seen how healthcare actors try to deal with the security paradox by introducing different forms of authentication and through usage of information desks where patients can be redirected if they have issues or troubles accessing the patient portals.

6. DISCUSSION

This chapter contains the interpretation of the results, a newly developed theory and model based on the findings of the study, the implications of the results, the limitations of the study, the recommendations and finally, ideas for future research.

Interpreting the results

In this study, we investigated the use of technology legitimation by healthcare actors to determine how legitimacy issues caused by impeding security requirements are tackled. We performed 16 semi-structured interviews with 18 people working in a healthcare related setting. We have also gathered survey input from three technology developers specialized in software solutions related to EMRs. Our results show us that medical institutions and other relevant organizations employ many different legitimation strategies to deal with legitimacy issues. Strategies can differ based on the type of organization and the resources it has available. Examples of strategies include the use of lobbying to change the regulative framework and including patients in decision-making through patient focus groups. In this chapter, we will focus on interpreting these results. Firstly, we examined whether DigiD or other forms of two-factor authentication is perceived as a barrier to patients. An important starting point for this research were the results of several studies indicating that patients experience two-factor authentication as a hindrance (Versluis & al, 2020; Essen & al, 2018; Vergouw, 2020). This could have an important impact on the legitimacy of EMRs. The responses from the respondents largely supported this view. Out of the six people who commented on this, three confirmed that DigiD does form a barrier, two mentioned that they recognize the problem but believe it has since been solved, and one respondent neither confirmed nor denied that two-factor authentication is a problem for patients. However, it would be preferable if more research was done towards to this subject so that a definitive conclusion can be drawn.

Johnson, Dowd, & Ridgeway (2006) name four stages of technology legitimation, namely: innovation, local validation, diffusion, and general validation. Keeping these various stages in mind, we can deduce that EMRs find themselves in the ‘general validation’ phase. According to the interview data, practically all the medical institutions in the country have adopted EMRs as laws, partially as a result of pressure from insurers. Without EMRs in place, day-to-day activities in healthcare settings would become impossible, because the amount of data cannot be processed on paper. The resulting amount of paperwork would severely limit care providers’

time with their patients. Furthermore, EMRs are no longer a new technology, although it did take a long time for hospitals to fully adopt them. However, it is hard to say whether full 'taken-for-grantedness', as explained by Suchman (Suchman, 1995) has occurred. Taken-for-grantedness implies that the concept of EMRs becomes so accepted among patients that its existence is not questionable. This could mean that some might not agree with the solution, but it is still widely recognized as an unavoidable fact (Tang, 2017). Although the majority of patients are willing to share their data, privacy concerns continue to remain an important factor. This finding is in line with the existing literature, which highlights the importance of privacy and security for patients (Wilkowska & Ziefle, 2012). Nonetheless, the so-called information paradox that we identified partially contradicts the literature. We found that patients worry mostly about their data when they are in good health. When dealing with severe illnesses or urgent medical situations, privacy and security become much less of a priority.

The literature also shows us that elderly patients often struggle with the adoption of new technology (Vergouw, 2020). This finding matches the results from the interviews; multiple respondents stated that older people do indeed have a hard time adapting to new technology. However, one interesting finding could not be accounted for by the existing literature. Respondent 18 noted that elderly people between the ages of 60 and 75 use the patient portal more often than younger patients. Women also seem to be using the patient portal more frequently than men. Because this interview was the last one to be held and time was limited, this finding could not be cross-checked with the other respondents. The literature also does not provide any meaningful explanations for this phenomenon, aside from the fact that women use eHealth related applications more than men do (Torrent-Sellens & al, 2016). However, the survey data from this study dates from 2011 and it does not explain the greater usage of eHealth among elderly patients. Because the study involves the EU as a whole, the results may not be applicable to the Netherlands specifically. A whitepaper from Nictiz notes high patient portal usage among elderly, but the sample size is relatively small, and results show more active users among younger patient groups (Pluut, Peters, Sinnige, & Schreuder, 2017). We theorize that respondent 18's experience may be explained by the fact that the elderly is overrepresented in hospitals and other medical institutions. Therefore, the absolute number of eHealth users in this age group could be greater than the overall relative numbers. Nevertheless, the design of this study did not allow us to determine whether this finding was an outlier or representative for patients as a whole. A potential future study could use a quantitative survey to investigate this phenomenon.

