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The influence of HIM implementations on hospital organisation and how this affected hospital healthcare performances

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Master thesis Organisational Design and Development

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Abstract

This research examines hospital organisational changes that are associated with the implementation of healthcare interaction models (HIMs) and how such changes affect hospital healthcare performance. It also explore the implementation of HIMs in the current patient journey. Four different HIMs are assessed based on two dimensions, namely localisation and synchronousness as well as the three dimensions of healthcare performance, namely quality, accessibility and affordability. Hospital organisation covers both hospital structure and hospital process parameters. This study is conducted in six different Dutch hospitals across the country, including three academic and three regional hospitals. It aims to answer the following main research question: As a result of the implementation of different healthcare interaction models, which hospital organisational changes are associated with HIMs and how do such changes affect hospital healthcare performance?

To address this research question, a qualitive multiple-case study (six cases) is performed and 12 qualitive semi-structured interviews are conducted. The respondents are selected based on their availability and personal interest in this topic. The respondents include medical staff members, an insurance company employee and patients whose diverse perspectives are relevant to the trias in healthcare.

The results indicate that most of the cases remain preoccupied with the implementation of one or more HIMs. Furthermore, several categories of issues slow down the implementation. However, academic and regional hospitals lack any differences. Hospital structural changes are mainly associated with HIMs, including the characteristics of different locations; meanwhile, the implementation of HIMs such as medical records triggers hospital process changes. Changes in hospital processes primarily affect the healthcare performance dimensions of quality and accessibility. By contrast, hospital structural changes apparently exert a larger impact on the affordability of the Dutch healthcare system. Therefore, the implementation of HIMs can help to achieve a quality, accessible and affordable Dutch healthcare system in the long term.

Contents

1. Introduction

Rapidly increasing healthcare costs (Verhees, 2017), closure of clinical departments in hospitals due to the shortage of medical staff (AT5, 2018), bankruptcy of hospitals (Nos, 2018) and inaccessibility of care due to long waiting times (Nos, 2017) are some of the issues raised in articles in the Netherlands. Additionally, Dutch healthcare costs are predicted to increase to 31% of GDP in 2040 (Arts en Auto, 2013). These articles suggest that the Dutch healthcare might experience problems with its affordability and subsequently accessibility in the long term.

The above-mentioned issues are similarly long-term concerns for many Western countries. For instance, the healthcare system of the United States (Amadeo, 2018) and the National Healthcare System of England (Triggle, 2018) are also characterised by rising healthcare costs and accessibility issues. Hospitals, which are among the key care-providing organisations, are responsible for nearly 50% of healthcare expenses in the Netherlands (Medisch Contact, 2018). To create an affordable and accessible healthcare system in the long term, governments, insurance companies and care-providing organisations have to find opportunities for reducing these problems.

Shifting from issues to solutions

Patient care, which may be referred as a patient journey, is one of the primary processes in hospitals. The hospital organisation, along with its structure and processes, is subsequently formed and organised around this principal process: the patient journey. Changes may be made to the current patient journey, at least in hospitals, to boost efficiency and effectiveness and thus create an affordable and still accessible Dutch healthcare system in the long term.

The current patient journey in hospitals often requires the use of a configuration in which the patient and the doctor have to be in the same place (localisation) at the same time (synchronousness). However, as mentioned by Swan (2009) and Smith (2012) and confirmed by Christensen, Grossman, and Hwang (2009), healthcare is not always limited to place and time due to technical innovations in the past few decades. This situation creates an opportunity to develop new interaction models in addition to the traditional practice, thereby releasing the rigidity of the two dimensions of localisation and synchronousness. Using these two dimensions, a quadrant with four different healthcare interaction models (HIMs) can be drawn, as depicted in Figure 1.

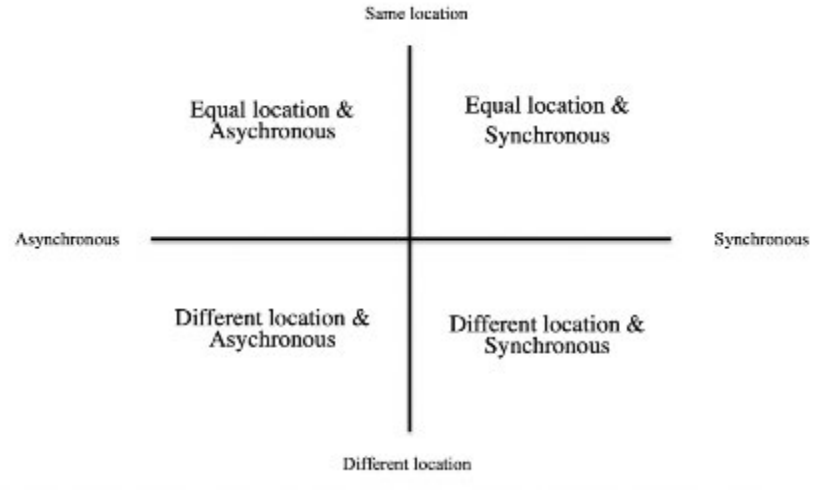

Figure 1. Four HIMs based on two dimensions (adopted from Smith, 2012, p. 3).

The various HIMs signifies that in the patient journey for each interaction moment, a different HIM can be used. In other words, the configuration of each interaction moment within the current patient journey can vary while the structure of the patient journey itself will not be alternated. The combined use of these four different HIMs within the journey of a single patient potentially enhances the efficient use of current resources and therefore affects the hospital structure and processes. According to Aiken, Sloane, and Sochalski (2009), the hospital organisation has an effect on the hospital outcomes; therefore, the alternated hospital structure and process can positively affect the affordability and accessibility of the system. There could be thought of financial, accessible and quality advantages caused by structure and process changes as for example reduction in hospital buildings, realisation of specialised centres and medical monitoring.

Healthcare is more than business

The Dutch healthcare system is recognised for its quality; in fact, it topped the list of the Euro Health Consumer Index in 2017 (Powerhouse, 2017). Next to accessibility and affordability, healthcare quality can be considered as an essential component. From the patient's perspective, a thorough treatment is preferable to a short waiting time. As West (2001) underscores, the way that a hospital is organised affects the quality of healthcare.

To create in the long term an affordable and accessible healthcare system that still achieves the required level of quality, changes to the current model are needed. One of those changes could be the use of different HIMs within the patient journey. Despite the benefits of the use of various HIMs, in line with Christensen's theory, a major objection occurs in this combinational usage. In the theory of Christensen, using two types of business models creates an extraordinary internal incoherence. He posits that the coordination of unique patient pathways increases overhead costs.

This research adopts a qualitative approach to derive insights into the mechanisms of how hospital organisational changes occur through the implementation of different HIMs and how

these hospital organisational changes affect healthcare performance outcomes in terms of quality, accessibility and affordability. This intent can be considered as the internal purpose. In the end, this knowledge can be used for successfully implementing HIMs in the patient journey and thus for creating a sustainable Dutch healthcare system. This target can be regarded as the external purpose.

1.1. Objective and Research Question

This study aims to examine the hospital organisational changes that are influenced by the implementation of HIMs and the extent to which such changes affect hospital healthcare performance. Therefore, the main research question of this study is as follows:

As a result of the implementation of different healthcare interaction models (HIMs), which hospital organisational changes are associated with HIMs and how do these hospital organisational changes affect hospital healthcare performance?

To answer the main research question, a set of four sub-questions is formulated:

1. What is the extent of success of the implementation of HIMs in hospitals?
2. Which organisational structure changes are associated with the implementation of HIMs?
3. Which organisational process changes are associated with the implementation of HIMs?
4. How do hospital organisational changes associated with the implementation of HIMs affect the healthcare performance of hospitals?

1.2. Theoretical Relevance of this study

The theoretical significance of this study can be linked to the current lack of literature on the specific relationships between the implementation of HIMs, the associated hospital organisational changes and their effects on hospital healthcare performance. However, the current literature provides numerous studies that are highly focused on a single HIM or a comparison between HIMs; such studies also largely consider the few effects on hospital healthcare performance but do not elaborate on the changes on the hospital organisation. For example, in their review, Piga Cangemi, Mathieu, and Cauli (2017) compared the differences between synchronous and asynchronous tele-healthcare in terms of patient satisfaction and effectiveness. In another review, Fogel, Khamisa, Afkham, Liddy, and Keely (2016) investigated the healthcare outcomes of live e-consulting compared to face-to-face consulting. Meanwhile, Van der Eijk et al. (2013) examined online healthcare communities in terms of medical knowledge, self-management and interdisciplinary collaboration.

Moreover, the current literature also includes some studies about the effects of changes in the hospital organisation on hospital healthcare performance. For example, Aiken et al. (2009) discussed alternations in hospital outcomes through structural and organisational changes in the hospital. Landon Wilson, and Cleary (1998) elaborated a conceptual model for the effects of the healthcare organisation on the quality of medical care. West (2001) explained the issue of why the hospital organisation affects the quality of patient care. Finally, Hearld, Alexander, Fraser,

and Jiang (2008) examined how hospital organisational structure and processes affect the quality of care.

Although some studies in the literature have discussed a part of the relationship targeted in this thesis (i.e. HIMs on healthcare performance and hospital organisation on healthcare performance), no empirical research has been conducted on the complete relationship. This study is based on qualitive research; as it includes hospitals from the entire country, this study is therefore designed to investigate the overall relationship. This empirical study allows for the examination of the real-world interaction among the three main concepts, which would not have been possible through a theoretical research.

This thesis initially explores how HIM implementation influences the hospital organisation and subsequently assesses the effects of HIM implementation on hospital healthcare performance. With the empirical results derived from this study, this thesis contributes to the literature in terms of additional theoretical knowledge about the complete relationship. Therefore, this thesis can help to explore the theoretical gap between the implementation of HIMs, the associated hospital organisational changes and their effects on hospital healthcare performance.

1.3. Managerial Relevance and social contribution of this study

This study provides insights into organisational changes associated with the implementation of different HIMs and its effects on hospital healthcare performance. Moreover, it presents an overview of how the implementation of HIMs can change the hospital organisation and which changes can be expected. This thesis also examines the extent to which these organisational changes affect the accessibility, affordability and quality of hospitals. These insights may assist Dutch ministerial regulators and policymakers, insurance companies and hospital boards in their search for solutions to ensure the affordability and accessibility of the Dutch healthcare system in the future. To reiterate, a reconfiguration of the hospital patient journey through the usage of different HIMs could contribute in this regard. Furthermore, the reconfiguration of the hospital patient journey entails the identification of the effects of HIM implementation on organisational and healthcare performance outcomes. Therefore, the results of this thesis add managerial relevance for medical organisations that are searching for possibilities to create and maintain a vital, affordable and accessible healthcare system for all citizens.

1.4. Organisation of this thesis

This thesis is organised into several chapters. Chapter 1 focuses on the introduction, including the objective and research question, theoretical and managerial relevance as well as the social contribution of this study. Chapter 2 covers the theoretical background and the core concepts that are utilised in this research. Chapter 3 describes the methodology used in this study. Chapter 4 explains the most important results of this study. Finally, Chapter 5 presents the conclusion and discussion.

2. Theoretical Background

A theoretical background is necessary to appropriately address the main research question. In this study, the theoretical framework covers the relevant theories and perspectives of key concepts such as healthcare interaction model, hospital organisation and healthcare performance.

The first part of this chapter describes in detail a healthcare interaction model (HIM). It initially provides an overview of the role of communication in healthcare and subsequently defines the two important dimensions of synchronousness and localisation and explains four different HIMs. Every model is distinguished to understand how the different HIMs can be a part of the patient journey. Moreover, this chapter discusses the concept of hospital organisation based on the current literature. A complete and comprehensive performance framework is fundamental to this research. Hence, this chapter explains how the construction of such a framework allows for the comparison of different HIMs on the key dimensions of quality, accessibility and affordability. The further operationalisation of each concept is presented in Chapter 4. The final section of this chapter focuses on a conceptual model, including the relationships among all the concepts.

2.1. Patient Journey in Hospitals

This study aims to examine organisational changes and the effects of HIM implementation during the patient journey on hospital performance. Hence, the patient journey is concisely described to understand how the implementation can generate the changes.

The patient journey can be regarded as the medical field's derivative of the customer journey from the business realm. Nenomen, Rasila and Junnonen (2008) describe the customer journey as a method for investigating user experiences. Furthermore, experience is 'process-oriented including all the moments of contact and emotions during the experience' (Nenomen et al., 2008, p. 54). The concept of patient journey in the medical field serves a similar purpose, as it is often used for identifying the route or steps undertaken by patients in hospitals to find problems and suggest improvements for the patients' experience. For example, Trebble, Hansi and Hydes (2010, p. 396) used the patient journey to increase the time spent on value-adding aspects (care) and reduce waiting times.

In this research, the patient journey is used as a roadmap for analysing the process of patient care in hospitals. This roadmap allows for the investigation of the effects of HIM implementation om organisational and healthcare performance.

For each patient, a simplistic journey can be drawn (see Figure 1). This journey starts with a sick patient who visits the doctor in the hospital. After this first visit, a diagnostic test (laboratory), imaging (X-ray, MRI, CT scan) or biopsy is often needed, usually on another day. The results are subsequently discussed during another hospital visit. The next part of the journey includes a treatment (e.g. medicine or surgery) that is evaluated during another visit. At this point, the journey stops for some patients but continues for others. In particular, chronically ill patients have to regularly visit the hospital over several years.

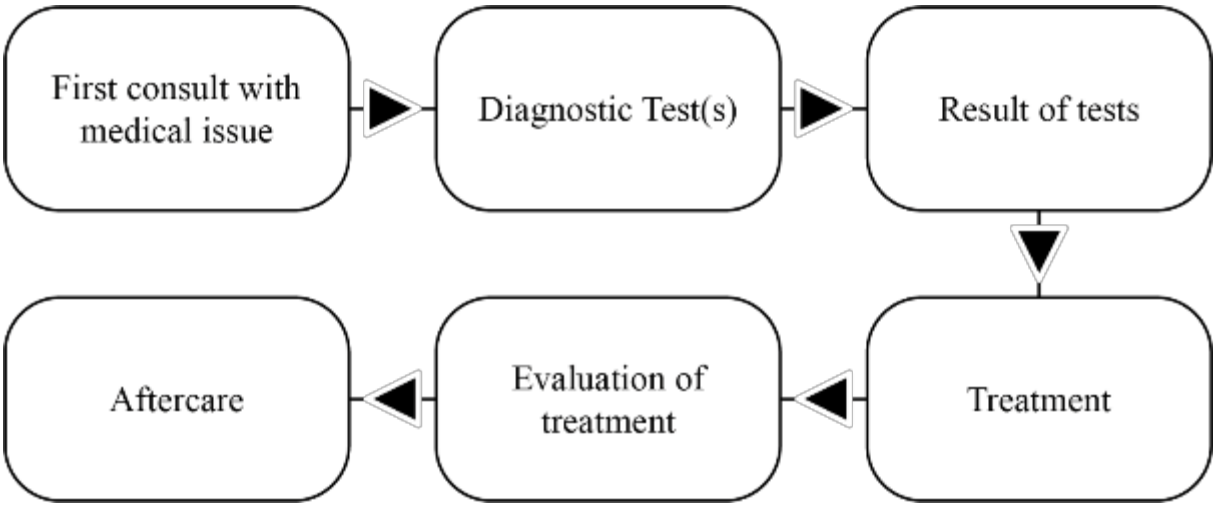

Figure 1: Current (basic) patient journey in hospitals.

The current hospital patient journey includes multiple physical visits, during which some interaction between the patient and the doctor transpires. This study is focused on these interaction moments that are highlighted in Figure 2.

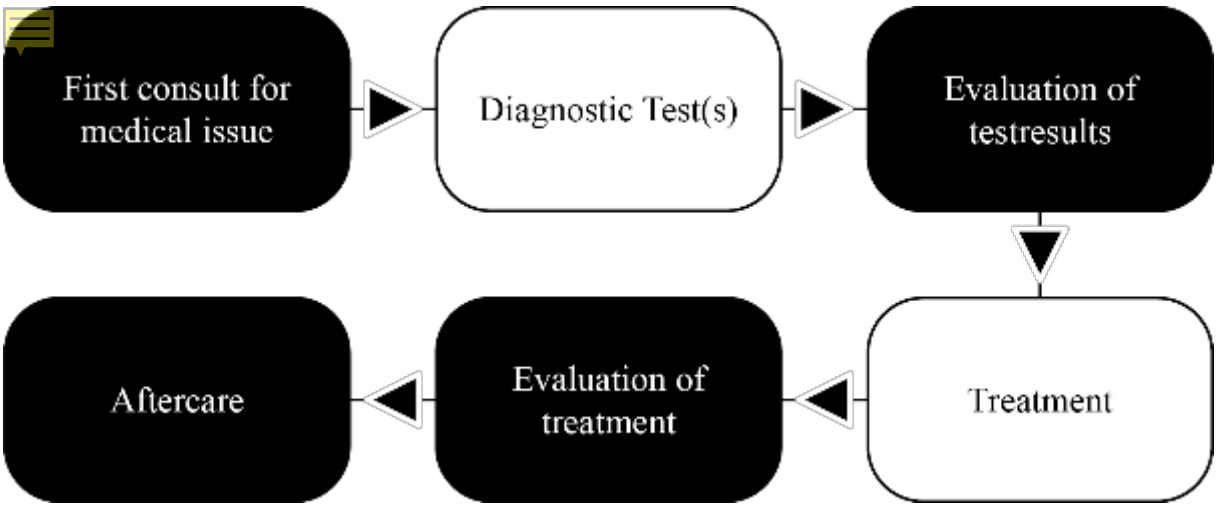

Figure 2: Interaction moments in the patient journey (highlighted in black) examined in this research.

Some of the highlighted interaction moments of the current patient journey are primarily configured as a patient who physically visits the doctor in the hospital. In this study, the four different HIMs, which are elaborated in Section 3.2, are possibilities that continue to allow the interaction to occur in the same structure but differ in the dimensions of place and time. Accordingly, the four different HIMs do not change the structure (or the sequence) of the patient journey. Healthcare interaction models are instead possibilities to reconfigure the composition of the same interaction moments.

New or different interaction configurations can possibly change the structure and processes in the organisation and influence healthcare performance. Before these effects are analysed, HIMs are introduced in Section 3.2 after the brief description of the role of communication in healthcare.

2.1.1. Communication in Healthcare

By changing an element in the interaction between the patient and the doctor, some effects on the communication between may be anticipated. After all, interaction largely constitutes communication. Understanding the positive or negative effects requires a discussion of the role of communication.

Communication can be viewed as 'the main ingredient in medical care' (Ong, De Haes, Hoos, & Lammes, 1995, p. 903). Ha and Longnecker (2010) confirm this importance and highlight that the patient–doctor communication is the heart and art of medicine and that such communication influences the quality of healthcare. The concept of communication should be mentioned given its relevance to the different HIMs that include four types of interaction.

Shannon (1948) initially developed a model for communication, which has been known as the Shannon–Weaver model since 1949. This model simplifies the communication process into a schematic diagram (see Figure 3).

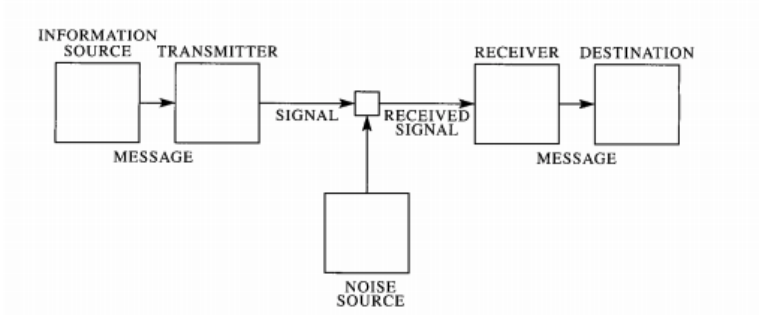

Figure 3: Schematic diagram of a general communication system (Shannon, 1948).

The communication process illustrated in Figure 4 is one-directional; however, communication in healthcare can be regarded as bi-directional due to the interpersonal character of medical care. During the patient journey, the role of a patient changes from information source to destination, whereas the doctor's function shifts from destination to source. According to Ong et al. (1995, p. 903), this bi-directional communication in healthcare has two different purposes, namely to create an effective interpersonal relationship and to exchange information. Furthermore, both purposes have to be covered in each type of medical interaction (Ong et al., 1995).

In the present study, the four HIMs alter the setting of interaction between the patient and the doctor and therefore possibly modify the communication itself. Moreover, each HIM represents a certain channel that transfers a signal from source to its destination. Therefore, an HIM should be capable of achieving (or contributing) to at least these two purposes of medical interaction when it is considered as a possible substitution for a certain stage.

2.2. Healthcare Interaction Models

In this research, the concept of healthcare interaction model is essential and central. The 'model' part of an HIM is interesting to elaborate. Therefore, the relationship between the four HIMs and the business models (BMs) is initially discussed. Localisation and synchronousness, the two dimensions on which the four HIMs are based, are then elaborated. Finally, the four HIMs and some examples are presented.