Finally, with regards to the usage of technology legitimation, we found that a greater emphasis was placed on achieving cognitive legitimacy compared to the other pillars of legitimacy. Upon analyzing the interview data, we found 30 codes that were linked to technology legitimation strategies; roughly 20 codes related to influencing the perception of the patients. This makes sense for the position EMRs find themselves in the four stages of technology legitimation. As explained above, we theorize that EMRs are currently in the 'general validation' stage (Johnson, Dowd, & Ridgeway, 2006). The last step of the process before full institutionalization occurs is achieving a full embrace of the technology from the public—in this case the patients (Lawrence, Winn, & Jennings, 2001). This is when the so-called 'taken-for-grantedness' takes place (Suchman, 1995). The literature also shows that socioeconomic status could have an impact on eHealth usage (Versluis & al, 2020; Jacobs, Lou, Ownby, & Caballero, 2016). Although this was not a focus of our study, multiple respondents have stated that socioeconomic status does play a role in patients' use of eHealth.

New theory and model

Current research reveals that the theory of (technology) legitimation examines the changes in the state of legitimacy through a certain period of time (Hallstrom & Bostrom, 2010). However, information on how this process occurs is limited and mostly abstract as the literature review has pointed out. Building on the theory provided in the existing literature, we have managed to visually shape the process behind this phenomenon based on the identified concepts of the study (see Appendix D: Data structure). The model, which can be seen in Figure 12, describes how patients first form an initial perception or evaluation based on the four pillars of legitimacy (regulative, cognitive, pragmatic, and normative). This initial legitimacy judgment is derived from information about the technology (in this case EMRs) that is known or available to the user (i.e., patient). This initial legitimacy judgement forms a baseline value or starting point from which legitimacy can be tracked over time. During the technology legitimation phase, healthcare actors apply technology legitimation strategies to further legitimize the technology (a few examples of strategies are given). Here, the initial legitimacy evaluation gets altered as the legitimation strategies influence the way users think about the technology. Some of these strategies also have spill-over effects to other pillars. This means that these strategies help to improve the legitimacy in more areas than just the one they are intended for. An example would be upholding the privacy standards. This strategy is relevant for regulative legitimacy (compliance with regulations) as well as normative legitimacy (doing what is considered *right*). The research has not included the aspect of time; therefore, there are no clear guidelines for the

length of this process. The duration of the technology legitimation phase could depend on the type of legitimation strategies that are applied. For example, a social media campaign to market new functionalities of an EMR will most likely produce its desired results after the campaign ends. Other legitimation strategies such as having doctors and other medical experts continuously engage in dialogue with patients about the benefits of EMRs could last as long as the situation deems necessary. However, this does not mean that effects are not noticeable throughout the course of legitimation. Furthermore, there seem to be no restrictions with respect to the number of legitimation strategies an organization may apply. Larger, more powerful organizations have more resources available to them to introduce a higher number of legitimation strategies. However, this does not limit smaller organizations from attempting the same should the situation allow for it. Moreover, we could not establish a certain order in which legitimation strategies should be applied. This could indicate that different legitimation strategies can be used in conjunction with each other. The presence of spill-over effects in legitimation strategies does seem to indicate that using several legitimation strategies at the same time could have beneficial effects for increasing the legitimacy. Once the technology legitimation strategies reach their desired effect, a new formulation of legitimacy takes place. This means that the views of the users toward the technology have been positively impacted. The model is purposely shaped as an arrow with clear input and output to indicate that the concept of technology legitimation resembles a process. During this process, the initial legitimacy judgment forms the input for the process. The main activity consists of altering this legitimacy judgment through the involvement of technology legitimation strategies. The eventual output is the (increased) adoption of the technology after the legitimation phase has gone through all the necessary steps.

The arrow going back and forth between the four pillars and the legitimacy of EMRs, and eHealth symbolizes the arrival of new information shaping the outlooks on the legitimacy of the technology. As more (favorable) information comes in, the perspective on the technology change for the better. This is a direct result of the legitimation strategies being introduced and changing existing narratives and views about the technology. As the legitimation strategies prove to be effective in reaching their goal, the overall legitimacy of the technology is improved. Increasing the legitimacy of a technology has a positive influence on the adoption as users develop more favorable views towards the technology. As they come to understand the technology better or start to recognize its benefits, the users will be more inclined to include the

technology in their daily lives. This is then reflected in the increased number of users or accounts, or in the adoption by other organizations or firms.