2.2.1. Healthcare Interaction Models and Business Models

In a review of the literature, two types of definitions concerning the concept 'model' in the field of healthcare are found. One definition describes a model in healthcare as the manner by which the total healthcare (in financial terms) is organised as a system. In that situation, three main models based on their funding can be distinguished: 'the Beveridge model, which is based on taxation, the Bismarck "mixed model", a mix of social insurances and private providers, and the private insurance model' (Lameire, Joffe, & Wiedemann, 1999, p. 1). The second type of definition, according to Christensen et al. (2009), refers to a model as 'an interdependent system composed of four components, [namely] the value proposition, the profit formula, the resources, and the used processes' (Christensen et al., 2009, pp. 9-10). The value proposition is defined by the *job-to-be-done* aspect that arises in people's lives and when services are needed to fulfil these demands. The profit formula holds the price, profit margins and costs. The resources include for example the people, technology, products, facilities and equipment for the services. The fourth component refers to all the procedures involved within the service and its organisation.

In both definitions, a model includes a certain organisational aspect. However, both consider the manner by which something is organised; the first definition of Lameire, Joffe and Wiedeman is about the organisation of the total Dutch system, which is not within the scope of the current research. As discussed in Section 3.1, the patient journey consists of various stages, each of which has a different purpose and a distinct job-to-be-done. In this research, Christensen's definition is therefore more applicable to further explicate the concept of model. As Christensen (Christensen et al., 2009, pp. 9-10) argues, 'the value proposition is the starting point for every model'. From Christensen's perspective, the other three components of profit formula, resources and processes are configured in such a way that the job-to-be-done aspect is delivered. Therefore, in this research with referring to model the business model, a configuration, in order to deliver a job-to-be-done and its resources, profit formula and processes, is mentioned.

2.2.1.1. Configuration of healthcare interaction models

According to Christensen (Christensen et al., 2009), the job-to-be-done element determines the configuration of the resources, processes and profit formula. Thus, to deliver a certain job-to-be-done, different configurations of the other three remaining components can be developed; that is, the configurations include various profit formulas, processes and resources to deliver the same job-to-be-done. To recapture the patient journey, each stage includes a distinct job-to-be-done aspect. Hence, within a single stage, the job-to-be-done can be delivered through diverse configurations. Examples of these configurations can result in a diagram illustrated in Figure 4.

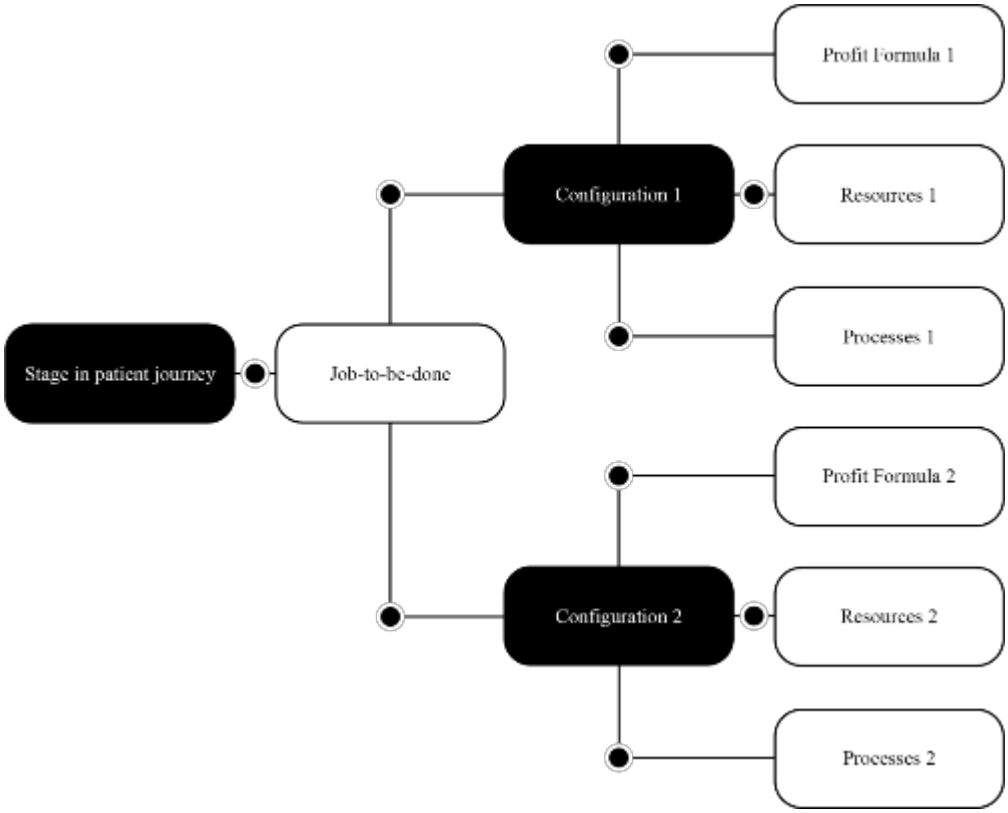

Figure 4: Different configurations with a similar job-to-be-done element.

The four different HIMs examined in this study are defined in the succeeding section. The four HIMs are distinctive in terms of their 'I' or the interaction part: how the interaction is organised between the patient and the doctor. To engender the interaction, resources, processes and a profit formula are necessary. Therefore, an HIM can be considered as a configuration of a profit formula, resources and processes. In this research, a HIM can be viewed as a certain configuration with a profit formula, resources and processes to deliver a specific job-to-be-done element. Each stage with a certain job-to-be-done aspect can possibly use different HIMs, thereby alternating the configuration of profit formula, resources and processes (see Figure 5).

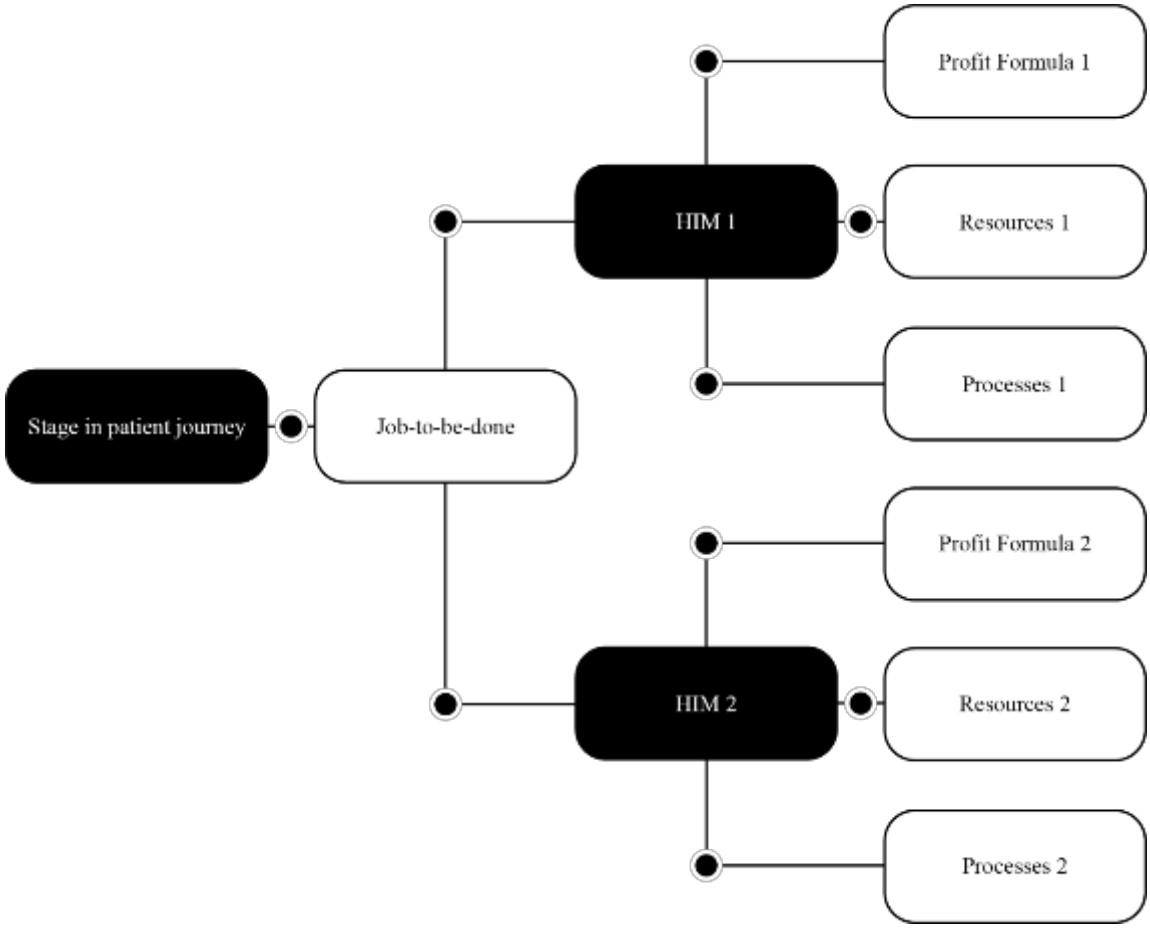

Figure 5: Different HIM configurations with the same job-to-be-done.

The expansion of the scope of this view can also entail the use of the same configuration — HIM — in different stages of the patient journey by changing the job-to-be-done feature (job-to-be-done 1, job-to-be-done 2 and so on). Additionally, this phase can even be taken one step higher. Given the interaction characteristics of an HIM and the fact that its corresponding resources are fixed, the assumption is that for the same job-to-be-done facet, the profit formula and the processes can also differ within an HIM. Therefore, the same HIM has various configuration possibilities; meanwhile, the resources are unchanged (see Figure 6).

In conclusion, a healthcare interaction model is recognisable and distinctive by its resources, while the processes and profit formula can differ to deliver different job-to-be-done in the different stages. An HIM can subsequently have multiple variations of the business model configuration. Furthermore, an HIM is possibly suitable in different stages of the patient journey; for each stage, multiple HIMs are probably substitutional.

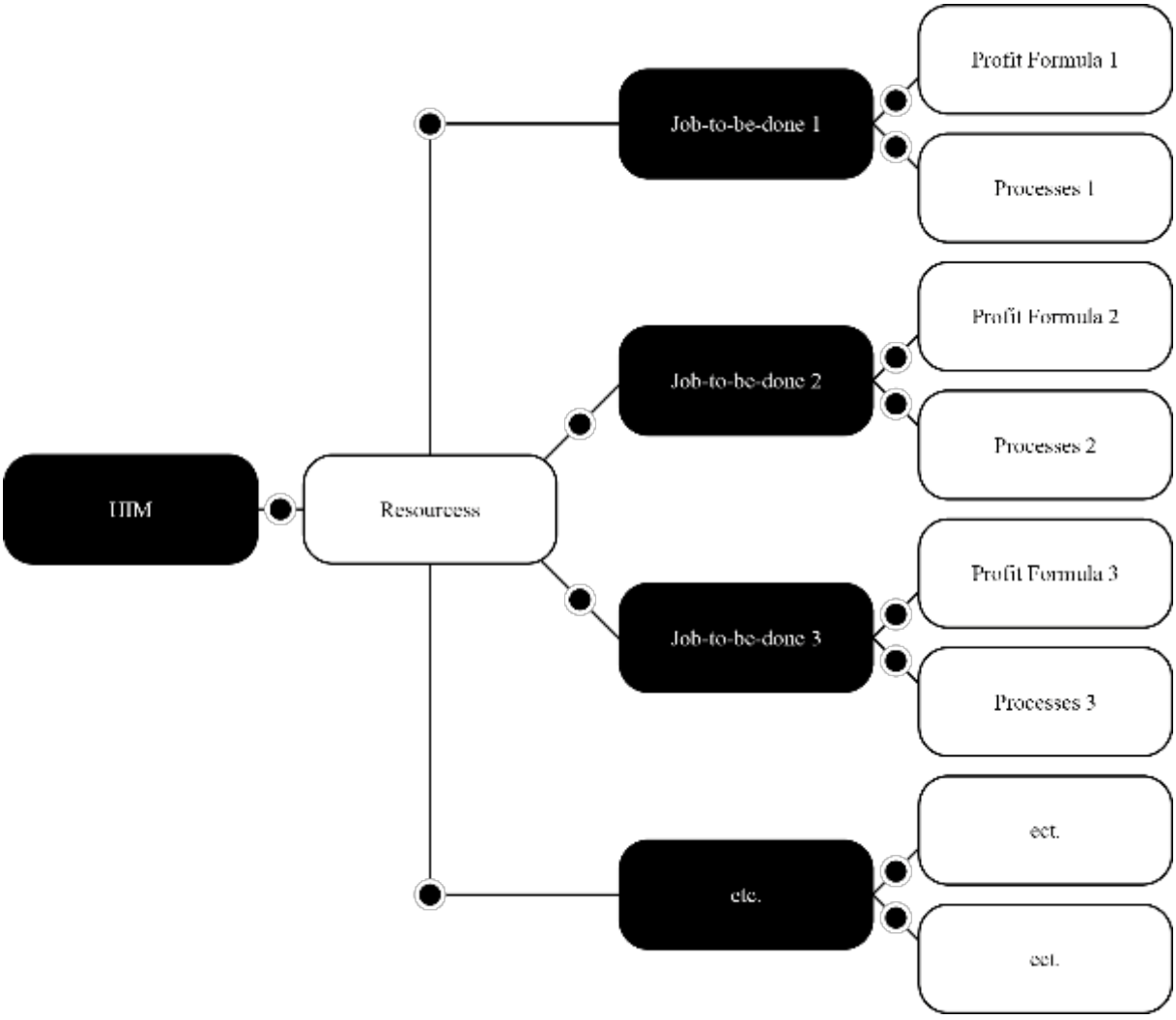

Figure 6: Linking an HIM to its resources, while changing the other configuration aspects.

In this research, with the model part of an HIM, a configuration of the job-to-be-done, the resources, the processes and the profit formula is identified. Each configuration of every HIM can be viewed as a unique business model. Theoretically, this can generate a major set of possible configurations of the patient journey, consequently changing the organisation and its healthcare performance. Before these two concepts can be discussed, the fundamental dimensions of HIMs —localisation and synchronousness— require an elaboration.

2.2.2. Localisation

Healthcare interaction models are based on the first dimension of localisation. Localisation is a feature that determines whether the patient and the doctor are at in same place. If they are not, then the patient and the doctor are communicating from two separate physical locations. This form of communication in healthcare can be referred to as telemedicine. According Roine, Ohinmaa, and Hailey (2001) and Mechanic and Kimball (2018), 'tele-' denotes 'transmission over a distance'. Thus, telemedicine means healthcare interaction over a distance (Mechanic & Kimball, 2018; Roine et al., 2001).

In their review, Roine et al. (2001) indicated that telemedicine could yield cost savings. This result is in line with the finding of Caffery, Farjian, and Smith (2016) who concluded that in comparison to the traditional face-to-face (FtF) model, telemedicine is more effective and capable of reducing the number of FtF consultations and even the number of appointments; additionally, telemedicine reduces waiting times (Caffery et al., 2016).

To facilitate communication over these distances, an ICT-related programme, tool or system is frequently required. This type of communication can be referred to as computer-mediated communication (CMC). Computer-mediated communication has emerged in the business realm since the introduction of computers in organisations. It began with text-based communication and later expanded with audio and video extensions; CMC has since been used for diverse activities such as group problem solving, forecasting, sharing ideas and mobilising organisational actions (Bordia, 1994).

In the current study, the effect of CMC versus FtF communication on the interpersonal relationship, which is a dimension of quality (see Section 2.4.1.1) is a point of interest. Most studies about the differences in CMC and FtF in terms of the interpersonal relationship can be found in the field of education. The relationship between healthcare and education is elaborated in Section 2.2.4.

In a medical study, Miller (2003) indicated that telemedicine depersonalises the interpersonal relationship between the patient and doctor due to sensory and non-verbal limitations, social and professional distancing, and undeveloped norms and standards. Mair and Whitten (2000) identified similar communication restrictions; additionally, they stated that total patient satisfaction increases because of improved access to specialists and reduced travel and waiting time. As mentioned in the introduction, Piga et al. (2017) compared the differences in patient satisfaction and effectiveness. They concluded that the overall patient satisfaction was higher, whereas the effectiveness was equal to or higher with the CMC interactions than standard FtF interactions. Fogel et al. (2016) similarly examined the healthcare outcomes of live e-consulting compared to face-to-face consulting and revealed that CMC can reduce the waiting time and the number of non-medically required FtF consultations as well as yield cost savings when the CMC interactions are used in the management of haematological disorders and the interpretation of laboratory tests (Fogel et al., 2016).

In summary and based on the literature, CMC interactions mainly improve the accessibility of healthcare, which is a dimension of performance (to be discussed in Section 2.4.1.2), as patient satisfaction seems to increase. However, the literature suggests the negative effects on the interpersonal relationship between the patient and the doctor.

2.2.3. Synchronousness

The second dimension, synchronousness, differentiates between two types of communication depending on the moment of time at which this communication transpires. According to Smith (2012), synchronous communication pertains to ‘any form of live communication that demands all parties involved in a conversation to be present at the same time. Asynchronous

communication is a method of segmental communication, where both parties can interact with each other at different times that are appropriate for them' (p. 1). Mechanic and Kimball (2018) use a nearly identical definition in healthcare, describing synchronous communication as an interaction in real-time and asynchronous communication as a 'store-and-forward' technique, in which a patient and a doctor collect their information and communicate with each other at a different time.

Although the definitions of Smith (2012) and Mechanic and Kimball (2018) are almost similar, the definition of Smith is used in the present research. Smith's definition of asynchronous communication (i.e. 'no simultaneous participation is required') is more comprehensive than the definition of Mechanic and Kimball who describe asynchronous communication as 'always a technique of storing and forwarding'.

For Valencia et al. (2017), asynchronous telemedicine is cost effective and capable of increasing patient satisfaction. Winkelman and Choo (2013) add that asynchronous medicine improves care outcomes for chronic patients, such as disease knowledge, patient-centred care and empowerment of patients by establishing expertise platforms with an asynchronous character. Similar to the differences between CMC and FtF communication in terms of the interpersonal relationship (Section 2.2.2), most of the studies in the literature on the synchronousness dimension can be found in the field of education.

2.2.4. Healthcare and Education

As previously mentioned, most studies about the effects of altering the dimensions of localisation and synchronousness are conducted in the education field. Education and healthcare are relatively similar in some aspects. First, both can be considered as a service. Second, either in healthcare or education, the recipients (patients/students) have a dependent relationship with the giver (doctor/teacher). Third, both services are governmentally regulated in most Western countries. Fourth, both services should be accessible to the whole population because nearly the entire citizenry uses them. Fifth, both services confront long-term affordability issues and target the efficient use of resources. In conclusion, the findings from the literature in the field of education could also be applied to healthcare, and they are therefore useful.

Distance education, which uses teleconferencing and interactive television-based classrooms, has been existent since the 1980s (Bernard et al., 2004). In the field of medicine, research in the literature about the effects on the interpersonal relationship is rare; on the contrary, studies about the interpersonal aspects of CMC versus FtF communication in the education field yield a wide range of diverse conclusions. For example, the students in the study of Ho (2015) expressed more satisfaction about an interpersonal relationship with FtF communication than the one with the use of CMC. Meanwhile, the students in the study of Jonassen and Kwon (2001) believed in the higher level of quality of interpersonal relations when they used CMC for group decision processes instead of FtF communication.

The review of the literature indicates that research on the effects of synchronous versus asynchronous communication has been conducted in educational contexts. Synchronous

(distance) education nowadays is primarily covered by web-based online environments, including chatrooms, mails and audio- and videoconferencing for synchronous communication, discussion boards and web lectures for asynchronous communication (Huang & Hsiao, 2012; Johnson, 2006). Branon and Essex (2001) reported in their survey that synchronous distance education is primarily useful in virtual team decision-making, brainstorming and community building. By contrast, asynchronous environments are particularly beneficial for encouraging in-depth, thoughtful discussions. Asynchronous communication also offers an opportunity to expand the student–teacher or student–student interaction and therefore provides rich and inclusive types of interchange (Dede & Kremer, 1999). Following the study of Duncan (2012) and the review of Johnson (2006), the combination of synchronous and asynchronous communication, especially in education, is found to maximise educational possibilities.

Therefore, the combination between synchronous versus asynchronous and FtF versus CMC communication offers many new opportunities to the provision of education as well as in the field of medicine. Although education and healthcare are similar in certain aspects, their key difference lies in the interpersonal relationship between patient–doctor and student–teacher. Sharma and Patterson (1984) explored the core variables for the perceived quality of communication and introduced the concept of 'functional quality of communication', or 'how' the message is received. They concluded that this functional quality subsequently has a positive effect on the trust between the sender and the receiver of the message.