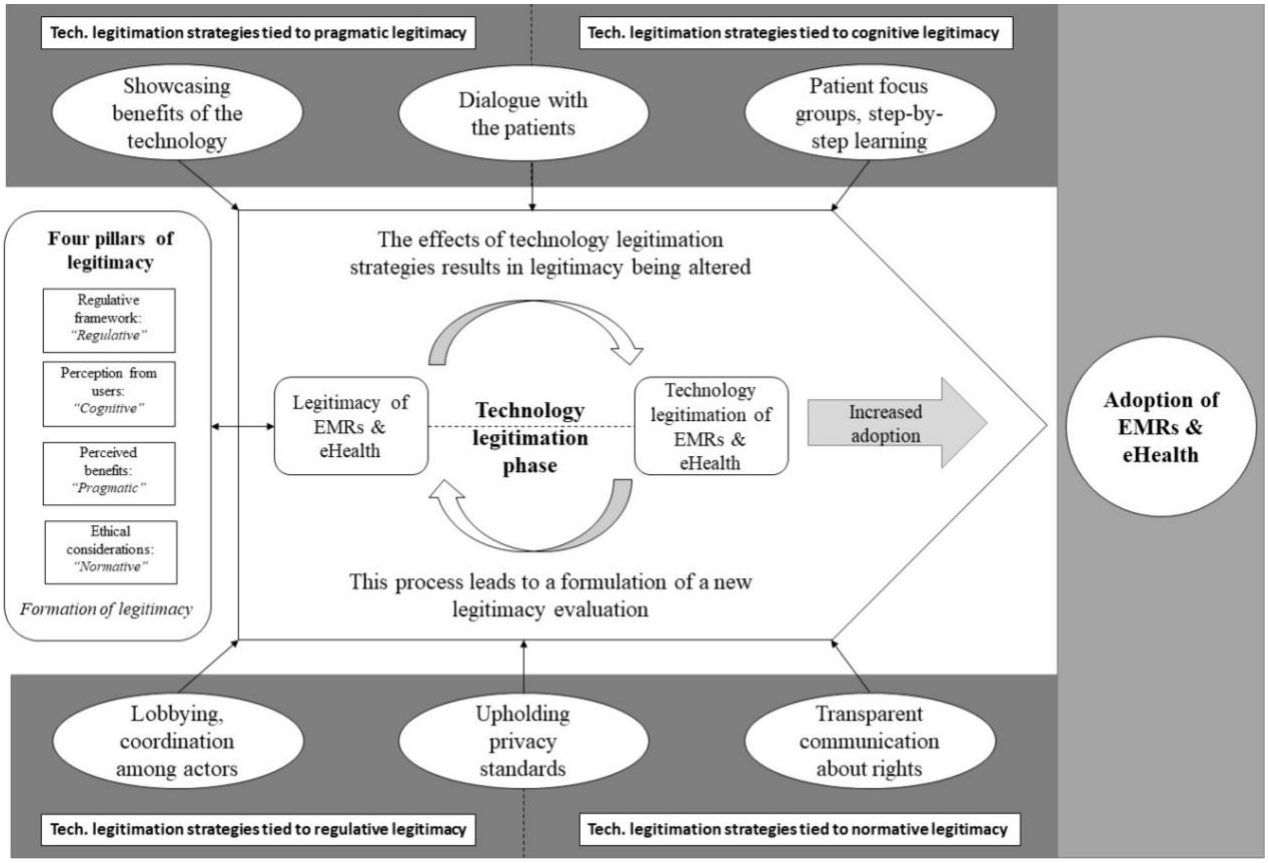

Figure 11: EMR technology legitimation model

This research focused on uncovering ways in which healthcare actors attempt to legitimize the value of a platform technology like EMRs in a complex multi-stakeholder setting. As such, the model was developed primarily with EMRs (and other eHealth applications) in mind; however, this does not mean that the model cannot be used by other technologies or different fields as well. If it is applied in a different context, however, the legitimation strategies will naturally differ from the example above. Nevertheless, the flexibility of its application would first need to be validated with additional research to prove its effectiveness for different situations.

Implications

Overall, the results from this study provide new insights into the way technology legitimation is used within the healthcare sector, specifically in relation to EMRs and to eHealth as a whole. Our findings identify existing legitimacy issues related to EMRs. The study showed numerous legitimation strategies being utilized across all disciplines of healthcare (GPs, pharmacies and

hospitals). Furthermore, the study also managed to cross-check earlier research studies into the impact of DigiD on eHealth usage and the importance of privacy and security for patients. The latter revealed that the importance of privacy and security could be directly linked to physical well-being of the patient. Moreover, a new theory and model describing the process of technology legitimation were developed. This will help to create a better understanding of how legitimacy is built up in the legitimacy-as-process configuration of which technology legitimation forms an important sub-set. Findings from the literature, which were later uncovered, reveals that the theory does not describe specific ways to operationalize legitimacy-as-process. The dashboard we will present in this chapter fills this gap by showing healthcare actors a way through which legitimacy can be measured. Summed up, the results from this study can serve as a starting block for further research into the subject. As the legitimacy of EMRs and eHealth in a wider context has not been studied before, more research into this field would be welcome. Quantitative data could serve to generalize the results from this study. This research could therefore serve as a useful reference for researchers looking to get started with new studies.