Furthermore, Ruppel et al. (2018) discussed in a meta-analysis the idea of self-disclosure, or the verbal revelation of personal information, thoughts or feelings, in CMC and FtF communication. They argued that self-disclosure is based on trust and is essential in care processes such as the exchange of information. As the interpersonal relationship influences the trust between a patient and a doctor and trust consequently affects self-disclosure, the effect of HIM on the interpersonal relationship is therefore relevant to the current study. The revelation of personal information and thoughts can be considered as more important in healthcare than in the education field.

In addition to this difference, which is the personal note of the author of this study, self-disclosure in healthcare pertains to the well-being or the health of a person, and it often includes feelings such as fear, ignorance and impotence. These emotions and the fact that self-disclosure is about an individual's life can and possibly influence the interaction. Therefore, the results of the available literature in the field of education are useful but are not rich or profound enough to be completely adopted to the field of medicine.

2.2.5. Definition of Four Healthcare Interaction Models

The four different HIMs and their corresponding examples are explained in the succeeding sections. The examples of HIMs based on the dimensions of localisation and synchronousness are depicted in Figure 7.

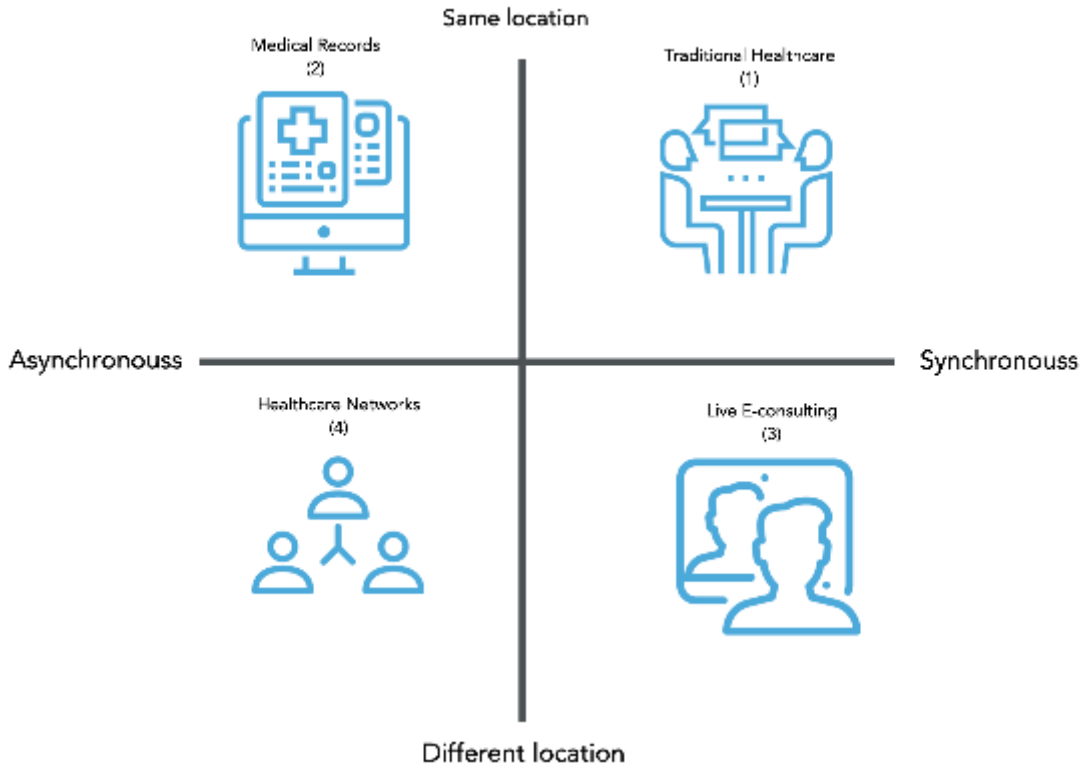

Figure 7: Four examples of healthcare interaction models based on two dimensions.

Healthcare Model 1: Synchronous and the same place: traditional healthcare

The first model can be viewed as the current medical practice and traditional means of providing healthcare. In this model, the patient and the doctor are both in the same location at the same time. An example of this model could be the physical consultation with an internist at a polyclinic.

Healthcare Model 2: Asynchronous and the same place: electronic medical records

The second type of healthcare provision has a more supportive character. An example of this type of interaction can be found in (electronic) medical records (EMRs, in Dutch EPD). In MRs, doctors can post notes or consultation reports in the file of a patient to initially build a medical history of the patient, to render the possibility of discussing the patient with a college and finally to create the possibility of taking care of each other's patients. This interaction is situated in the same physical location, the hospital, but it exhibits an asynchronous character.

Healthcare Model 3: Synchronous and a different place: live e-consulting

Technological developments in the past decades have engendered a secured and high-quality communication between patients and doctors. In this research, communication through direct messaging or audio- or video-conversation between a patient and a doctor is used as the example of this healthcare interaction model. During this type of communication, a patient and a doctor do not have to be at the same physical location, but they can still engage in a live conversation or consultation. Webcamconsult (Webcamconsult, n.d.) is an example of an organisation that

facilitates the technical possibility of live e-consulting, which is used at hospital departments such as dermatology.

Healthcare Model 4: Asynchronous and a different place: healthcare networks

The fourth healthcare interaction model is chiefly based on the idea of Christensen et al. (2009). Christensen developed a model that he referred to as a 'facilitated patients' network'. In such a network, patients with the same chronic disease are interlinked to support, coach and help each other. To secure the level and accuracy of the medical knowledge within the network, doctors are included. With the network, patients and doctors could be at different locations anywhere in the world, and they are still able to interact with each other. Such platforms overcome the limitations of time, thereby creating the possibility of asynchronous communication in addition to the potential of synchronous communication that is still available. Two examples of such an interaction model are myIBDcoach and ParkinsonNet (ParkinsonNet, 2018). Patients and doctors are able to communicate at different times and from different places due to the online component. With myIBDcoach, patients can upload their medical data about their disease at home, which are subsequently examined (within 24 hours) by a doctor; the patient consequently sees the interpretation and reaction of the doctor at a later time.

2.3. Hospital Organisation

To reiterate, the four different HIMs are assumed to affect the organisation of hospitals. To understand these effects and changes, the concept of hospital organisation is discussed in this section.

Before reviewing the literature about hospital organisations, a useful step is to explore the literature about organisational design. Mintzberg (1980, p. 323) identified some elements that appear to be most important in understanding the structuring of organisations'. According to Mintzberg (2008), these elements pertain to the five basic parts of an organisation:

1. Operational core (produces the basic products and services)
2. Strategic apex (comprises top managers and personal staff)
3. Middle line (located between (1) and (2))
4. Technostructure (accountants, work planners, schedulers and so on)
5. Support staff (indirect support to the rest of the organisation, such as PR and legal)

In addition to the fundamental organisational parts, five coordination mechanisms can be identified. The following mechanisms can help 'to accomplish the products and services of the company and its mission' (Mintzberg, 1980, p. 324):

1. Direct supervision
2. Standardisation of work processes
3. Standardisation of outputs
4. Standardisation of skills
5. Mutual adjustment

For Mintzberg (1980), an organisation is a certain configuration of elements (basic parts and coordination mechanisms) that are highly interdependent and complementary to each other. An internal fit of the organisation can be achieved with a high level of complementarities, which is the configuration hypothesis of Mintzberg (1980, p. 328). In addition to the configuration hypothesis, Mintzberg formulated the congruence hypothesis, which includes the external fit of the organisation. Mintzberg (1980) suggested nine design parameters for designing an effective and efficient organisational structure:

1. Job specialisation
2. Behaviour formalisation
3. Training and indoctrination
4. Unit grouping
5. Unit size
6. Planning and control systems
7. Liaison devices
8. Vertical (de)centralisation
9. Horizontal (de)centralisation

In Mintzberg's extended configuration hypothesis, a fit between the internal fit (organisational structure with the design parameters) and the external fit (environment) has to emerge. A good fit creates an organisation structure according to its environment.

Mintzberg focused on the identification of the most important and commonly used elements for designing an organisation, whereas Thompson (2007) demonstrated interest in the relationship between organisational factors and organisational behaviour. For Thompson, the primary process of an organisation should be labelled as the 'technology' of the organisation. His technical rationality aims at a predictable 'technology' of the organisation; in other words, Thompson seeks to reduce the uncertainty in the technology (the primary process) of the organisation. In this regard, Thompson (2007) classified the coordination activities of the organisation into three types: standardisation, planning and mutual adjustment. These activities should be coordinated in a manner that minimises the coordination costs.

Mintzberg (1980) and Thompson (2007) provide general business tools for examining the design of an organisation. In the field of medicine, some studies can be found in the literature about the organisation of hospitals and their design. In their investigation of the increasing organisational complexity of hospitals, Landon et al. (1998) identified certain characteristics that describe the hospital organisation and stated that the hospital organisation influences the quality of care: 'First, organisations directly determine the nature and capabilities of their provides, including the amount of resources devoted to each type of provider. Second, organisations can also influence care by direct contact with enrolees, such as patient education. Third, organisations can adopt a broader population-focussed mission characterized by public health and educational programs aimed at the larger community. Finally, healthcare organisation can directly influence physician behaviour' (Landon et al., 1998, p. 1378). Landon et al. (1998) identified the following structural characteristics:

1. Availability of services
2. Staffing mix
3. Availability of colleagues for consultation

West (2001) also explored the link between hospital design and quality of patient care. In her review, West aimed to 'identify variables at different levels of analysis that could be used for hospital organisation and quality of patient care' (West, 2001, p. 41). She defined two organisational dimensions for examining the organisational design:

1. Organisational structure
2. Organisational processes

Moreover, West (2001) outlined the various indicators for each dimension:

1. Organisational structure
    a. Specialisation of staff
    b. Decentralisation of decision-making
2. Organisational processes
    a. Volume of patients
    b. Coordination of care
    c. Collaboration between medical staff

Hearld et al. (2008) analysed the relationship between the structural characteristics and organisational processes in hospitals to improve the quality of provided care. In their review, the authors used the model of Donabedian (1980) to distinguish structural characteristics (i.e. these stable characteristics facilitate the provision of health services, and they could be mentioned as necessary but not sufficient for delivering care) and process characteristics (directly connected to the service of providing healthcare). Hearld, Alexander, Fraser and Jiang (2008) identified several hospital design indicators and categorised them into the dimensions of structure and process.

1. Structure:
    a. Type of staff members
    b. Size of staff
    c. Hierarchy
    d. Technical support team
    e. Dedicated units

2. Process:
    a. Collaboration between staff members
    b. Communication between staff members
    c. Coordination across the departments
    d. Coordination of care within the department

Aiken et al. (2009) similarly confirmed the effect of the organisational structure on hospital outcomes. In their study, the key structural characteristics are the size, types and mix of medical staff personnel. For the organisational processes, the collaboration between medical staff is described as an essential characteristic.

2.3.1. Hospital Organisation in This Research

The aim of this research is to analyse the effects of HIM implementation on the hospital organisation. Based on the examined literature above, two dimensions for this concept are often identified:

1. Organisational structure
2. Organisational processes

In this research, both dimensions of hospital organisation are considered as useful for studying the hospital's organisational design. The definitions formulated by Donabedian (1980) are acknowledged as thorough for the present research. Based on the aforementioned literature and given this study's aim to identify organisational structure changes, the following structural parameters are considered as relevant:

1. Number of staff members
2. Variety (mix and types) of staff members
3. Job specialisation
4. Specialised or dedicated departments
5. Size of the technostructure
6. Decentralisation of care

(Hospital) Organisation: Structure

	Mintzberg (1980)	**Landon et al. (1998)**	**West (2001)**	**Hearld et al. (2008)**	**Aiken et al. (2009)**
Number of staff members	x			x	x
Variety (mix and types) of staff members		x		x	x
Job specialisation	x		x		
Dedicated departments				x	

Size of the technostructure	x			x	
Decentralisation of care	x		x		

For 'organisational processes', another set of parameters could be selected based on the preceding literature:

1. Volume of patients
2. Coordination of care
3. Collaboration between medical staff

(Hospital) Organisation: Processes

	Mintzberg (1980)	**West (2001)**	**Hearld et al. (2008)**	**Aiken et al. (2009)**
Volume of patients	x	x		
Coordination of care	x	x	x	
Collaboration between medical staff		x	x	x

2.4. Healthcare Performance

The measurement and comparison of the four HIMs in terms of healthcare performance requires a comprehensive performance-score framework. Although some frameworks and instruments are mentioned in the current literature (to be discussed in subsequent paragraphs), neither a single nor a complete framework is available, which can assess the performances of all four models. Therefore, this section presents a synthesis of a total performance-score framework based on the current literature. As stated by the author, this total performance-score framework should fulfil two requirements for this research. First, this framework should be applicable to the Dutch healthcare system; second, it should be capable of assessing each HIM.

Concerning the first requirement, the identification of the needs of the Dutch healthcare system is essential. According to a report of the Dutch Ministry of Healthcare, Welfare and Sport, the total Dutch healthcare system should meet at least the following four needs (Deuning et al., 2011): staying healthy, getting better, living with a chronic illness or handicap and obtaining end-of-life care. These healthcare needs are patient-centred, and they cover all the phases of life. The Dutch healthcare system is required to take care of all citizens from birth to death. Additionally, as these four needs have to be covered within the total healthcare system, each of the four HIMs should contribute to at least one of them if these models plan to be implemented. To score how the healthcare system performs on those needs, the RIVM (Deuning et al., 2011) developed three dimensions, namely 'quality' (including effectiveness, safety, demand-centredness), 'access' and 'costs'.

As previously mentioned, the Dutch healthcare system is ranked as one of the best healthcare systems in the world (Barber et al., 2017). According to the UK-based healthcare sector research firm Health Consumer Powerhouse (2017), the Dutch healthcare system is recognised as the best one in Europe. However, the international comparison of different healthcare systems is difficult due to the diverse frameworks, indicators and quality levels of indicators that are being used in various countries (Braithwaite et al., 2017). Braithwaite et al. (2017) identified and analysed the indicators and frameworks to provide comparative cases and generate information for constructing future frameworks. In their comparison of the healthcare systems of eight Western countries (Australia, Canada, Denmark, England, Netherlands, New Zealand, Scotland and the United States), Braithwaite et al. (2017) concluded that the most commonly used dimensions in performance frameworks are 'safety', 'effectiveness' and 'access'.

A comparison of the international dimensions mentioned by Braithwaite et al. (2017) to the ones developed by the Dutch RIVM indicates that the dimension of 'access' is included in both sets of dimensions. Nevertheless, the RIVM combines the dimensions of 'safety' and 'effectiveness' with 'quality'. A separate dimension is created by the RIVM for the costs; according to Braithwaite (2017), except for the United States, this dimension is not extensively used internationally. More dimensions are included internationally. In Australia, Canada and England, for example, 'efficiency' and 'organisational quality' are part of their frameworks (Braithwaite et al., 2017).

Ten Asbroek et al. (2004) noted a growing demand for performance measurement systems in the Netherlands. As a response to this development, they initiated the construction of a framework for monitoring the healthcare system performance and linked it to the existing policy and accountability processes. In their article, Ten Asbroek et al. (2004) mentioned additional requirements for a performance measurement framework. First, the framework should be balanced and should cover the performance dimensions of 'effectiveness', 'efficiency', 'quality' and 'equity'. Second, the framework should link the performances of healthcare services to the population health. Third, the information required by the government and medical directors should be provided.

Some differences are evident when the dimensions of Ten Asbroek et al. (2004) are compared to the ones of the RIVM (2011). Effectiveness is no longer part of the dimension 'quality', but it has become a dimension on its own. The dimensions of 'equity', 'accessibility' and 'efficiency' are added as well. Moreover, Ten Asbroek et al. (2004) distributed their dimensions across four perspectives (financial, business, innovation and consumer perspectives) and is therefore more extensive for organisational and economic perspectives. A comparison of the dimensions developed by Ten Asbroek et al. (2004) and Braithwaite (2017) reveals the inclusion of 'effectiveness' in both frameworks. However, their frameworks differ, as Braithwaite (2017) includes 'safety' and 'access', whereas Ten Asbroek et al. (2004) incorporate 'efficiency', 'equity' and 'quality'.

RIVM (2011)	Braithwaite (2017)	Ten Asbroek et al. (2004)
Access	Safety	Effectiveness
Costs	Effectiveness	Efficiency
Quality	Access	Quality
1. Effectiveness	Efficiency	Equity
2. Safety	Organisational quality	
3. Demand centredness		

2.4.1. Appropriate Dimensions for Assessing Healthcare Interaction Models

The RIVM framework (2011) provides a strong basis but misses an organisational viewpoint. This issue could be addressed by adding organisational sub-dimensions to the dimensions of RIVM. The framework for this research therefore includes the following dimensions:

1. Quality
2. Accessibility
3. Affordability

2.4.1.1. Dimension: Quality

To reiterate, healthcare can be considered as a service. Therefore, a review of how quality is assessed in other service industries might be useful. Quality is important in a (business) service environment because it influences the attraction of new customers and maintenance of old customers to create a sustainable competitive advantage for the organisation (Lewis, 1993). According to Lewis (1993), quality can be defined as the extent of the alignment of the service delivered with customer expectations, needs and requirements. Cronin, Brady, and Hult (2000) state that the consumer decision-making process for the purchase of services is a complex system. This process incorporates both the direct and indirect effects of behavioural intentions that are influenced by perceived versus expected quality, value and satisfaction. Furthermore, satisfaction is 'a result of the customer's perception of the value received, in which value equals the perceived quality relative to the price' (Cronin et al., 2000, p. 159). This inference is confirmed by Dabholkar et al. (2000) who indicate that quality's role is part of the customer decision-making process.

Numerous tools for measuring quality have been developed, of which SERVQUAL (Parasuman, Zeithaml, & Berry 1988) is the most well-known and most dominant one. SERVQUAL, a multiple-item test for measuring the consumers' perceptions of service quality, includes the dimensions of tangibles, reliability, responsiveness, assurance and empathy (Lewis, 1993). SERVQUAL is used for testing service quality in many different service industries. Prior to the development of SERVQUAL, Thompson (1983) stated that healthcare expectations are also a vital element for (perceived) quality. However, Vandamme and Leunis (1993) argued that SERVQUAL is not a useful tool for measuring hospital quality. They rationalised their perspective as follows: (a) most of the time customers create expectations based on earlier experiences, which is not always possible for patients, and (b) the dimensions of SERVQUAL do not completely cover the dimensions of quality, which are regarded as important by patients in healthcare (e.g. infrastructure, personnel and safety). Duggirala, Rajendran and Anantharaman

(2008) similarly noticed the same shortcomings and designed a new patient-perceived total quality service (TQS) instrument, including the dimensions of infrastructure, personnel quality, process of clinical care, administrative procedures, safety indicators, overall experience of received medical care and social responsibility. This instrument is partly based on the dimensions of SERVQUAL, but it includes additional healthcare-related dimensions and defines healthcare-specific indicators.

Instruments such TQS are useful for measuring patient-oriented quality outcomes. However, this aspect does not fully cover the requirements in this study in terms of quantifying the dimension of 'quality' in healthcare performance. Quality in healthcare is not only analysed by the patients' perception of quality; it also needs to cover an expanded range, using multiple sub-dimensions for quality. Therefore, the sub-dimensions of effectiveness and safety, both of which are in the RIVM model (2011) and in the scorecard of Ten Asbroek et al. (2004), are added to the dimension of 'quality'. In the current study, the quality dimension is divided into the following sub-dimensions:

a. Effectivity
b. Safety
c. Patient's perspective
d. Employee perspective

2.4.1.2. Dimension: Accessibility

In the analysis of Braithwaite et al. (2017), the 'accessibility' dimension is evident in almost all performance frameworks; therefore, accessibility can be considered as an important dimension. The RIVM (2011) subdivided accessibility into geographical accessibility, financial accessibility, freedom of choice, availability of staff, waiting time and accessibility of needs. Ten Asbroek et al. (2004) defined dimensions such as financial accessibility, concentration of care provision, availability of human resources and availability of choice of insurer and provider, which are relatively similar. Aday and Andersen (1974) developed a framework for measuring the accessibility of healthcare, in which sub-dimensions identical to the ones of the RIVM and Ten Asbroek can be identified. Based on the dimensions found in the literature, accessibility is divided into the following sub-dimensions:

a. Financial accessibility for patients
b. Geographical accessibility
c. Availability of human resources
d. Availability of choice of healthcare provider

2.4.1.3. Dimension: Affordability

As mentioned in the introduction, the costs of the healthcare system are expected to increase, and this development is unlikely to stop with the current configuration of the healthcare system (Arts en Auto, 2013). The possible solutions for maintaining the affordability of future healthcare systems are therefore highly relevant in managerial terms. Although affordability is not a

commonly used dimension (Braithwaite et al., 2017), it is an essential one for the Dutch healthcare system according to the Dutch Ministry of Healthcare, Wellbeing and Sports (RIVM, 2011). The RIVM subdivided the dimension of affordability into the following sub-dimensions: expenses (total, growth, percentage to GPD, per capita), financial viability of insurance companies and healthcare organisations, degree of implementation of new innovations, effectiveness and contribution to prevention. Ten Asbroek (2004) included similar sub-dimensions: health system costs, development and substitution of organisational innovations, financial viability of financiers and care providers. As the present study intends to analyse the different HIMs' to contribute to the long-term affordability of the healthcare system, the following sub-dimensions are deemed to be the most relevant to this research:

a. Healthcare expenses
b. Organisational costs

Indicators are necessary to test the HIMs and score them on the three dimensions and the corresponding sub-dimensions. The RIVM developed several performance indicators for each dimension (RIVM, 2011). Ten Asbroek (2004) also established a list of indicators for each perspective of the scoreboard. Additionally, indicators developed by Duggirala et al. (2008) for the total patient-perceived quality service framework can be used for the sub-dimension of patient's perspective. The indicators used in this study are presented in Section 3.3.

Altogether the lists provide a large number of different indicators; however, not all the established indicators are relevant to this study. Therefore, numerous indicators are selected for each dimension. The indicators, which are applicable and measurable for at least three out of the four healthcare models, are selected. This step allows for the comparison of the different healthcare models. Most indicators mentioned in literature are measurable; nonetheless, they are only specific for one healthcare model and therefore lacking in the capacity to be used in a cross-case analysis. The complete list of selected indicators is provided in Appendices A to D. However, Braithwaite's list of indicators is unavailable.

The operationalisation of each indicator for this research is discussed in the succeeding s. Before undertaking this step, the relationships among all the concepts of this research are explained and elaborated in a conceptual model.

2.5. Conceptual Model

The three key concepts of this research — healthcare interaction model, hospital organisation and healthcare performance — are discussed in the previous four sections. As mentioned in the introduction, this study aims to explore how the implementation of HIMs changes the hospital organisation and the extent to which this implementation affects the healthcare performance of these hospitals. Moreover, the focus of this study is the analysis of the relationships among the relevant concepts.

To reiterate, this study does not expect the implementation of the four HIMs to change the structure of or the sequence in the patient journey. Moreover, the first relationship that is expected in this study concerns the effect of the configuration of the business model (BM) components of each HIM on the hospital organisation, specifically the structure and processes. As discussed in the previous chapter, an HIM consists of four BM components: job-to-be-done element, resources, processes and profit. Taking into account the current patient journey, it already includes different job-to-be-done components for various stages. However, for the new HIMs, the resources and processes could possibly be different, thereby affecting the hospital organisation.

The second expected relationship that may be found concerns the direct effect of the hospital organisational changes associated with HIM implementations on the healthcare performance of that hospital. Therefore, different HIMs could generate diverse performances in quality, accessibility and affordability. Taking into account both relationships, a conceptual model can be derived (see Figure 8).

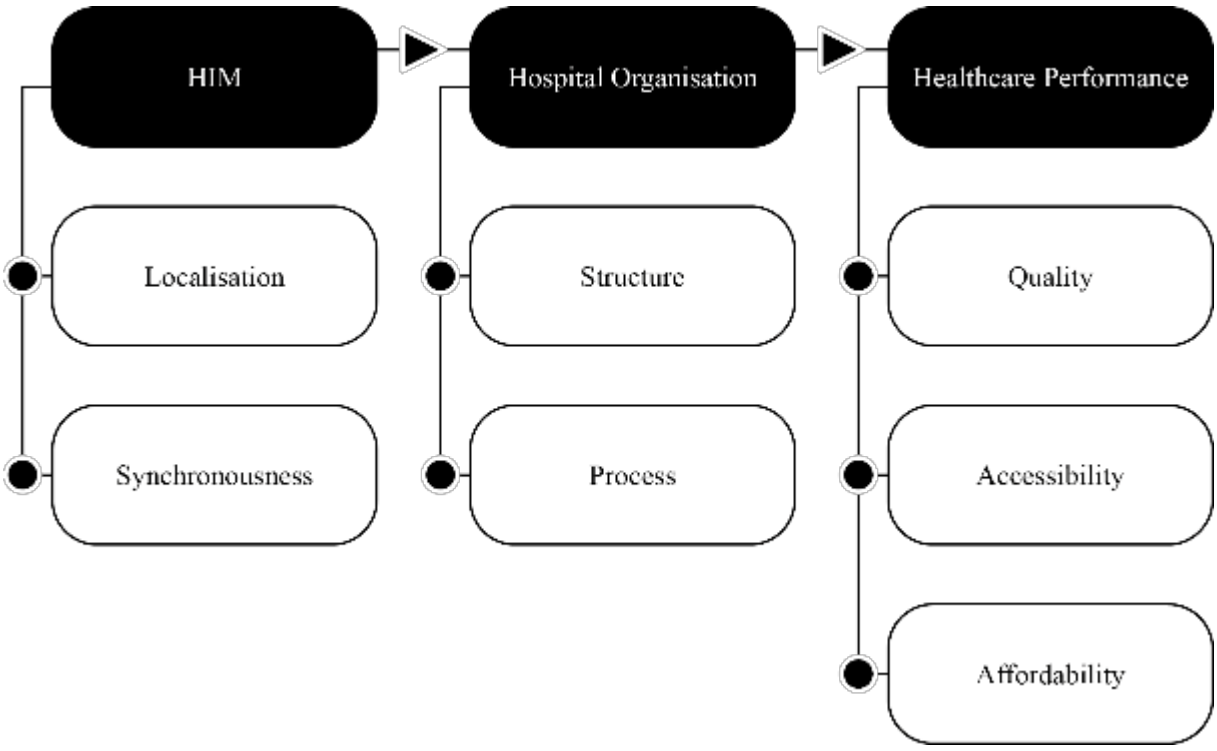

Figure 8: Conceptual model of this research.

3. Methodology

This chapter initially describes the research strategy adopted in this research. It subsequently explains the research design and the operationalisation of the concepts and indicators used in this study. Furthermore, data collection, respondent selection and analysis strategy for deriving the desired patterns and insights are then detailed. The final section of this chapter discusses the ethical aspects of this study.

3.1. Research Strategy

A qualitative research method was adopted to answer the research question of this study. In qualitative research, a real-life social phenomenon is described and examined in such a way that underlying causes, structures, patterns and relations can be detected using linguistic materials such as interviews, documents and observations (Blijenbergh, 2013). Furthermore, the objective of qualitative research is to determine the multiple underlying causes and structures that describe and explain the outcome variable (Blijenbergh, 2013). As the aim of the present study is to identify the multiple underlying causes of how the HIM implementation changes the hospital organisation and its effect on healthcare performance, a qualitative method is the most applicable. Moreover, to identify these underlying causes and patterns to be able to answer the research question, personal in-depth data were necessary and subsequently requested. As qualitative research provides the capacity to gather personal data and information from a small group of selected interviewees for a few variables, a qualitative method is also more appropriate than a quantitative method, which is focused on multiple variables and a large group of participants.

3.2. Research Design

As the aim of the present study is to identify the multiple underlying causes of how the HIM implementation changes the hospital organisation and its effect on healthcare performance, a qualitative method is the most applicable.

3.2.1. Deductive Approach

A research can start from either a deductive or an inductive approach. In this study, the existing literature was used for individually describing and analysing the concepts before the collection of empirical data. A deductive approach provided the possibility to define and formulate a theory including the individual concepts; more importantly, it prevented the study from missing essential existing theories, which could have resulted in a less powerful analysis. These arguments prompted the selection of a deductive approach as the most suitable approach for this research.

3.2.2. Multiple-case Study Approach

This study aims to examine the hospital organisational changes that are associated with the implementation of four HIMs and its effects on the healthcare performance of hospitals. The related causes, patterns and relations are thus described and examined. The case study approach is deemed to be the most appropriate for this research.

This research used a multiple-case study approach. The same case study 'may contain more than a single case' (Yin, 2014, p. 56). The authors believed that the research question could be best answered by the inclusion and cross-analysis of multiple hospitals. One major advantage of the multiple-case design is that the found evidence and conclusions of each single case can be tested and compared, which has substantial analytical benefits (Yin, 2014).

The cases were selected based on literal replication. Through literal replication, the outcomes and patterns are expected to be similar in all cases (Yin, 2014). This form of replication was appropriate for this study because the implementation of the four HIMs had similar expected effects, regardless of the hospital or its context. First, all Dutch hospitals have a similar structural financial (reward) system. Second, all Dutch hospitals have a similar access to HIMs. Third and most importantly, all Dutch hospitals have a similar purpose and contribution to society: healthcare provision. However, a key aspect should be highlighted: HIMs are recently developed and still developing, which raises questions about the similarity between cases.

The cases are selected based on the criteria that the four HIMs are implemented or the case has an intent to implement the HIM in the short term. Moreover, the cases were selected based on their interest in this topic. Cases 1, 2 and 3 are academic hospitals, whereas Cases 4, 5 and 6 are regional hospitals.

Description	Code
Radboud UMC	RUMC
Erasmus MC	EMC
Maastricht UMC	MUMC
Diakonessenhuis Utrecht	DU
Rijnstate Ziekenhuis	RZH
Meander MC	MMC

3.3. Operationalisation

The operationalisation of the core concepts and their (sub)dimensions and indicators is elaborated in this section. First, a stipulative definition of the core concepts is provided. The corresponding indicators of these concepts are subsequently outlined with stipulative descriptions. The stipulative descriptions are based on the theoretical background discussed in the previous chapter.

Concept	Stipulative Definition
Healthcare interaction model	A way, tool or method for interaction and how a patient and a doctor communicate
Hospital organisation	Divided by the dimensions of 'HIM implementation', 'organisational structure' and 'organisational processes'; it enables the examination of the effect of the changes by HIMs on the hospitals organisation
Healthcare performance	A framework developed for this study to allow the testing of the performance of an HIM in the dimensions of quality, accessibility and affordability

3.3.1. Indicators

The indicators were selected based on their relevance to the analysis. The indicators included in this study were considered during the interviews and later used in the coding. As some indicators were more applicable to the discussion of certain respondent types, not all the indicators were discussed with all respondents.

Similarly, not all the indicators are discussed in the results. The indicators covered in Chapter 4 are deemed to be relevant to answering the research (sub)questions. The indicators that were not tackled were useful in identifying and understanding the patterns and mechanisms supporting the analysis.

Healthcare Interaction Model

Indicator	Stipulative Description
CMC	Whether an ICT/IT platform is used or involved
FtF	Whether face-to-face communication is used or involved

Hospital Organisation

Sub-dimension	Indicator	Stipulative description	Reference
Organisational structure	Size of medical staff	Number of medical staff employees of a certain organisational unit	Section 2.3.1
	Variety (mix and types) of staff	Differentiation of staff employees and how it is combined or mixed within the organisational unit	Section 2.3.1
	Job specialisation	Whether a staff employee is specialised to do a specific job	Section 2.3.1
	Dedicated departments	Whether a hospital department is specialised or dedicated to a specific medical concern	Section 2.3.1
	Size of the technostructure	Size of the support staff, which is needed in the organisation to coordinate the departments	Section 2.3.1
	(De)centralisation of care	Whether the care is centralised or decentralised organised	Section 2.3.1
Organisational processes	Volume of patients	Number of patients being treated by a doctor or a department	Section 2.3.1
	Coordination of care	Coordination of care (e.g. appointments) across or within an organisational unit	Section 2.3.1
	Collaboration between medical staff	Collaboration and possibility to collaborate between staff employees	Section 2.3.1

Healthcare Performance

Dimension	Sub-dimension	Indicator	Stipulative Description	Reference
Quality	Safety	Attention to prevention	Degree of contribution to prevention	RIVM
	Patient's perspective	Patient centredness	Extent to which the provided care is centred on the patient	RIVM, Ten Asbroek
	Patient's perspective	Quality of personnel	Perception of the patient regarding the ability of personnel	RIVM, Clearpoint Indicators
	Patient's perspective	Shared decision-making	Perception of the patient regarding the extent to which she or he is able to influence the process of making healthcare-related decisions.	RIVM
	Patient's perspective	Patient's satisfaction	Overall satisfaction of a patient	Clearpoint Indicators, Ten Asbroek
	Employee perspective	Employee satisfaction	Overall satisfaction of the employee	Clearpoint Indicators
	Employee perspective	Employee's workload	Overall workload perceived by the employee	Clearpoint Indicators
	Effectiveness	Preventable appointments	Whether an appointment is preventable in retrospect	Inductively created during coding
Accessibility	Geographical accessibility	Travel time to healthcare utility	Time between a patient's home and the utility.	RIVM
	Geographical accessibility	Number of utilities	Number of utilities where the care is available in a certain area	RIVM, Clearpoint Indicators
	Available human resources	Waiting time	Time a patient has to wait before he or she can be served	RIVM, Clearpoint Indicators
	Availability of choice of provider	Restrictions in the selection of care provider	Indicates if the patient can select in his or her doctor of choice	RIVM
Affordability	Healthcare expenses	Total (system) expenditures	Total expenditures of the provided healthcare	RIVM, Clearpoint Indicators, Ten Asbroek
	Healthcare expenses	Coordination costs	Costs involving the coordination of care within an organisational unit	Christensen
	Healthcare expenses	Hospital revenue	Income and revenue that are collected by a hospital	Inductively created during coding

3.4. Data

This section focuses on two topics: data collection and data analysis. The former tackles the method for gathering the data and the resources available for conducting this study; it also summarises the list of respondents. In the data analysis section, the coding process adopted in this research is elaborated.

3.4.1. Data Collection: Method, Resources and Selection

In this research, semi-structured qualitative interviews were utilised as a method for collecting data. Case studies may rely on 'a single method for collecting data; interviews are popular'

(Symon & Cassell, 2013, p.355). Semi-structured interviews provide the opportunity to create a focus on the important topics of the research, while maintaining the possibility for the interviewees to answer in their own words, experiences and thoughts.

As mentioned in section 3.3.1, not all indicators are relevant to be discussed with all respondents. To collect the most significant information, three types of respondents (the data sources) were categorised based on the trias in healthcare (Fuijkshot, Versteeg, Verweij, Hilders, 2018):

1. Medical staff member (healthcare provisioner)
2. Employee of an insurance company (healthcare insurance company)
3. Patient (healthcare consumer)

This research required the incorporation of all perspectives to evaluate the broad and entire effects of the implementation of HIMs. The three types of respondents with diverse perspectives were included for a triangulation in the analysis. The semi-structured interview protocols were subsequently adapted for each respondent type (see Appendix D for the staff member, Appendix E for the patient and Appendix F for the insurance company). The interview protocols were considered as a guide during the interviews; additionally, for each respondent type, further in-depth questions concerning specific relevant indicators were asked.

The respondents were selected based on their involvement in the implementation of HIMs or experience with the effects of HIMs. Second, the respondents' availability and personal interest in this topic were then considered as selection criteria. All the respondents were personally contacted by the researcher through LinkedIn invites, personal networks or cold phone calls.

The research was initially focused on two departments. One was the Department of Geriatrics, the rapidly aging population of which has a major financial consequence. The other department was Internal Medicine, where a number of patients have chronic diseases. However, the lack of availability of these departments prompted the expansion of the scope to all hospital departments. A positive side effect of this change was that it enabled the examination of the effects of HIMs between departments.

The list of respondents is as follows:

Respondent	Case	Type and Description	Date	Duration
RUMC-1	Radboud UMC	Head of Geriatrics	26-02-2020	0:39:44
P1	Diabetes Vereniging	Board member	27-02-2019	0:57:40
P2	Parkinson Vereniging	Advisory council	18-03-2019	0:41:10
EMC-1	Erasmus MC	Head of research in patient journey studies	20-03-2019	1:01:20
RZH-1	Rijnstate Ziekenhuis	Staff member of Internal Medicine	12-04-2019	0:56:39
I1	Zilverenkruis Achmea	Head of strategy and policy	26-02-2019	0:32:16
DHU-1	Diakonesse Utrecht	Staff member of Neurology	14-03-2019	0:55:53
EMC-2	Erasmus MC	Head of Dermatology	01-06-2019	0:58:06
P3	Patient+	Owner of Patient+	01-06-2019	0:38:30
MUMC-1	Maastricht UMC	Staff member of MDL	26-04-2019	0:45:51
MMC-1	Meander MC	Head of Anaesthesiology	23-05-2019	0:51:38
RUMC-2	Radboud UMC	Head of Surgery	27-05-2019	0:49:36

3.4.2. Data Analysis

In this study, all the interviews were recorded and transcribed for the analysis process. Symon and Cassell (2012) define coding as the process of attaching a code to a text to index it to a theme. In the current study, the codes were based on the operationalisation described in Section 3.3.1. However, some new codes were added during the coding process and were developed inductively. ATLAS.ti 8.4.3 was used to support the coding process in this study. The final code scheme is provided in Appendix H.

After the coding process, the interviews with their codes were analysed, supported by the query function of ATLAS.ti. In addition to the transcribed interviews, memos of the interviewer were analysed, which were noted during the interviews.

3.5. Research Ethics

All the respondents voluntarily participated in this study and gave their informed consent before and after their interviews. When the participants were approached, the aim of the study was explained by email or phone, which was reiterated during the introduction of every interview. All the participants had the opportunity to ask questions and review their answers throughout the study. Moreover, all the participants were treated with care, respect, anonymity and confidence: neither confidential data nor identificational information was published.

4. Results

This study aims to elaborate the organisational changes that are associated with the implementation of healthcare interaction models (HIMs) and how this implementation affects the hospital healthcare performance. This chapter presents the results of this study, using the four sub-questions. The first section of this chapter focuses on the extent of success of HIM implementation. The second and third sections deal with the effects of the implementation on the hospital structure and hospital processes, respectively. Finally, the effects on hospital healthcare performance are presented.

Before the elaboration of the results, some important notes according to the results are made. First, as this study is not aimed to explore a probable change in the structure of the patient journey, it sticks to the sequence of stages as presented in Section 3.1. Instead, this research is focused on examining the effects of HIMs on hospital organisation and hospital healthcare performance.

Second, to assess the associated effects on the hospital organisation, not the (examples of) HIMs themselves but their underlying fundamental characteristics (dimensions) are used for the analysis, namely localisation and synchronousness. In addition to its dimensions, an HIM is a configuration of four business model (BM) components: job-to-be-done, resources, profit formula and processes. To reiterate, an HIM can therefore have multiple possibilities for BM configuration.

Third, the HIM 'medical records' (MR) is placed in the upper-left quadrant and is thus classified as 'same location' in the dimension of 'localisation'; however, based on the research results, MR is categorised under 'computed-mediated communication' (CMC). In other words, the analysis of the effects of 'same location' versus 'different location' is about 'traditional healthcare' versus the other three HIMs, including the topic of medical records.

4.1. Extent of Success of the Implementation of HIMs in Hospitals

Nearly all of the cases' preoccupation with the implementation of at least one healthcare interaction model became evident during the study. The analysis therefore is focused on the current implementation tracks and complemented implementations of HIMs. Table 1 provides an overview of the status of the six cases.

Table 1: Current situation of the HIM implementation of the six cases.

Case	*Asynchronous – Same location*	*Asynchronous – Different location*	*Synchronous – Different location*
Academic Hospitals			
1	Implemented	Implemented	Implementation started
2	Implemented	Implementation started	Implementation started
3	Implemented	Implemented	Not started (yet)
Regional Hospitals			
4	Implemented	Implemented	Not started (yet)
5	Implemented	Not started (yet)	Implementation started
6	Implemented	Implementation started	Not started (yet)

As depicted in Table 1, all the cases were still proceeding with the implementation of one or more HIMs. This result is not surprising because the (technological) availabilities for the HIMs have only existed for a few years. However, during the analysis of the data derived from the interviews, several different but recurring implementation issues emerged. These implementation issues slowed down the pace of implementation or even completely delayed the start of an implementation; these issues can be categorised as cost-related, governmental, ICT-related and human-related factors. These four categories are elaborated in Section 4.1.1 to Section 4.1.4. These sections include an analysis of the differences between academic (Cases 1, 2 and 3) and regional hospitals (Cases 4, 5 and 6).