Limitations

This study aimed to shed light on the technology legitimation strategies employed by healthcare actors to tackle legitimacy issues related to EMRs. Though we succeeded in doing that with the sample we used, there are ways in which the study could have been strengthened. In this study, we have interviewed employees of various healthcare-related organizations located in the Netherlands. However, due to time constraints, we did not interview patients. This means we did not get the opportunity to cross-check the findings in the literature directly with patients. Input from patients would have been helpful to determine how they experience DigiD as a barrier to eHealth usage and possibly determine the effectiveness of the legitimation strategies used by healthcare actors. Moreover, there are many more medical institutions that use EMRs that were not included in this study, such as physiotherapists and rehabilitation centers. These were also left out due to shortage in time as well as not being able to find suitable respondents. From the existing pool of respondents, half of them represented various hospitals located in the Netherlands. Therefore, the results from the interviews may be biased towards the opinions and views of hospital personnel as more codes have been developed based on their statements. In that sense, the recommendations could also be biased although we have tried to generalize the interventions as much as possible by avoiding specific recommendations for hospitals. Additionally, due to the COVID-19 pandemic, the interviews took place through mediums like

Skype, Microsoft Teams, or telephone. Face-to-face are preferred when social cues are important. They also make it easier to form a connection with people (Opdenakker, 2006). Although this study was not focused on establishing these so-called social cues, it is hard to tell whether the responses would have been different if the participants and the researcher met in real life.

Recommendations

Based on the findings and the identified issues, we formulated the following recommendations:

- While many patients are fine with sharing their data, this buy-in can be increased by further familiarizing patients with the technology. This can be achieved through information meetings or webinars where the necessity, advantages, and practicalities of these systems can be explained.
- DigiD serves to protect the data of patients, but it also seems to impede the usage of eHealth. Organizations should therefore use alternate methods that may be more intuitive or stop the use of DigiD when it might not be necessary.
- Knowledge of the law seems to be lacking in the field of healthcare, which may lead to mistakes in data protection. Specialized legal advocacy groups could be set up to help medical institutions interpret the law more efficiently.
- Measuring legitimacy is a way for medical institutions to track the effectiveness of their legitimation strategies. A dashboard, as shown in Appendix H: Dashboard, could help to gain more objective insights into the state of legitimacy.

Future research

As previously mentioned, patients have been left out of this study. Although the study still provides valuable perspectives on the use of technology legitimation with regards to EMRs, a more complete picture could be provided by also including patients in future research. A qualitative study can determine how patients experience the technology legitimation techniques employed by healthcare actors. Such research could provide shed light on the effectiveness of the strategies used by healthcare actors. Furthermore, the model we have developed also warrants further validation. In addition, future research should focus on the eHealth experiences of other medical professionals, such as physiotherapists. These professionals may have different experiences than the ones uncovered in this study, which could help to better understand technology legitimation in healthcare. Alternatively, a quantitative study could be conducted to

examine the generalizability of the results from this study. A higher number of medical institutions and other relevant organizations, such as lobby groups or government organizations, could be approached to identify the overlap in the way legitimation techniques are used. Through this research, best practices in legitimation techniques can be more accurately described, which could increase overall eHealth usage among patients. This could potentially lower the cost of healthcare, decrease the workload of care providers, and help patients improve the quality of their lives (Adesina & Abiodun, 2019). Finally, we have seen that the literature differs regarding the order in which (technological) legitimacy is built up and who the 'drivers' are of legitimacy. A follow-up study examining these differences would be very beneficial for the theory of legitimation.

To conclude, this study focused on uncovering ways in which the value of a platform technology like EMRs is legitimized for its end-users by healthcare actors. We were particularly interested in seeing how the paradox of security was solved. To achieve this, we have performed semi-structured interviews with 16 persons working in a healthcare-related setting and looked at existing surveys and other sources. We have also gathered data from three technology developers. The data was (inductively) coded after it was collected. The results show us that a great emphasis is placed on promoting cognitive legitimacy through dialogue and other forms of verbal communication. We have also seen various spill-over effects from the strategies that are employed indicating that many of these are closely interlinked. Finally, the security paradox remains a serious struggle for patients and medical experts alike. The findings show us that while the problem is recognized, actions to solve it are mostly limited to individual initiatives. Based on the identified concepts of the study, we have developed a new theory and a model explaining the process the (technological) legitimation of EMRs. This study has served to provide more insight in the legitimation of a platform technology like EMRs in a multi-stakeholder setting.