4.1.1. Cost-related Factors

One of the most apparent factors that underlie the limited degree of implementation of HIMs can be related to the costs of HIMs. The initial costs especially constitute a major issue in multiple cases. These initial costs include hardware and infrastructure costs. As respondent MUMC-1 states, *'The implementation costs a [vast amount] of money, in particular the investment in technological hardware and connections, [among others].'*

MUMC-1, who works in an academic hospital, also addresses the second cost-related issue that is mentioned by multiple other respondents, namely the lack of clarity about who should pay for these new implementations: *'We did not get any extra money. [The new implementation] had to be cost efficient, which proved difficult. If everyone says [that the implementation] will be cheaper, then the hospital has to pay, while the hospital refers to the insurance company. [The matter] is about the start-up costs to save costs at the end. Someone has to take the first step.'*

A similar situation has been experienced in Case 5 (RZH). As RZH-1 explains, *'You first have to consider the costs before you can have a sense of the benefit. The hospital has to pay this investment first, but it does not have the financial resources to invest.'*

In both cases of MUMC-1 (3) and RZH-1 (5), an academic and a regional hospital, respectively, no budget was available for the implementation costs. In Case 3, neither the hospital nor the insurance company intended to pay for these initial costs. In addition, RUMC-1 suggested that the hospitals, government and insurance companies should cooperate: *'As a hospital, you are responsible for the technological infrastructure. The government and the insurance companies should determine which way we are going to enable the hospital to invest smartly.'*

For both regional and academic hospitals, clarity about who should take care of the (initial) costs for HIM implementations is lacking. As RZH-1 explains, *'There is no regulation for both types of hospitals. A hospital can determine on its own the specific direction [to pursue].'* Additionally, no difference between regional and academic hospitals is found for this issue in the results.

A third cost-related factor pertains to the costs of (software-related) maintenance and education of the HIMs. Case 5 (RZH) refers to the maintenance costs for their MR; meanwhile, the continuation costs after the implementation are mentioned in Case 1 (RUMC).

RZH-1: 'A huge amount of our budget of maintenance is going to the medical record systems.'

RUMC-1: 'We have noticed from previous projects that the implementation can be successful, but the maintenance is very difficult and expensive.'

The initial hardware and software costs explain the difficulty of implementing HIMs. In particular, the issue of who should pay for these initial costs is unclear: the hospitals or the insurance companies. This concern holds for both regional and academic hospitals.

The insurance companies are also part of another reason for the delay in implementation: governmental and insurance regulations. This topic is detailed below.

4.1.2. Governmental and Insurance-related Factors

The current regulations constitute another barrier to the HIM implementation process. According to respondent MMC-1, the doctors are obliged to physically see a patient on a regular basis, which is not conducive to the implementation of consulting over distance or asynchronous consulting: *'The traditional model is commonly used right now. That approach is mainly driven by a number of rules and guidelines, which state that we have to meet the patient for a certain frequency.'*

Another frequently heard argument is the recently introduced GDPR, which regulates the European privacy laws. The introduction of the GDPR complicated the development of organisational and patient-friendly MRs. The connection between different software applications to exchange medical data was specifically recognised as a major difficulty. As RZH-1 argued, *'The exchange of (medical) data is sometimes also impossible due to the GDPR. That factor is a big disadvantage, especially for the patient.'*

Another issue is a financial one: the current financial infrastructure is unprepared for new HIM configurations. In other words, the traditional model is financially the most interesting for both academic and regional hospitals because new configurations tend to reduce hospital incomes. Academic hospitals also have research departments and complicated care compensations, whereas regional hospitals depend on the delivered (basic) care. For the latter, the basic incomes are essential to remain financially viable. In Case 2 (EMC, academic) and Case 6 (MMC, regional), the decrease in hospital income via a more efficient provided healthcare slowed down the implementation of HIM.

EMC-1: 'It should not be possible for the hospital that by organising your business more efficiently, you lose a part of your revenue. Changes have to made in the financial constructions.'

MMC-1: 'The success of the consult was very moderate because the clinical department earned less for each consult than with the traditional situation.'

However, Case 2 (EMC) experienced a more frequent use of e-consulting when the insurance company changed its financial model: *'We reached a special agreement [with insurance companies], which included a similar financial reimbursement in proportion to a traditional consult.'*

4.1.3. ICT-related Factors

Data confirmed that a handful of different medical record systems (MRs) are applicable for hospitals in the Netherlands. Although each system has its own benefits, it hinders the integration and thus the implementation of HIMs.

RZH-1: 'Currently the exchange of information is not possible, [although such exchange] is about the same patient. The "curtains" between hospitals should be removed. Unfortunately that solution is technologically very difficult.'

MMC-1: 'We have our own MR system, which offers the advantage of allowing us to organise the system however we want. On the contrary, you have to fight hard to get everything connected to the outside world because everyone has their own system.'

According to MMC-1, their hospital experienced difficulty with connecting different applications to their own MR. In the case of RZH-1, the lack of connectivity between the systems slowed down the daily patient information exchange. Respondent MMC-1 concurred that the lack of connectivity between MRs similarly slows down the capability to create a complete medical overview of the patient: *'All parties have their own MRs, which is a huge problem. A central overview with all the relevant information about the patient is still lacking.'*

Despite the existence of multiple MR suppliers, some attempts have been made to connect the different MRs. However, this solution has not yet produced the desired results. Respondent MMC-1 primarily attributed the shortcoming to the steep requirements: *'The creation of a superior system is difficult because the required demands are ridiculous, making such a system impossible. If you want such a system, it should be organised centrally: either by the government or the insurance companies.'*

For most respondents, the lack of connectivity between systems within the hospital seems to be an issue; however, in Case 3, the connectivity issue is not a problem at all. According to MUMC-1, *'We just work on two screens. Nobody complains, and people do not have any work limitations.'*

4.1.4. Human-related Factors

The research identified multiple human-related aspects that affected the successful implementation of HIMs. Moreover, the doctors seemed to be a key factor in the patients' adaption process.

EMC-2: 'The patient's response is a reaction to the enthusiasm of the doctor, and the doctor should simply offer it. There should be a change in routine. If you have no customers or patients,

then you have to do something. However, as all the doctors currently have too many patients, the need to change is low.'

MUMC-1: 'Surprisingly, patients often just want to come along. Enthusiasm simply works. Meanwhile, you notice the traditional problems with change management, especially with older colleagues.'

EMC-2: 'Last year, with an ample amount of attention, the implementation and the usage were equally successful. However, after a year, the implementation and the usage dropped once again. Doctors have quite a fear of something new.'

In Case 3 (MUMC), the intrinsic enthusiasm of the doctors influenced the patients' adaption; she described that most of the patients from her hospital adopted the HIMs when the doctors were enthusiastic. In Case 5 (RZH), the adaption got a setback when the department's board started paying less attention to the adaption. Respondent EMC-2 concurred with Case 3 regarding the need for enthusiasm but mentioned another issue: doctors do not adapt new HIMs because they do not have to do so. Currently doctors have more than enough work, and their agendas have been overscheduled. Additionally, they simply lack the (financial) impulse to change their behaviour. This factor, in combination with a decrease in hospital income (previously discussed in Section 4.1.2) via the use of new HIMs, possibly creates a major obstacle to implementation.

The new HIMs similarly complicate the patients' adaption. In the case of MUMC for example, the respondent stated, *'Most of the resistance is frequently found in the fear of "even more administration", but that is not the case at all.'*

Moreover, due to its current additional role, the use of HIMs is considered as an alternative in multiple cases. Given that the HIM is an alternative that can be chosen, a slowdown in the adaption has occurred. For example in Case 2 (EMC-2), *'The use of an HIM is not a common habit; hence, you sometimes get a response such as "You don't necessarily have to".'* From the patient's perspective, this approach could be done differently. As patient respondent P1 stated, *'I believe that HIM implementation is done too softly. Simply saying, "This is the new way to go" would be a more successful approach.'*

However in Case 1 (RUMC), one of the implementations was not an alternative but the new protocol, consequently generating the desired outcomes. As RUMC-1 explained, *'We have reversed the situation. Everything that is standard is done remotely now, unless… . Now the use of the HIM just happens, and hardly anyone remembers the old situation.'* In another department of Case 1, RUMC and an academic hospital, a search for the best adaption process is underway to boost the success of the implementation in the subsequent years. As RUMC-1 stated, *'At the board we want to discover what works and what does not. We currently investigate the adaption barriers and how we can overcome them.'*

The results suggested that the adaption by doctors was slightly more difficult for academic hospitals than for regional hospitals. Nonetheless, an explanatory reason was not found.

In addition to the adaption by medical employees, an adaption by patients is needed. Both from the patient's perspective (P1) and the medical employee's standpoint, adaption problems in the technical abilities of patients are evident. Meanwhile, respondent P3 discussed from the patient's perspective the difficulty of reading the doctor-written medical content for patients.

P1: 'We hardly do any live e-consult. The reason is that many of our patients are older and less digitally capable and equipped.'

DHU-1: 'I believe that the digital medical healthcare is accessible to a good digital generation. For those who are not, the MR and video consultation are inaccessible.'

P3: 'The terminologies in majority of the medical files are largely unsuitable for patients.'

The data indicate the presence of enthusiastic, technology-using doctors and non-IT-using doctors; however, the same variance can be identified among patients. A mismatch is subsequently conceivable, and this mismatch is described by respondent P2 from the patient's perspective:

P2: 'We see a notable mismatch. Patients wanting to digitalise are faced with a doctor who no such intent, and vice versa.'

The results suggest that most of the organisations in this study are evidently still implementing one or more HIMs. Several issues have slowed down the implementation of HIMs. The issues include cost-related factors such as high initial costs, lack of clarity about who should pay and requisite maintenance costs. Factors related to the government and insurance companies also influence the HIM implementation, especially GDPR and absence of a new appropriate financial infrastructure. Moreover, the existence of different MRs, lack of connection between these MRs and difficulty with connecting HIMs to MRs are some of the ICT-related factors. With regard to human-related factors, the most important ones are the partial enthusiasm of doctors, the lack of obligation and the patients' (digital) adaption problems.

A major difference in the HIM implementation success between academic and regional hospitals could not be identified. This result may be explained by the following factors that hold for both categories: the same financial system, the same insurance companies to deal with and the same regulations to follow. However, academic hospitals, which are more research- and pilot- oriented than regional hospitals, are apparently more likely to implement new HIMs and therefore more driven to proceed with the undertaking. Their financial resources may be a factor as well. On the contrary, the adaption by doctors when an HIM is implemented seems to be more successful in regional hospitals.

Following the analysis of the HIM implementation process in the researched organisations, the examination of the effects of such an implementation on the hospital organisation itself is of importance. The structural organisational changes associated with the implementation of HIMs are the point of interest in this regard, which are discussed in the succeeding section.

4.2. Organisational Structural Changes That are Associated with HIM Implementation

The previous section provided an overview of (partly) completed HIM implementations. In Section 4.2, the effects on the organisational structure associated with HIM implementations are analysed. The structural changes are initially examined because the researcher believes that the structure of the organisation should support the processes in the organisation. This view is supported by Christensen who argues that a new structure is necessary for the successful introduction of a new business model (Christensen, 2009, p. 28). However, as mentioned by nearly all the respondents, in the cases the structure is largely modified after the processes have been changed, resulting in not only poor but also a few successful implementations.

Throughout this section, the structural changes derived from the data are evaluated on three organisational levels: macro, meso and micro. The structural changes discussed in these paragraphs are mostly structural changes that are expected to happen. Most of the structural changes could not be observed yet due to the recent implementation of HIMs.

First, the centralisation, specialisation of medical staff and vertical decentralisation were noticeable. The implementation of HIMs was considered to have played a crucial role in these structural changes. These types of structural changes have changed the position of hospitals and therefore have influenced the total Dutch healthcare at the macro level. Second, at the meso level, the structure of hospitals has been affected, thereby reducing the amount of required facilities and size of the planning personnel. These meso-level issues are classified as changes in the technostructure of a hospital. At the micro level, the structural organisation of an individual department within a hospital, a shift in the required personnel and task differentiation has occurred at both academic and regional hospitals.

Table 2 provides an overview of the identified structural changes. It also outlines whether a structural change is an effect of an alternation in localisation and/or synchronousness in comparison to the traditional model.

Table 2: Identified structural changes.

Level	Localisation	Synchronousness
Macro	• Centralisation of care • Specialisation of medical staff • Vertical decentralisation of care paths	• Specialisation of knowledge
Meso	• Reduction in the required hospital facilities	• Reduction in the required hospital facilities • Reduction in the required planning personnel
Micro		• Demand for various types of staff members

4.2.1. Macro Structural Changes: Centralisation of Care, Specialisation and Vertical Decentralisation

A first structural change that was repeatedly mentioned, with the alternation of the dimension localisation, was the centralisation of care. The centralisation of care corresponds to a specialised centre that focuses on a (few) disease(s). In the traditional model, patients always have to drive long distances to go to such a specialised centre. However, not all of these patient can reach the specialised care centres that are already in place. From the patient's perspective, respondent P1 observed that this concern has prompted a group of patients to simply disregard these specialised centres because they refuse to travel far: *'Some patients also think, 'I am not going there because it is so far away".'*

However, for Case 2 (MMC-1) and Case 6 (EMC-2), an academic and a regional hospital respectively, specialised care at a distance became possible without traveling through HIMs that include computer-mediated communication.

MMC-1: 'We practice centralisation for surgery to achieve a better quality, which also includes remote care.'

EMC-2: 'We do webcam-consulting to eliminate a patient's need to go back and forth for small messages every time.'

Aside from specialised care, highly centralised knowledge can become more accessible across the country through alternations within the dimension of synchronousness: centralised smart medical networks or platforms about a single disease could present an opportunity to make highly centralised knowledge available anywhere and anytime. One example of such a network is ParkinsonNet, which is starting to build these types of communities.

P2: 'Much more knowledge is available on the digital platform ParkinsonNet, which you can always consult as a patient. You can easily ask fellow patients certain questions, which reduces the amount of time for dealing with a single question. The patients' quality of life consequently improves.'

However, the centralisation of care has altered in particular the local role of regional hospitals. Regional hospitals are essential for ensuring the high volume of basic medical knowledge of all the departments, thus guaranteeing that patients have access to all the specialisations within their own region. The centralisation of care therefore raises the issue of whether hospitals — a collection of multiple departments — are still needed. From the patient's perspective, this centralisation of care prompts another question, that is, whether patients indeed prefer such centralisation of care. For example, proper approaches and cultural differences between regions are important matters for patients. Patients, who are in one of their most vulnerable positions when they are ill, often desire an environment that matches with their own culture, values and norms. As respondent RUMC-2 explains, *'Elderly patients from the east part of the country do not like visiting a hospital in the west part at all because of their attitude and approach.'*

Nevertheless, multiple respondents introduced a possible compromise that they differently described. This compromise involves specialised centres in a particular part of the patient journey: diagnostics, treatment or aftercare. In this case, the patient does not have to visit the specialised centre for the entire process but only for a single part of it. The other parts are conducted in the patient's own area. This compromise is in line with the approach of certain insurance companies: centralising highly specialised care and maintaining the local aspect of aftercare and follow-up care. This mode could be viewed as the vertical decentralisation of care.

I1: 'The journey takes place in different places. For example, the operation is performed in location A, whereas the follow-up is done at location B, a more regional area.'

However, the author of this study indicated the probable emergence of a problem of providing medical care in this manner; that is, the competition between hospitals. Every hospital is an independent company that runs its own business. The specialisation of care and jobs would mean that particular diagnostics, treatments and aftercare are to be transferred to other hospitals. At this moment, particular stages of certain diseases are financially more interesting than others. This aspect might become a problem when hospitals have to negotiate on how to divide these stages.

Hospitals are apparently financially driven to expand or to include more financially interesting care. However, with centralisation, specialisation and vertical decentralisation, hospitals may shrink instead of expand. This subject is further discussed in Section 4.2.2.

4.2.2. New Technostructure: Structural Changes at the Meso Level

As a result of the centralisation of care, departments are expected to close and hospitals to shrink in terms of facilities. In other words, they will become smaller in both the spectrum of provided care and needed facilities. Next to the reduction of facilities due to the centralisation of care, new HIMs themselves will also decrease the required facilities. For example, fewer consulting rooms are needed when video-based consulting is used. These now occupied square meters of hospitals are highly expensive and are currently only being used for a few hours a day. This situation was observed in Case 5 (RZH-1), Case 4 (DHU-1) and Case 6 (MMC-1).

RZH-1: 'The required square meters are fewer, especially when you see how many spaces are empty now.'

DHU-1: 'You need fewer waiting rooms, less facilities and less of everything compared to the traditional model.'

Next to facilities, the technostructure of hospitals further consists of planning departments. Most of the patient planning is performed by assistants at the secretariats. Patient planning is indeed important; however, due to an HIM such as medical records, in which time and place are independent, patient planning could be automatised. This approach can result in a reduction of the technostructure and support processes within the organisation. (The latter is discussed in Section 4.3.) For example, in the case of respondent RZH-1, certain patient paths have been

standardised: *'We have set up certain paths in our system. Hence, the doctor initiates the path and the rest automatically follows.'*

Additionally, a certain coordination unit across departments is needed to secure the patient's journey. This unit can even be localised outside the hospital and perhaps coordinated between different hospitals. These coordination departments could be complemented with medical staff, as proposed by respondent RUMC-2: *'I envision a virtual care centre, with computers on the one hand and physically located specialists on the other hand. It is a type of control tower with experts behind the computers, controlling and delegating everything.'*

The team's composition is posited at this point. In Section 4.2.3, an examination of the mix and variety of team members is provided.

4.2.3. Micro Structural Changes: Medical Staff and Variety of Personnel Demanded

The introduction of both HIMs and coordination departments has had and will have an effect on the team's composition. The variety of professionals is expected to change, as these new interaction models will require differently skilled team members compared to the traditional model. First, the new interaction models are in need of more technically and logistically trained nurses who are able to properly configure the HIMs. Second, non-caring jobs with a more logistic function (e.g. patient planners) will disappear when systems such as medical records take over planning. Third, next to job specialisation, task differentiation may emerge (to be elaborated in Section 4.3). However, task differentiation may increase the required number of highly trained nurses, while reducing the number of needed doctors. In the case of respondent MUMC-1 for example, this task differentiation prompted the expansion of the nursing staff: *'We certainly need more nurses because of the huge shift in tasks.'* It could be possible that task differentiation is more possible in regional hospitals because of their lower complex provided healthcare.

Several respondents repeatedly mentioned the possible reduction of logistic functions. For example, respondent EMC-1 stated, *'It is conceivable that you will need a smaller staff at the secretariat because everything is done with the e-consultations.'*

Several structural changes associated by the implementation of HIMs are discussed in this section. These associated changes are different from the selected parameters in the operationalisation part of this research. Te author choose to continue with the identified structural changes from the data because they seem to be more accurate and relevant to the current situation of the research cases. Moreover, we infer that the operationalisation is inadequate by disregarding the subdivision of macro-, meso- and micro-level changes. The structural changes could be subsequently allocated to HIMs (see Table 3).

Table 3: Identified structural changes allocated to an HIM category.

Hospital Organisation: Parameter	**Hospital Organisation**	Medical Records	Live E-consulting	Healthcare Networks
Centralisation of care	Structural change (macro)		x	
Specialisation of medical staff	Structural change (macro)		x	x
Vertical decentralisation of care paths	Structural change (macro)		x	x
Specialisation of knowledge	Structural change (macro)			x
Reduction in the required hospital facilities	Structural change (meso)		x	
Reduction in the required planning personnel	Structural change (meso)	x		
Demand for various types of staff members	Structural change (micro)	x	x	

4.3. Organisational Process Changes that are Associated With HIM Implementation

This section is focused on the procedural changes associated with the implementation of healthcare interaction models. In this study, with procedural changes, alternations in the processes in and around the delivery of hospital care are intended. Subsequently, these alternations can have a direct effect on the patient's journey.

Again and in the extension of Section 4.2, most of the identified organisational changes in this section are expected to occur once. Some of the identified changes have already transpired, but most of the process changes could not be observed due to the recent implementation of HIMs.

First, the effects on the coordination of care — the patient planning — are demonstrated. Second, the change in the hospital intake process due to the implementation of HIMs in the patient journey is discussed. Third, a brief review is provided regarding how the implementation of HIMs will have an effect on the follow-up of care. Finally, the effects of HIMs on information exchange and collaboration between medical staff are presented.

Table 4 depicts an overview of the (expected) identified hospital process changes. The changes are once again allocated to the dimension of HIMs, which cause or are related to that particular organisational process change.

Table 4: Identified process changes.

Process Change	**Localisation**	**Synchronousness**
Coordination and planning of care		x
Process of hospital intake	x	
Process of aftercare: 'follow-up'	x	x
Monitoring of chronic patients	x	x
Communication-time cycle patients	x	x
Information exchange	x	
Collaboration between medical staff	x	x

4.3.1. Planning and Coordination of the Patient Journey

With the implementation of HIMs, an effect on the coordination of the patient planning could be possible. In both academic and regional hospitals, the secretary of each department is responsible for manually conducting the patient planning, as the following statements suggest:

RZH-1: 'The secretaries were previously responsible for the patient planning. They arranged everything.'

MUMC-1: 'The continuity of appointments is secured with the secretary ladies. However, if someone does not show up, you forget to reschedule the patient and then he or she is lost in terms of follow-up.'

However, as respondent MUMC-1 mentioned, maintaining control over the complete patient journey was excessively difficult in this process. When the HIMs were implemented, and new interaction models became possible, these actions had to be properly coordinated for each patient. Several respondents described the following three types of coordination mechanisms:

1. Selection by the patient
2. Planning by a central department
3. Planning by medical records

In the first type of coordination mechanism, the patient decides the specific HIM to be used at a certain moment. In particular, both patient respondents P1 and P2 advocated to put the choices in hands of the patients. They indicated that patients believe that they know what is best for themselves.

P1: 'I believe that the patient should determine what the best way or preferred way of interaction is at a certain moment.'

P2: 'I strongly advocate for patient empowerment, wherein a patient can oversee the best when he needs something.'

Respondent EMC-2 also viewed patients as a major influencer in their own planning. He added that patients should select their own doctor through a specific platform:

EMC-2: 'A patient selects the specialism and then clicks on the doctor whom the patient prefers, based on the number of criteria that you believe are important. This platform gives the patient more power and options, and it is also more transparent.'

According to another group of respondents, a certain central coordination department should oversee the planning of care. For most of them, not a clinical department but a central department should select the HIMs. Such central departments can perhaps most effectively estimate and weight the medical demands versus the logistic options because these departments have specialised staff members. Otherwise, the respondents fear that patients or systems will not select what medically is relevant or needed, causing life-threatening situations.

DHU-1: 'A central coordination unit should determine which HIM should be applied at a certain moment.'

RUMC-2: 'I envision a virtual care centre, with computers on the one hand and physically located specialists on the other hand. It is a type of control tower with experts behind the computers, controlling and delegating everything.'

However, respondent I1, from the insurance company perspective, oversees major financial costs for such a central coordination department. His suggestion is to put the coordination of care in the control of systems as medical records:

I1: 'If you create an extra coordination department, that will only be an extra coordination and link. You can more effectively coordinate the information and the system than anything else. Such link should not be a department but a file that can arrange that automatically.'

Several respondents supported this type of coordination of the patient journey, which is controlled by medical records. Based on the patient's files, the planning and selection of HIMs is automated by workflows. Subsequently, this planning reduces the amount of required manual processes. Therefore, it could also be a major possibility to reduce overhead costs.

RZH-1: 'The doctor orders a file in the system; based on that file, the necessary items are put out. For example, a number of repeat consultations are already scheduled on the basis of a certain care path.'

MMC-1: 'From the MR system, you can decide on the basis of data the specific appointment that you need and when. That approach can easily save an ample amount of secretary time.'

4.3.2. Process: Intake of the Patient

These integrations of new HIMs also engendered new types of consults, which alternated the work processes in the patient journey. One of the alternations pertained to the process of hospital intake. Currently a first, physical consult is organised to determine if and which patient journey should be followed. However, 'pre-consults' became possible due to the implementation of new HIMs. In such a pre-consult, preparations can be made and concerns about whether a patient should even go to the hospital can be addressed.

From the data, multiple respondents supported these pre-consults. For these respondents, a pre-consult creates the possibility to save time during the consult. With the pre-consultations, the preparation time of the actual first physical consults in the hospitals could also be reduced because a substantial amount of medical data can be withdrawn from the MR in advance. Additionally, with a brief digital pre-consult, concluding that a physical visit to the hospital is not even useful is possible, which also reduces the number of unnecessary consults.

RZH-1: 'From the digital patient portal, a volume of data from the patient can be retrieved, which is an advantage for the consultation. That would reduce the amount of preparation hours for a doctor.'

MMC-1: 'E-consulting could also be useful for determining if a patient can stay in the first line of healthcare, by briefly assisting as a specialist. That approach will prevent an appointment in the hospital.'

4.3.3. Process: Follow-up of Care: Difference for Non-chronic and Chronic Healthcare

Multiple respondents addressed the power of HIMs in the phase of 'aftercare', the phase after the intervention or treatment as even more powerful. Non-chronic care usually involves a few follow-up appointments. Nowadays these repeat appointments are physically made in the

hospital; by contrast, with HIMs such as video consultations and MRs, these physical appointments could be prevented without losing the patient interaction.

EMC-1: 'We conduct digital questionnaires with patients after an intervention. Based on these results, we determine if a patient has to come back or not.'

DHU-1: 'We can monitor the progress of the wound much better through video consulting.'

Chronic disease management is more about monitoring, prevention of exacerbations and small modifications in their care. However, multiple respondents acknowledged that the current system confronts difficulties because the follow-up of chronic patients is organised in the same way as the follow-up for non-chronic patients. In other words, the hospital organisation is more focused on acute healthcare. Subsequently, with the traditional model, chronic patients have to visit the hospital for every control appointment, which is every three months. As respondent EMC-2 mentioned, most of the time these physical control appointments are meaningless: *'For example, chronic patients come every three months and relate how things are going, and the process often goes well. That consult has no further aim or content.'*

The current standard with consultations every three months is inappropriate for chronic patients. First, a single viewpoint does not represent the chronic illness of the past three months. Second, with chronic diseases, the timing of intervention is necessary; hence, an intervention of once in three months will not suffice. Third, for patients, every consult is a confrontation with a disease and a time-consuming undertaking, which possibly lacks any contribution to their health. In other words, for most patients, these appointments do not matter for their care and do consume the useful time of medical employees.

With the implementation of HIMs, the information of patients can be obtained and analysed even without their presence in the hospital. In the case of respondents MUMC-1 and MMC-1, patients are only seen in the hospitals if the data notice certain abnormalities and thereby subsequently determine the further progression of the patient's journey. Respondent MMC-1 raised another interesting point: the standardisation by and control function of HIMs leave more time for social interaction, which stimulates the doctor–patient relationship.

MUMC-1: 'The dashboards are essential and fundamental. Reminders are sent from there, and we are notified if someone has not entered their data. The care path is determined based on the obtained data.'

MMC-1: 'E-consulting has a bright future for standard procedures and regular checks to remain in touch with the patient. It is likely to involve a social conversation, but that does not require being present in the hospital.'

Respondent MUMC-1 indicated that their hospital intends to reduce these useless appointments. For a specific chronic disease, they developed an application that reduced 40% of unnecessary consults and 50% of hospitalisations.

MUMC-1: 'We developed an app, where continuously measuring is possible. We believe that chronic patients can benefit from strictly remote monitoring and advice on related matters.'

Aside from MUMC-1, several respondents supported the beneficial component of new HIMs for the follow-up of chronic patients. When the monitoring of MRs is more accurate and standardised, the work process of evaluating these medical data is altered. Moreover, it allowed for the shifting of the follow-up of these chronic patients to nurses and other medical staff members, as stated in the case of MUMC-1 and RUMC-2:

MUMC-1: 'The nurses actually assess the data of those dashboards.'

RUMC-2: 'You can also have a task reallocation from the doctors to the nursing specialists. You will then need more of the latter group.'

Aside from this change in processes (i.e. not only interacting when an appointment is scheduled), the process of communication-time cycle is also altered: from once in three months to almost every possible second. The possibility to whenever interact with a preferred personal doctor can benefit the patient–doctor relationship from the patient's perspective.. Second, the patient's involvement with the disease also increases. As respondent RZH-1 states, *'With these alternatives you can have 24/7 contact and almost real-time contact with the specialist. This accessibility means that you have a question for a short time in your mind, resulting in the patient's increased involvement in the disease.'*

4.3.4. Process of Information Exchange and Cross-hospital Medical Staff Collaboration

Next to the alteration in interaction time, digital MR increases the accessibility to a patient's own medical file. In some cases, patients can view their test results even before their doctor or specialist have discussed these test results. According to the medical employees, the MRs changed their behaviour in writing medical reports and helped to prevent the patients' confusion and pre-empt their questions. They address that otherwise this has a negative influence on the consults.

RUMC-1: '"My Radboud" [application] is very quick in sharing the data. Thus, information becomes readily available for patients, even before the results are discussed with the doctor. That often raises questions and creates confusion."

DHU-1: 'Sharing the files from the MR system can have trigger confusion. People cannot properly interpret the files, which in turn brings adverse effects to the traditional consult. You spend more time explaining the information that was not there before.'

In addition to the enhanced information exchange between a doctor and a patient, the information exchange between doctors can be improved as well: the relevant medical information could be more accessible across different hospitals. In particular, more asynchronous possibilities could increase the collaboration between doctors, according doctor MMC-1: *'A platform where you can*

easily share consultations with each other and then hold a meeting would be easier. Consequently, you don't have to get hold of each other at the same time, but you still can discuss the case with each other.'

According to respondent RUMC-2, transmural information exchange is crucial for a successful patient journey. Such exchange is especially essential when treatment and follow-up are in different locations. However, currently most systems are self-contained as already mentioned in Section 4.1.

RUMC-2: '[Consider the case of] aftercare, for example. It may happen elsewhere, other than the location of the treatment. For that you need the availability to share medical files with each other. The current system simply does not support that aspect.'

4.3.5. Processes

In this section, several procedural changes emanating from the implementation of HIMs are presented:

- Planning and coordination of care
- Process of hospital intakes
- Process of aftercare: 'follow-up'
- Monitoring of chronic patients
- Communication-time cycle for chronic patients
- Information exchange
- Collaboration between medical staff

Subsequently these process changes could be related to HIMs. These releations can be found in Table 5. Both the structural and procedural changes are elaborated in this section.
The results of the extent to which the structural and procedural changes affect the healthcare performance are presented in Section 4.4.

Table 5: Identified process changes allocated to an HIM category.

Hospital Organisation: Parameter	**Hospital Organisation**	Medical Records	Live E-consulting	Healthcare Networks
Coordination and planning of care	Process change	x		
Process of hospital intake	Process change	x	x	
Process of aftercare: 'follow-up'	Process change		x	x
Monitoring of chronic patients	Process change	x	x	
Task differentiation	Process change	x	x	
Communication-time cycle	Process change	x	x	x
Information exchange	Process change	x		
Collaboration between medical staff	Process change	x		

4.4. How Hospital Organisational Changes Associated with HIM Implementation Affect the Healthcare Performance of Hospitals

Aside from analysing the organisational changes associated with HIM implementations, this study also examines the extent to which such implementations affect the healthcare performance of hospitals. This section therefore elaborates the relationship between hospital organisational changes and hospital performance.

Table 6 provides an overview of the relationships found in the results between hospital organisation parameters and healthcare performance effects. The discussed parameters of healthcare performance in this section do not cover all the parameters mentioned in Section 3.3.1. However, all the parameters in Section 3.3.1 are analysed; the researcher concluded that the parameters of healthcare performance are affected or could have been affected more in comparison to the non-selected ones (see Table 7) and hence are more interesting to discuss in Sections 4.4.1 to 4.4.3.

Table 6: Identified and discussed relationship between hospital organisational changes and hospital healthcare performance.

Hospital Organisation: Dimension	**Hospital Organisation: Parameter**	**Healthcare Performance: Parameter**	**Healthcare Performance: Dimension**
Structural change (macro)	Centralisation of care	Quality of care Number of utilities	Quality Accessibility
	Specialisation of medical staff	Quality of care	Quality
	Vertical decentralisation of care paths	Travel time	Accessibility
	Specialisation of knowledge	Patient satisfaction	Quality
Structural change (meso)	Reduction in the required hospital facilities	Number of utilities Total expenditures	Accessibility Affordability
	Reduction in the required planning personnel	Total expenditures Coordination costs	Affordability Affordability
Structural change (micro)	Demand for various types of staff members	Total expenditures	Affordability
Process change	Coordination and planning of care	Coordination costs	Affordability
	Process of hospital intake	Travel time Total expenditures	Accessibility Affordability
	Monitoring of chronic patients	Attention to prevention Prevention of appointments Travel time Total expenditures	Quality Quality Accessibility Affordability
	Process of aftercare: ‘follow-up’	Travel time	Accessibility

	Task differentiation	Attention to prevention Quality of care	Quality Quality
	Communication-time cycle	Patient centredness Patient satisfaction Shared decision-making	Quality Quality Quality
	Information exchange	Preventing appointments Patient satisfaction Shared decision-making	Quality Quality Quality
	Collaboration between medical staff		

Table 7. Non-selected hospital healthcare performance parameters discussed in this section.

Quality	Patient's perspective	Quality of personnel
	Employee perspective	Employee satisfaction
	Employee perspective	Employee's workload
Accessibility	Available human resources	Waiting time
	Availability of choice of provider	Restrictions in the selection of care provider
Affordability	Healthcare expenses	Hospital revenue

4.4.1. Quality

The analysis of the effects on quality entails a focus on the consequences of the changes in organisational processes on healthcare performance. Hospital organisational changes had an effect on, first, safety and prevention of appointments, and second, the patient's involvement in the disease.

4.4.1.1. Attention to Prevention and Avoidance of Repeat Consultations

The changes in monitoring and follow-up of patients facilitated their uploading of data by themselves. As a result, medical staff were able to monitor these data to determine whether a patient was experiencing a setback. The oversight of the actual status of a patient instead of the analysis of a patient once in three months and subsequently intervention to prevent hospitalisation or even death became possible. The safety of patients' medical status thus increased, particularly for chronic patients. As respondent EMC-1 explained, *'Now there are early notifications; thus, the nurses can intervene to save a patient's life or to stabilise the case and avoid a hospitalisation.'*

Aside from increased safety, another major advantage of the patients' uploading of data is the prevention of systematic repeat consultations. Based on the data, the medical staff could decide that a standard scheduled appointment was meaningless if the patient status was satisfactory. In that situation, these standard scheduled appointments are cancelled, as in the case of respondent MUMC-1 who works in an academic hospital. In the case of MUMC-1 they also included a number of patient outcomes, in addition to the disease modifiers. With patient outcomes, the status of the patient as a human could be monitored as well. This aspect, together with the reduction of meaningless appointments, can have a positive effect on the patients' satisfaction and quality of life.

MUMC-1: 'We periodically ask patients for certain patient outcomes, disease outcomes and disease modifiers. If people fill in those questions and note that things are going well, then they no longer need to go to the clinic.'

Nevertheless, the data could not only be analysed by the medical staff to ascertain the necessity of an appointment. Furthermore, patients can gain more qualitive insights into their own disease status, whereby they can also determine whether they prefer an appointment. This situation occurred in the case of respondent RUMC-2: *'People have insights into their own medical results. A consult is scheduled only when they need it.'*

From the patient's perspective, preventing these repeat consultations increased the patient's satisfaction and quality of life. First, visiting a hospital emphasises a disease from the patient's standpoint. Second, patients intend to have a have meaningful consult that really matters to the treatment. Third, visiting a hospital is expensive for patients. A patient respondent and a medical staff member addressed this matter.

P2: 'One of those things is going to the hospital, while your quality of life does not improve. You prefer to come to the hospital for something meaningful.'

RUMC-2: 'You have to look for the added value for the patient and incur costs for the patients with each appointment. Another value is that when patients come to the hospital, they also have the idea that they are coming for something useful.'

From the employee perspective, the reduction of unnecessary preventable appointments resulted in the agendas of doctors not being fully booked and hence decreased the employee's workload. According to several respondents, the major workload component is determined by the fullness of the daily agenda.

However, monitoring patients based on these data could have a negative effect as well. From the patient's perspective, the fear that a holistic examination of the patient may disappear is present. As respondent P2 explained, *'It is paper information. With big data analysis, you can all participate in fantastic predictions, but you will lose the patient as a human.'*

4.4.1.2. Patients' Disease Involvement: Patient Satisfaction and Shared Decision-making

In addition to safety and prevention advantages, the alternations in the communication-time cycle and the information exchange resulted in the patients' ability to, first, continuously oversee their own medical data, and second, to ask questions during the entire period between appointments. According to the respondents, the disease involvement of patients similarly increased. From the employee perspective, respondent EMC-1 shared that *'These techniques induce the ability to have 24/7 contact, which means that as a patient you have a question short in your mind. As a result, both the experience and health involvement of the of the patient improve.'*

In the context of the patient's satisfaction, the researcher expected the patients' major preference for vertical decentralisation. However, this preference was not found.

In the medical field, shared decision-making—formulating the decision with the patient instead of for the patient—becomes increasingly important. Therefore, the relevant information for facilitating the patient's ability to decide has to be provided. Accordingly, with the changes in the communication-time cycle and information exchange, the ability to offer the relevant information has been expanded. The capacity to make the right decisions can have a major influence on the quality of life of patients. Respondent P3, from the patient's perspective, underscored the value of having the right and complete information to be able to make crucial decisions as a patient.

P3: 'The most important [matter] is that the knowledge and data that the patient needs are properly prepared. The moment you make clear what the possibilities are with a certain diagnosis, you ensure that the right patient not only has the right care but also the right place or location.'

4.4.1.3. Quality of Care

As mentioned in Section 4.2, the centralisation of care has engendered specialised centres, thereby improving the quality of delivered care. These specialised centres have high volumes; however, low volumes are normally the case for certain diseases, diagnoses or treatments. The specialisation of medical staff and task differentiation are also expected to have a positive effect on quality for a similar reason. As MMC-1 observes, *'You want to centralise highly complex care with low volumes to achieve better quality.'*

The effects of organisational changes associated with HIM implementation on the quality of healthcare performance are described in Section 4.4.1. These changes bring consequences to information exchange, safety, prevention, repeat consultations, disease involvement, shared decision-making and quality of care. The succeeding section describes the effects of such organisational changes on the accessibility of healthcare performance.

4.4.2. Accessibility

Repeat consultations every three months constitute the focus of the previous section. Asynchronous (data) platforms, monitoring and anticipating during the covering period reduce the amount of these repeat consults. Nonetheless, sometimes the need for a patient–doctor interaction and traditional, regular consultations is still present, as the respondents indicate.

Technological opportunities no longer require a physical visit to the hospital. Changes in the hospital processes in monitoring chronic patients, the processes of aftercare and patient intake have a major effect on the accessibility of healthcare. From the patient's perspective, these process changes reduces the time that patients have to travel for a consult. In addition, the waiting period prior to a consult is less aggravating; nowadays patients can wait in their own homes instead of a clinical waiting room in the hospital. By contrast, from the employee perspective, a major benefit is lacking because the consultation time is the same. However, waiting for patients resulting in expired consultation hours could be less. P2, from the patient's perspective, and

respondents EMC-2 and RUMC-2 from the employee perspective, state their respective positions:

P2: 'You can simply turn on the computer for 15 minutes and have a conversation instead of being on the road for four hours to get from point A to point B.'

EMC-2: 'I can engage in some social talk through webcam consulting, which is delightful. Meanwhile, patients do not have to travel to the hospital, thus saving a huge amount of time.'

RUMC-2: 'E-consulting is hardly a time-saving method for the doctor, but it is definitely a time-saving mode for the patient. Moreover, if the patient comes late for the consultation, then my consultation time is extended. Thus, I can do consultations with fewer people per hour.'

With vertical decentralisation, a structural organisational change, specialised healthcare has become more accessible for every patient in the Netherlands. As previously mentioned, centralising specialised healthcare is in favour of the quality of healthcare; with vertical decentralisation, treatments can transpire on location A, whereas the aftercare is more regional on location B. However, with the centralisation of care, the number of utilities is expected to decrease, thereby reducing the geographical accessibility of healthcare. In addition to this centralisation, some specialised knowledge and/or treatments then become physically out of reach for certain patients. This case is evident for some academic hospitals that are the only national hospitals for particular specialised treatments. This situation is anticipated to gradually intensify when regional hospitals eventually become specialised utilities. From the patient's perspective, that situation is not advantageous, with which respondents EMC-1 and RUMC-2 concurred:

EMC-1: 'As we are an academic hospital, we get patients with special diagnoses that could not be treated anywhere else in the country. That aspect is not always conducive to accessibility.'

RUMC-2: 'We pretend that people do not mind overcoming these distances, but that is not true. The elderly do not like it at all. I have had many of those patients who came back screaming and not wanting to go the other side of the country anymore.'

Structural and process changes have affected the accessibility of healthcare. In particular, structural organisational changes have chiefly affected the geographical accessibility of care, whereas process changes have overcome distances and reduced patient time, thus enhancing the accessibility of healthcare for every patient in the Netherlands.

4.4.3. Affordability

A review of the effects of organisational changes on the affordability of healthcare reveals the following main consequences:

1. Financial effects in the process of hospital intake
2. Financial effects in the monitoring of chronic patients
3. Financial effects relating to personnel

The first effect concerns the process change with a pre-consult. This effect has financial advantages for both the hospital and the total Dutch healthcare system, as respondents EMC-2 and P3 indicate. First, these consults can have a lower cost due to the decreased volume of the needed facilities and reduced doctors' time, which is beneficial for the system costs. Second, with a pre-consult, a significant amount of unnecessary hospital consults can be reduced, thereby saving costs for meaningless healthcare.

EMC-2: 'With the pre-consults, you can offer a consultation to insurance companies at an extremely low cost. A consultation in the hospital costs between €200 and €300, whereas pre-consultations can be done for €60.'

P3: 'The focus is on reducing unnecessary care. Thus, the sense and nonsense to refer someone can already be taken away during a pre-consultation, which can certainly be cost effective.'