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8. APPENDIX

A. List of respondents

Table 2: List of respondents

Name	Company/Organization	Role	Interview nr.
Respondent 1	Organization representing the collective interest of hospitals in the Netherlands	Policy officer	1
Respondents 2 and 3	Organization responsible for the infrastructure of a medical data exchange platform	Spokesman *and* board member respectively	2
Respondent 4	Knowledge center for the use of eHealth	Senior advisor	3
Respondent 5	National patient advocacy organization	Manager Digital Healthcare	4
Respondent 6	General practitioner's office in the Amsterdam region	GP	5
Respondent 7	Mental health clinic in the Utrecht region	Nurse	6
Respondent 8	General practitioner's office in the Amsterdam region	GP	7
Respondent 9	Pharmacy in The Hague region	Pharmacist	8
Respondent 10	Hospital in the Leiden region	Manager Architectures & Security	9

Respondent 11	Pharmacy in The Hague region	Pharmacist	10
Respondent 12	Hospital in the Amsterdam region	Intern	11
Respondent 13	Hospital in the Hague region	ECM Project Leader	12
Respondent 14	Hospital in the Groningen region	Senior staff member	13
Respondent 15	Hospital in the Rotterdam region	Laboratory assistant	14
Respondent 16 and 17	Hospital in the Rotterdam region and large hospital in the Hague region respectively	Phlebotomist *and* general medical expert respectively	15
Respondent 18	Hospital in the Utrecht region	ICT Consultant	16

B. List of technology developers

Table 3: List of technology developers

Name	Company	Role
Respondent 19	Market leader of EMR systems in the Netherlands	HR
Respondent 20	Software company specializing in various healthcare domains	Manager in the Healthcare Division
Respondent 21	Leading software company in Europe specializing in IT-solutions for the field of healthcare	Product Manager

C. Interview protocol

Interviewee:

Date and time:

Organization:

Current position:

Education:

Years at the current position:

Total work experience:

Contact:

Context (hidden from interviewee):

- Introduction about the purpose of the research and the researcher himself; Goal of interview: understanding the paradox of security requirements and the impact of the requirements on the usage of eHealth (EMR specifically); Understanding the various legitimation methods of actors involved with EMR to deal with this paradox.
- Background on eHealth and the use of EMR in the Netherlands.
- Permission to audio record the interviews.

Introduction:

- How did the story of EMRs develop in the Netherlands? What are common important security barriers? How do these influence the adoption of this technology?

Topic 1: Regulative legitimacy:

- What regulations are associated with EMRs and the adoption of eHealth? Do they facilitate adoption of the technology or hinder it? Why and how?
- How did you or your organization deal with these obstacles? Do your colleagues/collaborators from other departments or companies deal with this issue in the same manner?

Topic 2: Cognitive legitimacy:

- How do patients in the Netherlands perceive eHealth and EMRs in general?

- What are the ways in which you or your organization tried to positively influence the patients' perception on eHealth? Were these attempts successful? Why or why not?
- Is there a difference between the way you and your colleagues/collaborators from other departments or companies deal with this issue?

Topic 3: Pragmatic legitimacy:

- Do people understand the benefits of eHealth and EMRs? Why or not?
- Were there any concerns of fears from the patients about eHealth or EMRs? How did you or your organization tried to address these issues?
- How do you and your colleagues/collaborators from other departments or companies deal with these problems (maybe over time)?

Topic 4: Normative legitimacy:

- How do people feel about their medical information and data being stored online? Were there any important ethical considerations to take into account? If so, which ones and why?
- How do you circumvent these problems (maybe over time)? How do your colleagues/collaborators from other departments or companies deal with these problems (maybe over time)?

Final questions:

- Are there any topics left you feel are worth discussing that we didn't address during the course of the interview?
- Can you share/refer to any website address, booklet, report, article, whitepaper, presentation slides, and so forth that may help us understand better the topics we talked about in this interview?
- Are you open to follow-up questions through email? If any follow-up is required/planned: When? How?
- Can you please introduce us to your colleagues/collaborators/advisors (to have the same type of interview with them)? Someone who has been involved or informed about this case. Please let us know about up to three persons.
- This interview took … hours and … minutes.

Interviewer's remarks/notes:

D. Questions for the technology developers

Q1: What are the most important developments which your company recognizes with regard to EMR systems?

Q2: How has the usage of EMRs changed over the years? Has the technology developed new roles for example?

Q3: New laws based on data security and privacy, such as the GDPR, have made an important impact on the business world. What have been the most important challenges for the creation of EMR systems? Have these changes resulted in an impact on the adoption process by customers? If so, how?

Q4: What are, translated from the customers such as hospitals, the most important needs for patients when it comes to EMR systems?

Q5: Patient information is stored in EMRs. Are patients also an important stakeholder in the developmental and innovative processes of new EMRs? If so, how are is their input considered in these processes?

Q6: How has the interaction with the other stakeholders changed over the years? Which impact did this have on the development of EMRs?

E. Example of transcriptions

Interview with respondent 8

A: Looking at eHealth and EMRs from the perspective of the patient, what is their perception towards this technology?

B: Patients have been ready for this technology for a very long time I think. I think it's mostly the systems we use in healthcare that are outdated. But if you look at how people function in their daily lives and how many things they do online, then it's pretty weird how they can't have the same understanding with their doctor. This is something we experience in our work, that patient are able to easily embrace this use of technology.

A: What are some ways in which you try to increase the use of these technologies among patients?

B: I feel like you don't have to do much, it mostly happens naturally. In the beginning we had to spend a bit more time introducing it of course, but now it's just the standard.

A: Looking at other clinics where the usage of eHealth is not so prevalent, what are some things that you do while they don't?

B: I think it has to do with the assumption that patients won't know how to use certain technology. Because when you talk with GPs, you'll hear them say stuff like; my patients don't know how to use this. This shocks me because I don't understand how they can think this way. I mean, how many mobile phones do we have in the Netherlands? But to give an example as to how easy it is, when we introduced a chat function 3 years ago, we didn't announce it, but it was included as an option. So, when we launched this at 10 AM, we already received our first message through this chat function exactly 3 minutes later. People saw it and immediately started using it. People see it as normal and they're very happy that they can use applications like that.

A: Does age make a difference here?

B: Not really, no. Of course, when you have a 95 year old patient, it might make a difference, but there are also plenty of 95 year olds who do chat with us for example.

A: So, your patients do recognize the benefits of eHealth and EMRs?

B: Absolutely. What I noticed is that video calling is something that's more often used by people of your generation, so that's more young people who make use of it. These people often use the same applications for when they're studying so it's become the norm for them. For the older generation, they still need more time to get used to it.

Interview with respondent 18

A: How does your organization deal with patients who have a negative view of eHealth? How do you try to positively influence the perception they have?

B: You have to make it measurable first. So, you set up a KPI, and then you go measure because you want to test or measure something like patient satisfaction and then specifically, with regards to certain eHealth services. With video consult for example, you try to find obstacles people experience, so then you try to help them or set something up without an actual video consult happening, and then you go through all the steps which helps with trusting the service. And based on that, they have a success story which makes it more likely that they'll use a certain eHealth service. And informing obviously which is also very important, highlighting the value of an eHealth service. But this isn't taken care of in one day, these are long lasting processes.

A: So, it's about engaging in a dialogue and removing any discomfort?

B: Yes.

A: You already mentioned advantages, which is the next topic, do people recognize the benefits of eHealth and the EMR, or rather the patient portal which they have in front of them?

B: Yes, the point however is that a disadvantage carries more weight than an advantage. A big advantage can disappear if there's a minor disadvantage. So, people are more likely to

remember the negative things even though there are many positive things. So, that's something you have to carry with you, the human factor.

A: Are there are also specific fears or concerns related to eHealth and the EMR? You often hear about people being concerned with their privacy. What are things you hear?