Cost savings due to changes in monitoring and prevention for chronic patients constitute the second affordability effect of organisational changes. Real-time monitoring helps to prevent expensive hospitalisations and discontinue expensive treatments. As respondents RZH-1 and MUMC-1 stated,

RZH-1: 'As you anticipate the moment when things get worse, you prevent more expensive hospital intakes.'

MUMC-1: 'You can stop expensive medical treatments at some point because you monitor very closely. That [approach] could be cost effective.'

In addition to the direct healthcare-related costs that respondent EMC-2 addressed, continuous monitoring helps with significantly decreasing the number of repeat consultations and thus with reducing the costs for both the total (financial) healthcare system and patients. As EMC-2 explained, *'Of those frequent repeated checks, 60–70% do not need follow-up at the hospital. That saves a large amount of money.'*

The reduction of overhead planning personnel generates the third affordability effect. With the change in coordination and planning of care, the number of secretaries is reduced. Additionally, the volume of required building facilities is smaller; by contrast, the amount of required facilities is larger with the traditional model.

EMC-2: 'The traditional consultation simply becomes more expensive because more facilities and secretaries are needed. With technological developments such as webcam consulting, you even do not need a physical hospital anymore. That factor translates into enormous savings in the required facilities, personnel and consultation rooms.'

Aside from the reduction of overhead costs (personnel), the required type of staff members has a financial effect as well. More nurses and technological staff members are needed, thus increasing the costs. However, task reallocation possibilities reduce the number of expensive doctors, thereby positively affecting the personnel costs.

5. Conclusion and Discussion

The first section of this chapter provides a conclusion of the results from Chapter 4. The theoretical and managerial contributions of this research are presented in Section 5.2 and Section 5.3, respectively. In Section 5.4, the limitations and quality of this research are discussed based on several assessment criteria. Finally, Section 5.5 presents some directions for further research.

5.1. Conclusion

This study analysed specific hospital organisational changes that are associated with the implementation of healthcare interaction models and the extent to which these changes affect hospital healthcare performance. To be able to answer the main research question, a brief conclusion for each sub-question is provided.

First, the process of HIM implementation was assessed. Most of the implementations were not completed in all the cases because several issues slowed down the process. The issues could be classified into four main categories: cost-related, governmental and insurance-related, ICT-related and human-related factors. In the first category, the initial costs are especially a major issue for the hospitals. The issue of whether the hospitals themselves or the insurance company should shoulder these initial costs lacks clarity. Furthermore, the maintenance costs of the technological infrastructure tend to account for a significant proportion of most hospital budgets, thus reducing the financial stimulation for HIM implementation. The second category of governmental and insurance-related factors includes current law regulations, the GDPR and the financial infrastructure. As hospitals' income decreases with the implementation of HIMs, hospitals are compelled to either slow down or discontinue the HIM implementation. In particular, regional hospitals could not afford the amount of revenue losses. Concerning the ICT-related factors, the existence of various suppliers of medical records (MRs) represents a barrier to the effective connection of multiple HIMs with MRs. In the fourth category, the doctors' enthusiasm for the use of HIMs is a crucial factor in the successful adaption.

A major difference between academic and regional hospitals in terms of the process of successful HIM implementation was not found. In comparison to regional hospitals, academic hospitals seemingly have a slight preference for starting pilots and implementations. However, regional hospitals have a stronger capacity to adopt the use of HIMs than academic hospitals.

Second, the effects associated with HIM implementation on the hospital structure were assessed in this study. With the new possibilities in the dimension of localisation, HIMs help with enabling the centralisation of care, specialisation of medical staff and vertical decentralisation at a macro level. Hence, the role of regional hospitals is largely affected because they are expected to shift from high-volume, basic care to more specialised centres with low-volume, highly specialised care. At the meso level, which pertains to the

technostructure of hospitals, a major decrease in the numbers of required hospital facilities such as buildings, secretaries and staff members is evident. At the micro level of hospital structure, changes in the required team composition are identified: equiring more nurses and technical staff members than before. Most of the structural changes are associated by HIMs with the characteristic of ‘different location’ in the dimension of localisation.

In the third section of the results, the process changes associated with the implementation of HIMs were examined. The data revealed that four processes were mainly affected. The implementation of HIMs caused a shift in patient planning: from manual planning by secretaries, patient planning has become MR-driven. The implementation of HIMs has also considerably affected the intake of patients, the second identified process. With the new HIMs (i.e. asynchronous and on a different location), patients can be screened before they actually have to visit the hospital. This method saves time, costs and unnecessary consults. The capacity to continuously monitor chronic patients likewise affects the process of follow-up and aftercare. The process concerns the constant tracking of patients’ data instead of evaluating them only once in three months. The fourth process of information exchange between medical staff is enhanced by the digitalisation and implementation of HIMs.

Most of the hospital process changes associated with HIM implementation are related to HIMs such as medical records. The reason is that MR systems have the opportunity to digitalise and therefore automate processes, which could not be done before. Subsequently, MR systems primarily affect work processes in comparison to other HIMs.

Fourth, the relationship between hospital organisational changes and their associated effects on healthcare performance was analysed in this study. From the dimension of quality, organisational process changes principally have a beneficial effect. In particular, quality has improved in the perspective of prevention and avoidance of appointments. From the patient’s perspective, quality has changed as well. Patients no longer have to visit the hospital every three months; at the same time, their disease involvement has increased. With the structural changes such as vertical decentralisation and centralisation of care, the quality of the delivered care is improved by turning from a low volume to a high volume of complex care.

In the dimension of accessibility, the parameters of travel time to the healthcare utility and the number of utilities have improved. Travel time is mainly improved by the fact that the number of actual physical examinations is reduced via an increase in virtual appointments, which again represents an organisational process change. Due to vertical decentralisation and centralisation of care, both organisational structure changes, the number of utilities is reduced.

Three financial effects are identified in the dimension of affordability: financial effect of the change in the process of hospital intake, process of monitoring chronic patients and structural change in the size and variety of required personnel.

The table below integrates the three concepts into a single overview. Appendix G includes additional cross-tables regarding the relationships found among the three concepts.

Medical Records	Live e-consulting	Healthcare Networks	Hospital Organisation – Parameter	Hospital Organisation – Dimension	Healthcare Performance – Parameter	Healthcare Performance – Dimension
	x		Centralisation of care	Structural change (macro)	Quality of care Number of utilities	Quality Accessibility
	x	x	Specialisation of medical staff	Structural change (macro)	Quality of care	Quality
	x	x	Vertical decentralisation	Structural change (macro)	Travel-time	Accessibility
		x	Specialisation of knowledge	Structural change (macro)	Patient satisfaction	Quality
	x		Hospital facilities	Structural change (meso)	Number of utilities Total expenditures	Accessibility Affordability
x			Planning personnel	Structural change (meso)	Total expenditures Coordination costs	Affordability Affordability
x	x		Required type of staff-members	Structural change (micro)	Total expenditures	Affordability
x			Coordination and planning of care	Process change	Coordination costs	Affordability
x	x		Process of hospital intake	Process change	Travel-time Total expenditures	Accessibility Affordability
	x	x	Monitoring of chronic patients	Process change	Attention to prevention Preventing appointments Travel-time Total expenditures	Quality Quality Accessibility Affordability
x	x		Process of aftercare – 'follow-up'	Process change	Travel-time	Accessibility
x	x		Task differentiation	Process change	Attention to prevention Quality of Care	Quality Quality
x	x	x	Communication-time-cycle	Process change	Patient centredness Patient satisfaction Shared decision making	Quality Quality Quality
x			Information exchange	Process change	Preventing appointments Patient Satisfaction Shared decision making	Quality Quality Quality
x			Collaboration between medical staff	Process change		

The tables help to provide an answer to the main research question of this study (i.e. the identified organisational changes that are associated with the implementation of HIMs and how such changes affect the hospital healthcare performance). In particular, the table above presents these relationships and indicates that hospital organisational changes are a central factor.

In the introduction of this research, the question of how the Dutch healthcare system could become affordable and still be accessible with the preferred quality in the long term was raised. The results indicated that the current patient journey is apparently incapable of coping with the expected massive growth in the demand of care and the financial consequences. However, with the implementation of HIMs, the Dutch healthcare system could possibly even achieve better performance in quality and accessibility, while decreasing the financial costs in comparison to the current situation. From the perspective of this research, it is not about acknowledging the advantages of the HIM's, but it is just a matter of wanting to make a change to the current situation.

5.2. Theoretical Contributions

This research examined the effect of HIM implementation on the hospital organisation and hospital healthcare performance. As HIMs are based on the two dimensions of localisation and synchronousness, the implementation of HIMs essentially influences the alternations in these dimensions on hospital organisation and hospital healthcare performance. In this study,

the respondents were asked about the specific hospital organisational changes that are associated with the alternations in localisation and synchronousness and how these changes directly and indirectly influence hospital healthcare performance. The answers to these questions could be related to the theories found in the current literature.

First, about hospital organisation, the implementation of HIMs could contribute to two of the three coordination types identified by Thompson (2007): standardisation and planning. From the results of this research, it seems that hospitals are better capable of standardisation and planning due to the HIMs than they were before. The findings of this study confirm the theory of Thompson (2007) that with more standardisation and better planning facilities, the coordination cost of the primary process, which is the patient journey, can be minimised. Landon et al. (1998) stated that the quality of care was directly influenced by the hospital organisation, which is again in line with this study. Especially their second argument, the increase in patient education, seems to have a beneficial effect on the quality of care according our study. However according to Aiken et al. (2009) in particular hospital structure should have an effect on hospital outcomes, the results of this study hospital structure show a main relation with the affordability parameters while hospital processes changes seems to be more correlated with quality and accessibility as performance outcomes.

We found for the concept quality, a healthcare performance dimension, that the perceived quality by patients indeed do influence their choices and behaviour in selecting hospitals and providers. This is in line with the findings of Lewis (1993). Further, Computer-Mediated-Communication (CMC) was expected to have a beneficial effect on travel-time, waiting-times and effectiveness according Mair and Witten (2002), Piga et al. (2017) and Fogel et al. (2016) which can be confirmed with the results of this research. However, our results differ from the findings by Miller (2003) and Mair and Whitten (2002), where they stated that the interpersonal relationship is negatively affected by the use of CMC. On the contrary is found in this research that CMC has a positive effect on the interpersonal relationship which increased the patient satisfaction.

5.3. Managerial Contributions

This research focused on the identification of hospital organisational changes that are associated with the implementation of HIMs and the extent to which such changes affect the hospital performance. The results suggests that HIM implementations are difficult and hindered by several issues that delay these implementations. Furthermore, the connectivity between hospitals and systems seems to be vital for functional and total HIM implementations. Therefore, one recommendation could be the connection of medical records as the foundation of HIM implementation and the establishment of a complete connected platform in the Netherlands. Subsequently, different HIMs can be connected to the MRs. Moreover, by asking the respondents about the implementations, insights into the crucial role of medical employees were derived. The willingness and cooperation of medical employees should be stimulated to ensure a successful adapted implementation. The results also highlight the importance of a sufficient budget for the implementation of HIMs. Therefore, the issue of

who has to shoulder the financial burden, should be clarified. If HIM implementations are indeed preferred, then hospitals, insurance companies and the government have to provide the requisite budget. In line with this proposal, the proper direction of insurance companies and the government, along with the participation of preferred suppliers and companies to work with, would help individual hospital departments to successfully implement HIMs and subsequently avoid budgetary waste.

However, multiple performance improvements may be obtained from a successful HIM implementation. Quality outcomes could be primarily improved by HIM implementations affecting hospital organisational processes. Affordability and accessibility are influenced by HIM implementations, resulting in changes in both the hospital structure and processes. Moreover, the results suggest that the hospital structure and processes should alternate before HIMs could even be implemented. Nonetheless, the current structure and processes are incapable of supporting the use and execution of HIMs.

Therefore, a key step is to recognise the desired performance improvement and subsequently determine the hospital structure and/or hospital processes parameters that are related to such improvement. The relevant HIM can then be selected and implemented in a more successful manner.

5.4. Limitations and Reflections on the Methodology

The primary limitation of this study pertains to its generalisability. Multiple hospitals with different clinical departments were studied, and these hospitals and departments were randomly selected. Moreover, the selected departments expressed their willingness to invest in this research. This aspect raised the question of the a bias of these departments by being more interested in this topic in comparison to most others that were not included in this study. Second, these departments' diverse clinical focuses caused difficulty in generalising the answers and therefore the results.

Another limitation lies in the scope of this research. The concept of hospital healthcare performance is at a different level in comparison to hospital organisations and HIMs. All the concepts are analysed based on the respondents' perceptions. Hospital organisations and HIMs can be overseen and experienced on a daily basis by the respondents; by contrast, healthcare performance is perceived at a more macro level. This aspect may have affected the internal validity of this research.

As a reflection on the methodology for this research, the interview protocol merits a discussion. The interview protocol should have had more focus on the hospital organisational changes. In retrospect, the interview protocol was mainly focused on HIM implementation and its effects on hospital healthcare performance. The second and linking concept, hospital organisation, was consequently underexplored during the interviews. The operationalisation of hospital organisation was thus insufficient for the analysis. First, some operationalised parameters could not be identified in the results due to the lack of discussion during the

interviews. Second, a few new parameters were inductively identified during the analysis, which had not been operationalised. The operationalisation of hospital healthcare performance turned out to be adequate for both the interviews and the analysis.

In addition, some of the interviewees apparently lacked relevant insights or information to adequately answer the questions. For example, sometimes the replies to questions about macro- and meso-organisational changes as well as affordability effects could not be articulated; moreover, these topics seemed to be beyond their managerial level.

5.5. Further Research

With the aim of analysing the organisational changes associated with HIM implementation and the related changes in healthcare performance outcomes, the first recommendation for further research would be to explore cases that have implemented completely the four categories of healthcare interaction models. This approach would allow for a reflection on all the relevant aspects. However, this undertaking was not possible in this research due to the brief existence of several HIMs.

A second direction for further research could be the inclusion of more identical clinical departments to enable the comparison of the effects at a more departmental, or micro organisational, level. Additionally, the incorporation of department features could boost the possibility to compare the effects, thereby increasing the knowledge about the relationship between the department type and the consequences on healthcare performance. Policy makers and hospital directors could subsequently use this knowledge in the selection of an HIM implementation that could be relevant to a certain department. Another recommendation for further research would be to interview multiple respondents with diverse functions within the same clinical department, for example nurses and doctors on the workfloor. This approach could yield different perspectives about the effects on the hospital organisation and healthcare performance. These perspectives could offer other insights into quality and accessibility effects in comparison to their managers' standpoints because these nurses and doctors have to face these consequences in their daily work. However, this step was never properly executed in this research due to time constraints.

A third and final research direction could be an investigation into the implementation process itself. In such a longitudinal research, multiple implementations could be examined from beginning to end to gain deep insights into the implementation process. By exploring multiple implementations, possibly deep-laying mechanisms could be identified, which could be useful in developing guidelines for future implementations in (other) hospitals.

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7. Appendices

7.1. Appendix A: RIVM Indicators (Deuning et al., 2011):

Kwaliteit van zorg

Preventie
- Deelname aan bevolkingsonderzoeken
- Vaccinatiegraad
- Preventieve interventies geestelijke gezondheidszorg
- Bereik jeugdgezondheidszorg
- Zuigelingensterfte

Curatieve zorg
- Voorschrijven in de huisartsenpraktijk
- 30-dagensterfte na acuut myocardinfarct of beroerte
- Lichamelijk functioneren na operatie
- 5-jaarsoverleving bij kanker
- Heupfracturen binnen 48 uur geopereerd
- Vermijdbare ziekenhuisopnamen
- Ongeplande keizersneden
- Drop-outs geestelijke gezondheidszorg

Langdurige zorg
- Ervaren lichamelijke verzorging
- Ervaren professionele en veilige zorg
- Kwaliteit van zorg volgens personeel
- Ondervoeding
- Valincidenten
- Meerbedskamers
- 7x24 uursbeschikbaarheid arts
- Bekwaamheid personeel

Patiëntveiligheid
- Ervaren fouten
- Gestandaardiseerde ziekenhuissterfte
- Onbedoelde schade in eerste lijn
- Medicijnincidenten
- Ziekenhuisinfecties
- Bloedtransfusiereacties
- Decubitus
- Volume chirurgische ingrepen
- Farmacotherapeutisch Overleg op niveau 3 en 4

Vraaggerichtheid
- Bejegening
- Beleefde behandeling
- Begrijpelijke uitleg
- Meebeslissen
- Voldoende tijd
- Zorgbehoeften in geestelijke gezondheidszorg

Coördinatie en afstemming
- Integrale bekostiging
- Zelfde verhaal vertellen
- Tegenstrijdige adviezen
- Coördinatie testaanvragen
- Ontslaginformatie
- Beschikbaarheid informatie medicatie

Palliatieve zorg
- Wat is palliatieve zorg?
- Gebruikers palliatieve zorg
- Sterfte naar doodsoorzaken
- Plaats van overlijden

Toegankelijkheid van zorg

Financiële toegankelijkheid
- Onverzekerden
- Wanbetalers
- Betaalbaarheid niet-vergoede middelen
- Afzien van zorg vanwege kosten
- Extra zorguitgaven van chronisch zieken en gehandicapten
- Eigen bijdragen
- Eigen bijdragen naar inkomen
- Eigen bijdragen internationaal

Geografische toegankelijkheid
- Bereikbaarheid eerstelijnszorgvoorzieningen
- Bereikbaarheid ziekenhuizen en verpleeg- of verzorgingshuizen
- Gemiddelde rijtijd naar dichtstbijzijnde zorgvoorzieningen

Tijdigheid acute zorg
- Normoverschrijdende spoedeisende ambulanceritten
- Bereik mobiel medisch team
- Bereikbaarheid spoedeisende hulpdienst
- Bereikbaarheid huisartsenposten
- Telefonische bereikbaarheid huisartsen voor spoedoproepen
- Onbeantwoorde acute hulpvraag

Tijdigheid niet-acute zorg
- Ervaren wachttijden
- Telefonische bereikbaarheid huisartsen
- Wachtenden in geestelijke gezondheidszorg
- Ziekenhuizen met wachttijden langer dan de Treeknorm
- Problematisch wachtenden in langdurige zorg
- Wachtenden op donororgaan

Toegankelijkheid naar behoefte
- Zorg naar behoefte
- Telefonische bereikbaarheid tijdens kantooruren
- Ervaren bejegening
- Zorggebruik naar sociaaleconomische status
- Ziekenhuisheropnamen naar etniciteit
- Toegankelijkheid gezondheidszorg voor dak- en thuislozen
- Toegankelijkheid gezondheidszorg voor illegalen

Personeelsaanbod
- Vacatures
- Moeilijk vervulbare vacatures
- Nettoverloop in verpleging en verzorging
- Arbeidsverzuim
- Beschikbaarheid personeel in ziekenhuis of verpleeghuis
- Aantal artsen en verpleegkundigen

Keuzevrijheid
- Houders van persoonsgebonden budget
- Verzekerdenmobiliteit
- Beperkingen ten aanzien van verzekering
- Zoekenden naar zorginformatie

Kosten van zorg

Zorguitgaven
- Totale zorguitgaven
- Groei zorguitgaven
- Volumegroei per sector
- Zorguitgaven en bruto binnenlands product
- Determinanten groei zorguitgaven
- Zorguitgaven en overige uitgaven
- Zorguitgaven en overige collectieve uitgaven
- Collectieve zorguitgaven per werkende

Financiële positie zorginstellingen en zorgverzekeraars
- Rentabiliteit zorginstellingen
- Solvabiliteit zorginstellingen
- Rentabiliteit zorgverzekeraars
- Solvabiliteit zorgverzekeraars