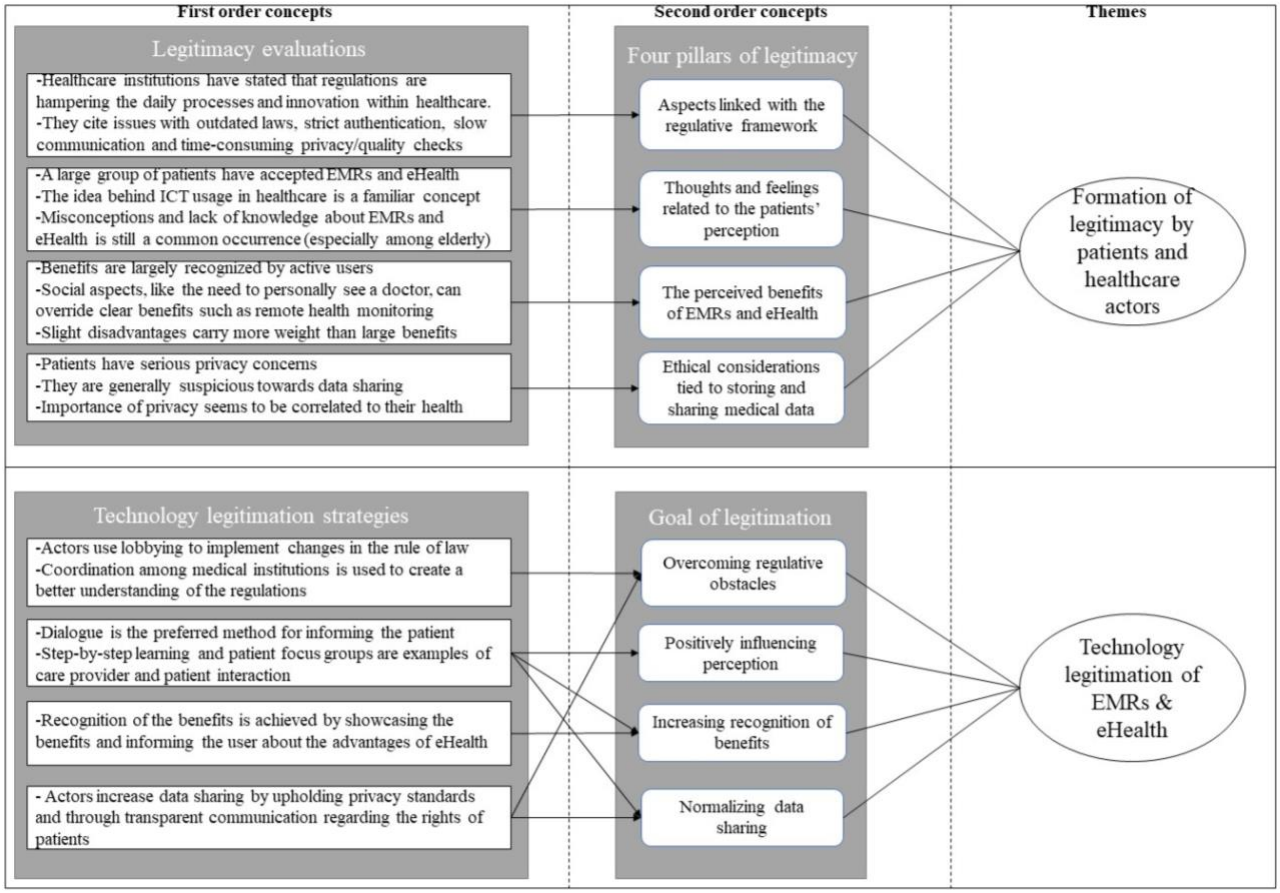
B: Actually, that's the main thing we come across. People don't want their data to get leaked, it's pretty sensitive after all. And even organizations, that for example provide mortgages, I believe you can't use it, I believe it says in the law that you can't use certain data in an assessment like with a mortgage, but even then, people are biased if they have certain data of you. So, people are pretty wary of this which is the main reason. And the ease of use of course.

F. Overview of technology legitimation strategies

Table 4: Overview of technology legitimation strategies

Legitimacy pillar	Common issues	Technology legitimation strategy
Regulative	• Lagging regulations • Outdated regulations • Regulations impede daily activities and innovation processes	• Coordination among medical institutions to develop best practices • Lobbying for changes in the regulative framework
Cognitive	• Lack of knowledge among patients • Lack of know how among elderly and other vulnerable groups	• Engaging in dialogue • Gaining input from patients • Visual advertisements and helpdesks • Patient focus groups • Gamification
Pragmatic	• Negatives outweigh the positives for patients • Social aspect	• Showcasing the positive aspects of EMRs and eHealth • Establishing the needs and wants of the end-users
Normative	• Fears regarding privacy • Information paradox	• Ensuring compliance with the relevant privacy laws • Communication and transparency

G. Data structure



H. Dashboard

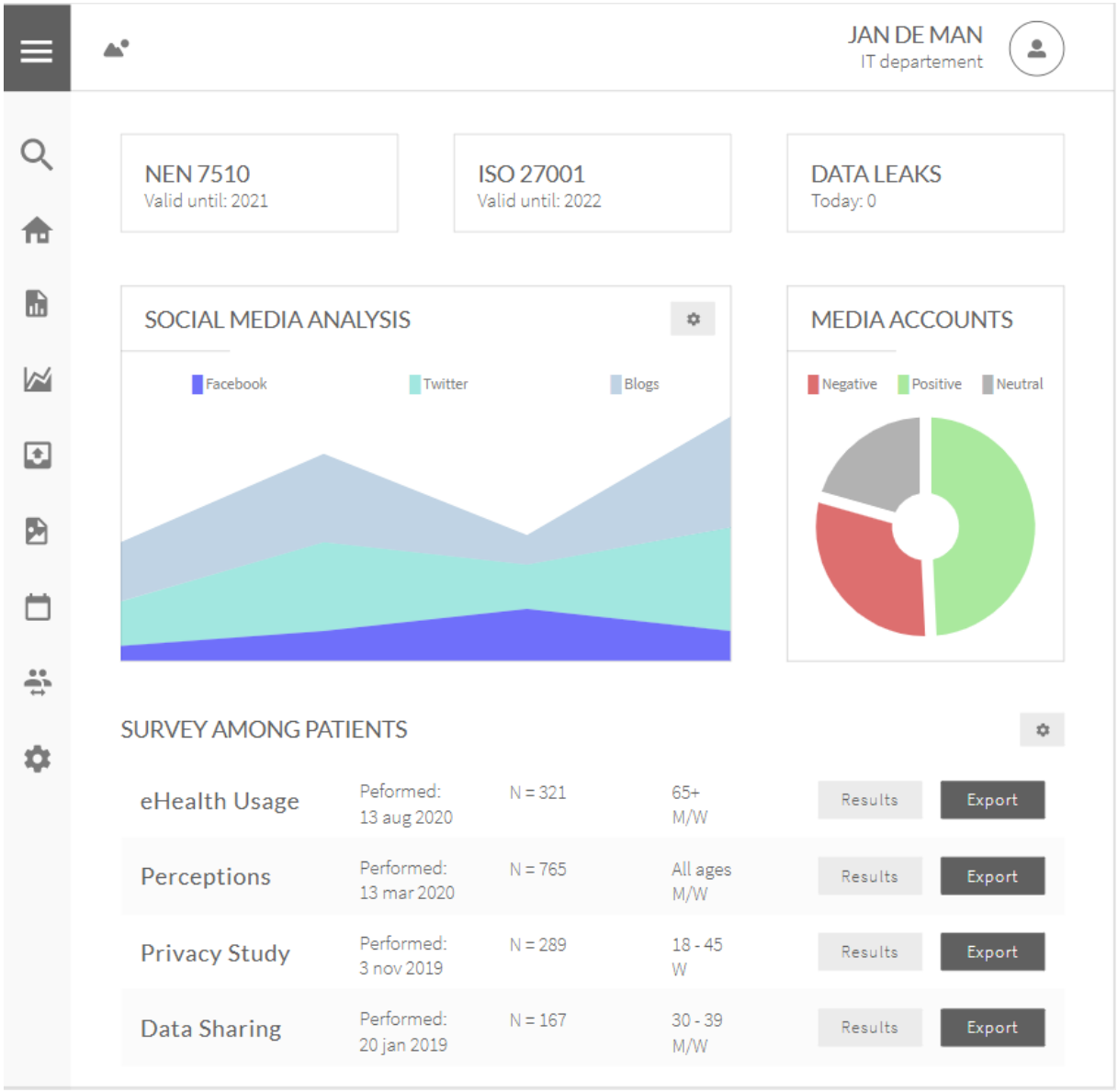


Figure 12: Example of a legitimacy dashboard

Creating a dashboard to measure legitimacy

Based on the literature, we know operationalization of legitimacy-as-process occurs by studying how the perceptions towards a certain organizational practice change through time (Langley, 2007). As the literature does not describe a specific way to measure legitimacy through this way, we can lend the measurements methods from legitimacy-as-property. While this configuration employs measurement methods that are mostly cross-sectional in nature, through continuous measuring we can, to some extent, replicate the same effect of a longitudinal research design. By establishing a baseline value, we can see how the legitimacy changes over

time. There are two ways through which legitimacy can be measured (López-Balboa, Blanco-González, Díez-Martín, & Prado-Román, 2021). The first way is on a macro level (media accounts, linkage with regulative bodies and sentiment analysis through social media). We have already determined that media accounts might not have a direct influence on the legitimacy of an organization, so this specific form of measurement can be left out. However, if organizations do choose to include it in, they can measure the amount of positive versus negative (newspaper and internet) articles written about their EMR/eHealth practices within a given time period. Linkage with regulative bodies can be measured through accreditation and certifications. This relationship is usually expressed through binary means (i.e., an organization is either accredited by the relevant regulatory bodies or not). Alternatively, the amount of data leaks could prove to be a more relevant form of measuring as certifications generally do not change so easily, though this form of measuring is not specifically described in the literature. Sentiment analysis involves gathering individual judgements from tweets, diaries, hashtags, and other pieces of text taken from social media networks like Twitter (Etter, Colleoni, Illia, Meggiorin, & D'Eugenio, 2018). This can be done through APIs, data crawlers (e.g., Issue Crawler developed by the UVA), and third-party firms specialized in collecting data from social media websites. A disadvantage from measuring judgements from social media networks is that not all age groups, ethnicities, genders, education levels and personalities may be represented equally. Also, the presence of fake profiles may skew the results. Measuring legitimacy on a micro level is usually done through surveys among the patients. The data from all these information sources can be incorporated into a dashboard (see figure 12 above).