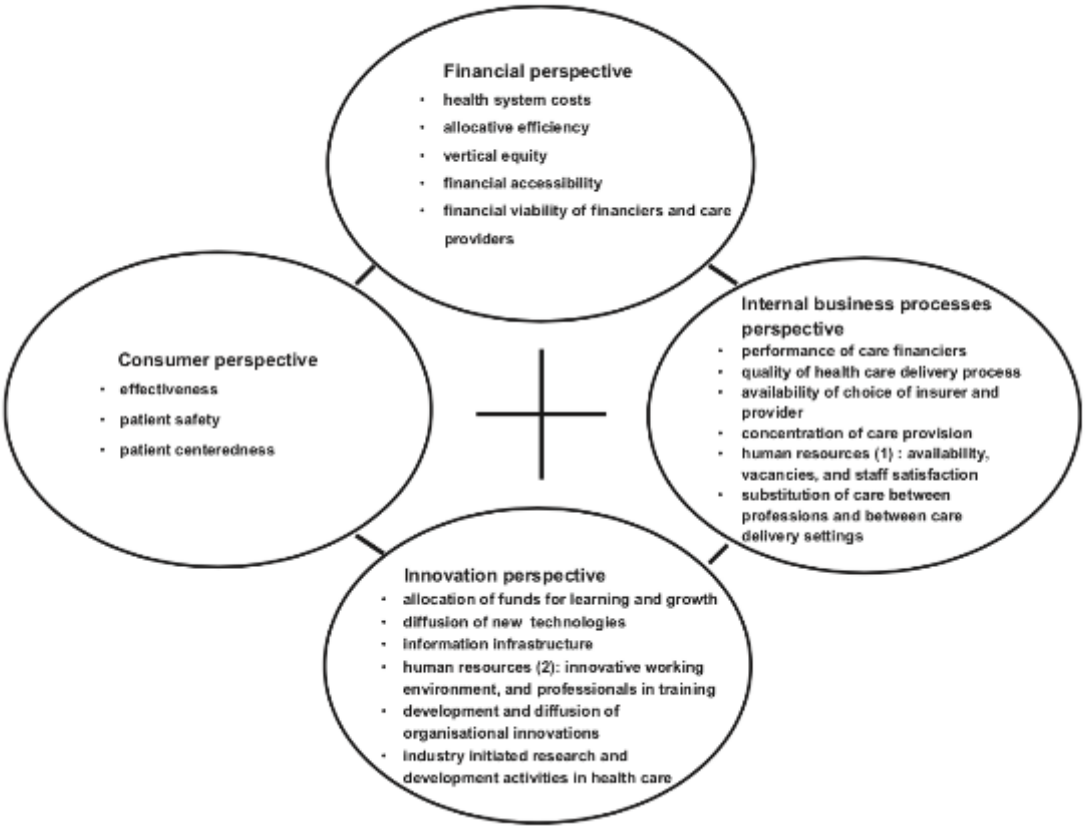
Doelmatigheid

Macroniveau
- Zorguitgaven en levensverwachting
- Zorguitgaven en vermijdbare sterfte
- Zorguitgaven, gezondheidsverschillen en klantervaringen
- Administratieve lasten

Mesoniveau
- Productiviteit ziekenhuizen
- Prijzen B-segment ziekenhuiszorg
- Regionale variatie gebruik ziekenhuiszorg
- Ligduur ziekenhuizen
- Tarieven huisartsenposten
- Gebruik generieke geneesmiddelen
- Doelmatigheid geestelijke gezondheidszorg
- Doelmatigheid ouderenzorg
- Vermijdbare ziekenhuisopnamen
- Substitutie kleine verrichtingen

Dynamische efficiëntie (innovatiegraad)
- Gebruik medische technologie in ziekenhuizen
- Dagopnamen ziekenhuizen
- Adoptiesnelheid nieuwe geneesmiddelen
- Uitgaven nieuwe geneesmiddelen
- Substitutie geneesmiddelen
- Gebruik zorg op afstand
- Huisartsen met elektronisch medisch dossier

7.2. Appendix B: Ten Asbroek Indicators (Ten Asbroek et al. (2004))



7.3. Appendix C: Clearpoint Indicators

Life Cycle KPIs	Description
Operations	
Patient Wait Time	Calculates the average amount of time a patient must wait between checking in and seeing a provider. It can help with staffing and scheduling and provide insight into patient satisfacation.
Average Number of Patient Rooms in Use at One Time	Shows how well space is used to treat patients and helps determine if more or less space is needed in the facility.
Staff-to-Patient Ratio	Indicates the use and capacity of staff resources. This can affect the quality of patient care.
Percentage of Appointments Cancelled/Missed	Helps determine how many appointments can be scheduled during a certain time frame.
Bed/Room Turnover	Demonstrates how fast patients are moving in and out of the facility. It affects the efficiency of the facility and should be considered when looking at patient satisfaction.
Admission Rate	Enables organizations to know how many patients they have coming in. The growth or decline in this number can help with decision-making regarding marketing, hiring, equipment, and space.
Readmission Rate	Calculates the rate of patients who come back to the facility shortly after they were seen. If high, it can indicate a lack of staff, experience, or attention during treatment.
Occupancy Rate	Indicates the use and capacity of the facility and can help determine if more space is needed.
Average Length of Stay	Shows how quickly medical staff are able to diagnose and prescribe treatment that does not require further stay. Also helps the facility predict how many patients they can bring into the facility during a specific time frame.
Number of Patients Served Per Month	Tracks the number of individuals receiving care each month.
Percentage of Patients Leaving Against Medical Advice	Accounts for the number of patients leaving against a healthcare provider's advice over the total number of patients hospitalized.
Number of Beds	Shows the capacity of the organization and how many patients it can hold. You may need to break down into different units/bed types.
Discharge Process Time	Measures the time it takes for patients to get discharged from the facility and for beds to open up. Keeping a low discharge process time means beds open up faster.

Equipment Utilization Rate	Accounts for the number of days the equipment was actually available compared to the days the equipment was expected to be available.
Number of New Patients	Measures the number of unique individuals who were first-time patients during the reporting period.
Operational Certifications	Shows the number of third-party certifications held by the organization that are related to its processes and that are valid.
Percentage Adherence to Treatment Plan	Calculates the percentage of patients that listen to and follow the health provider's treatment plan.
Response Times For Patient Transport Service	Measures the amount of time the transportation takes to travel to and from a medical facility.
Average Minutes Per Surgery	Demonstrates efficiency with scheduling. You may need to also track the average time for different procedures since they may vary widely.
Operating Room Turnaround Time	Calculates the time it takes to clean and prep the operating room before procedures, impacting the number of procedures scheduled.
Hazardous Materials Usage	Shows the amount of hazardous materials that are used in the healthcare facility. You can track the amount of hazardous materials as well as the cost to managing the materials.
Communication Between Primary Care Physician, Proceduralist, & Patient	Determines how frequently various parties are in communication with one another, increasing the quality of care for the patient.
Average Lab Test Time	Measures the average amount of time it takes to run a test in the laboratory.
Staff Overtime	Demonstrates the amount of time that staff is needed to work over their normal hours. May indicate that the facility has too many or too little staff resources.
Vacancy Rate	Shows the average rate at which beds in the facility are vacant.
Energy Usage	Measures the amount of energy the facility uses. This affects the overhead costs of the organization.
Finance	
Average Insurance Claim Processing Time & Cost	Averages the amount of time and money an organization spends processing insurance claims. When low, it indicates that the facility recieves payment faster and there is less cost to the patient.
Total Expenditures—All Sources	Accounts for the total amount of money that the organization spends. It can be broken up into different products and services or shown as a total amount.
Average Cost Per Discharge	Averages the cost that the facility incurs for a patient's entire stay.

Total Operating Margin	Demonstrates an organization's operating efficiency. It also affects the organization's pricing strategy.
Claims Denial Rate	Provides insight into the effectiveness of the organization's revenue cycle. A low claims denial rate means that the organization has more time to focus on patient care and spends less time on paperwork.
Indirect Expenses	Records the overhead expenses that supplement the direct operations of the facility. They can affect the pricing of services.
Labor Cost	Compiles the total cost of salaries, wages, and employee benefits. It affects the price of treatment for patients as well as the satisfaction of employees.
Patient Transactions	Tracks the number of patient transactions during the reporting period.
Average Treatment Charge	Shows the average amount that a facility charges a patient for a treatment. It can be broken down by treatment or shown as an average of all treatments or treatment categories.
Permanent Employee Wages	Records the value of wages (including bonuses) paid to all full-time employees during the reporting period.
Third-Party Revenue	Records revenue earned from the government and other third parties, such as insurance companies.
Medicine Costs	Shows the amount that the organization is spending on medicines used to treat patients.
Equipment Maintenance Costs	Measures the cost to maintain equipment throughout the facility.
Percentage of Patients Without Medical Insurance	Calculates the percentage of patients that do not have any kind of medical insurance.
Percentage of Patients With Public Insurance	Calculates the percentage of patients that have public insurance.
Percentage of Patients With Private Insurance	Calculates the percentage of patients that have private insurance.
Communications	
Number of Press Releases Released	Tracks the number of press releases your organization sends to the media so that you know how much exposure you're receiving from news sources.
Number of Media Mentions	Keeps track of how often you're mentioned in the media. This could include the news as well as social media. You may want to consider tracking positive and negative mentions separately.
Number of Fact Sheets Developed	Counts the total number of materials created, which supply information to patients and act as a marketing tool.

Overall Patient Satisfaction	Calculates satisfaction levels by combining several factors. It can be a great marketing tool for your organization if it's high. A low number could signal a problem with other operations or services.
Number of Patient Complaints Filed	Logs the number of complaints filed by patients before, during, or after their period of care.
In-Patient Satisfaction With Physician	Communicates the level of satisfaction among patients admitted to the healthcare facility.
Outpatient Satisfaction With Physician	Communicates the level of satisfaction among patients who receive care without being admitted to a hospital.
Percentage of Patients That Found Paperwork to be "Clearly Written & Straightforward"	Demonstrates whether a healthcare organization has ensured that written materials have clear instructions that patients can understand easily and respond to.
Percentage of Medical Documentation Translated	Demonstrates what lengths are taken to accommodate diverse populations.
Money Spent in Marketing & Advertising	Includes money spent increasing awareness of the organization, including services that are offered, ratings, and patient testimonials.
Number of Website Hits	Displays the amount of traffic going to an organization's website.
Percentage Increase in Subscriptions to Newsletter	Calculates the percentage increase in newsletter readership, demonstrating the level of interest in the healtcare facility's operations and events.
Internal	
Number of Employees That Participate in Internal Training	Indicates that your organization cares about the qualifications and training of your workforce.
Trainings Per Department	Tracks the amount of training that each department provides or requires of their staff.
Percentage of Employees That Find Internal Training Useful	Shows the effectiveness of your internal training. If it is low, it may indicate that changes need to be made to internal training so that it benefits the organzation and employees.
Average Monthly Full-Time Equivalents	Affects the cost of your workforce and how many patients you are able to treat.
Employee Turnover Rate	Shows how steady the workforce is for the organization and can affect the level of care and effectiveness of the facility.

Employee Satisfaction	Gauges the satisfaction level of employees, which can majorly impact turnover rates.
Total Number of Training Hours	Calculates the total number of training hours provided to employees.
Percentage of Electronic Health Records	Demonstrates how technologically advanced an organization's record system is.
Referrals	Shows number of patients that were referred to another facility. It may indicate that the facility is losing revenue to other providers and needs to hire more specialized employees or acquire new equipment.
Number of Mistake Events	Gauges the number of mistakes that are made in the organization. You can track by mistake category. Can indicate the effectiveness of employees and equipment.
Impact of Mistakes	Shows how crucial the mistakes that employees make are and can help determine what steps need to be made to further prevent mistakes.
Patient Confidentiality	Measures the number of times a patient's confidential medical records were compromised and seen by an unapproved party.
Advocacy/Policy	
Charitable Donations	Tracks the dollars spent on donations to other organizations. This could include advocacy groups, research organizations, or other healthcare organizations.
Adolescent Obesity Outreach Campaigns	Demonstrates the amount of time and dollars spent on educating adolescents on the causes and effects of obesity.
Corporate & Foundation Giving	Shows the value raised from corporate and foundations' gifts.
Planned Giving	Shows the amount raised from individuals' gifts or commitments, usually a part of an estate or financial plan.
Public Support	Calculates the money raised from local, state, and federal government funding.
Total Fundraising Expenses	Shows a total dollar value of expenses incurred for fundraising events and campaigns.
Gross Funds Raised	Indicates the effectiveness of fundraising campaigns for donations to another organization or for funds raised for internal use.
Cost to Raise a Dollar	Calculates the money spent to raise a dollar for the organization's mission by dividing the fundraising expenses by gross funds raised.
Number of Partnerships With Advocacy Groups	Counts the number of relationships established with other organizations. A high number of partnerships can increase the impact of campaigns and policy events.
Public Health	

State Funds	Shows the amount of monetary support the organization is receiving from the state.
Childhood Immunizations	Demonstrates the number of children who have received immunizations.
Adolescent Lead Occurances	Indicates the number of children who have been affected by lead in their environment.
Childhood Obesity Rates	Shows the occurance of obesity in children.
Number of Educational Programs	Indicates the time and effort put into educating the public. This can be broken down into the type of program as well as the target audience for each program.
Amount of Education Resources	Measures the amount of resources that the facility provides to the public on public health-related issues. This may include fact sheets, videos, training guides, etc.
Number of Cancer Screenings	Calculates the number of screenings performed for patients.
Prevalence of Mental Illness	Demonstrates the degree to which mental illnesses affect the population.
Number of HIV Cases	Shows the prevalence of HIV within a community.
Tobacco Usage Rates	Exhibits the percentage of the population that uses tobacco.
Number of Preterm Births	Counts the number of preterm births (under 37 weeks) that have occurred in the region.
Alcohol & Illicit Drug Use Rates	Exhibits the percentage of the population that use alcohol or illicit drugs.
Number of Vehicle Accidents	Calculates the number of accidents on the road in the community.
Emergency	
Patient Wait Times by Process Step	Shows the amount of time a patient must wait during their visit to the emergency area of the facility.
Arrival to Bed	Calculates the amount of time a patient must wait before they are taken from the waiting room to a bed.
Arrival to Nurse	Calculates the amount of time a patient must wait between their arrival and seeing a nurse.
Arrival to Physician	Calculates the amount of time a patient must wait between their arrival and seeing a physician.
Arrival to Discharge	Calculates the total amount of time a patient is in the emergency room, from the time they arrive to the time they are discharged.
Number of Rapid Response Vehicles	Shows the number of emergency vehicles available at the facility.

Time Between Symptom Onset & Hospitalization	Gauges the amount of time a patient begins experiencing symptoms and when they were hospitalized.
Number of Trauma Cases	Demonstrates the number of trauma cases that occur in the facility.
Number of Visitors Who Left Without Being Seen	Indicates the number of people who were unwilling to wait to see a physican. May show if more beds or staff are needed to handle the number of patients coming in.
Code Response Time	Measures the amount of time it takes for staff to respond to an emergency code in the facility.
Care	
Medication Errors	Measures the number of times there is an error in prescribing medication at the facility. Includes when a mistake is made in the medication, patient, or dosage and applies to inpatient and outpatient services.
Patient Care Hours	Shows the amount of time that healthcare workers spend directly with patients.
Patient vs. Staff Ratio	Demonstrates the number of staff available per patient. May indicate whether the facility is overstaffed or understaffed.
Patient Retention Rate	Shows how many patients come back to the facility for another unrelated visit. It is related to patient satisfaction.
Rate of Complications	Indicates how many patients have complications related to the care they received at the facility.
Post-Procedural Death Rate	Shows how many deaths occur at the facility following a procedure.
Quality of Nursing Care	Shows if patients are satisfied with the level of care they received from nurses during their time at the facility.
Patient Follow-Up	Measures the number of patients who receive follow-up after their visit to the facility. This could be from a physician, nurse, or other staff member asking about the visit and the patient's improvements.
Hospital Acquired Conditions	Quantifies the number of conditions acquired during a patient's stay at a healtcare facility, such as reactions to prescriptions or pressure ulcers.
Unexpected Return to Surgery	Measures the number of patients who must return to surgery unexpectedly because of complications during a surgery.

7.4. Appendix D: Semi-structured interview protocol – Staff member

Interview instructies:

Voor het interview

- Maak de interviewruimte klaar voor het interview;
- Eventuele aanpassingspunten die iteratief en met voortschrijdend inzicht gedurende het onderzoek en of na afloop van een eerder gehouden interviews naar voren zijn gekomen, zijn verwerkt;
- Zorg voor het interview dat het opname apparatuur klaar staat en werkt;
- Het vastleggen van de interviews zal gebeuren middels een spraakopname. Verder kunnen er eventueel extra aantekeningen gemaakt worden

Tijdens het interview

- Er is sprake van een semi-gestructureerd interview;
- Wanneer de respondent een ontwijkend antwoord geeft, zal de vraag moeten worden herhaald op een iets andere manier. Wanneer de respondent wederom de vraag ontwijkt, zal de vraag later in het interview nog eens terugkomen als de respondent zich meer op zijn gemak voelt;
- Bij tegenvraag van respondent aangeven dat daar niet op ingegaan kan worden op dat moment, maar dat er na het interview wel tijd voor is;
- Wanneer de geïnterviewde afwijkt van de opgestelde vragenlijst qua antwoorden kan hier verder op ingegaan als de onderzoeker van mening is dat dit relevantie informatie zou kunnen zijn.

Afronding van het interview

- Vraag of de respondent verder nog wat wilt toevoegen aan het gesprek;
- Bedank respondent en vraag of er nog eventueel contact kan worden opgenomen wanneer er nog meer informatie achteraf nodig blijkt voor het onderzoek.

Na het interview

- Upload de opname zodat er een back-up gegarandeerd is;
- Zal er een transcript gemaakt worden van de opname;
- Zal het interview geëvalueerd worden, alvorens het volgende interview wordt gehouden.

Introductie

Goedendag. Allereerst wil ik u bedanken voor de mogelijkheid van het interview. Ik zal mijzelf eerst kort voorstellen: Ik ben Timothy Hoolhorst en ben momenteel bezig met mijn afsluitende scriptie voor de master Bedrijfskunde. Graag zou ik een kort interview doen van maximaal een uur, waarin ik een aantal onderwerpen belicht die relevant zijn voor mijn onderzoek. Het interview bestaat daarom uit een aantal onderdelen, gebaseerd op de onderdelen in het onderzoek.

Geen enkel antwoord is goed of fout, het gaat hierbij echt om uw eigen ervaringen en ideeën. Graag zou ik het interview opnemen, omdat het een onderdeel is van mijn onderzoek. Met de verkregen informatie zal uiteraard ethisch worden om gegaan en alle namen en/of bedrijfsgegevens zullen ook anoniem worden verwerkt. Uiteraard kunt u altijd aangeven als u bepaalde informatie liever niet zou willen delen. Het uiteindelijke rapport zullen we ook terugkoppelen met de afdeling en kunnen we ook sturen naar u als u dat graag zou willen

1. Algemeen

1.1. Zou u uzelf kort kunnen voorstellen met welke rol of functie hier heeft?

2. Introductie interactiemodellen

In het onderzoek onderzoeken we vier verschillende interactie-modellen (laat nu een plaatje zien van het overzicht), waarbij met name de interactie tussen deze interactie-modellen op de afdeling centraal staat.

We kennen natuurlijk het traditionele consult, communicatie via EPD's, video- en e-consulten en netwerkgeneeskunde als Parkinsonnet.

2.1. Van welke interactie-modellen wordt er op uw afdeling gebruik gemaakt?

- 2.1.a. Naast elkaar?
- 2.1.b. Wanneer, welke?
- 2.1.c. Historie van gebruik
- 2.1.d. Hoe en waarom bevalt welk model (niet)?
- 2.1.e. Toekomst plannen?

2.2.Hoe draagt volgens u elk model bij aan de kwaliteit, bereikbaarheid en betaalbaarheid van zorg in uw ogen?

3. Interactie tussen de interactiemodellen

Op de afdeling worden dus de …. Interactiemodellen gebruikt.

3.1. Hoe ziet volgens u het samenspel tussen de interactiemodellen er uit?
3.1.a. Aanvulling
3.1.b. Overlap
3.1.c. Conflict
3.1.d. Gaps?
3.2. Hoe wordt het samenspel en de afwisseling van de verschillende interactiemodellen georganiseerd?
3.3. Hoe verhouden de verschillende interactie modellen zich tot elkaar qua kosten?
3.3.a. Zijn daar (extra) kosten mee gemoeid?
3.3.b. Zo ja, hoeveel?
3.4. Hoe werden de verschillende interactie modellen geïntroduceerd en geïmplementeerd?
3.5. Wordt het gebruik van de verschillende interactiemodellen gestimuleerd?
3.6. Wat is de algemene reactie van patiënten over het gebruik (of niet-gebruik) van de verschillende interactiemodellen?
3.6.a. Kwaliteit
3.6.b. Bereikbaarheid
3.6.c. Betaalbaarheid
3.7. Waarom is er gekozen voor het gebruik van verschillende interactiemodellen?
Draagt het samenspel bij aan de kwaliteit van zorg in uw ogen?
Of is er potentieel dat dit kan gebeuren?
3.8. Draagt de interactie bij aan de bereikbaarheid van zorg in uw ogen?
Of is er potentieel dat dit kan gebeuren?
3.9. Draagt de interactie bij aan de betaalbaarheid van zorg in uw ogen?
Of is er potentieel dat dit kan gebeuren?

4. Afsluiting

4.1. Zou u nog iets willen aanvullen?
4.2. Heeft u wellicht ook ondersteunende documenten of ander ondersteunende informatie?
4.3. Kent u wellicht nog collega's die beschikbaar zijn?

7.5. Appendix E: Semi-structured interview protocol – Patient

Interview instructies:

Voor het interview

- Maak de interviewruimte klaar voor het interview;
- Eventuele aanpassingspunten die iteratief en met voortschrijdend inzicht gedurende het onderzoek en of na afloop van een eerder gehouden interviews naar voren zijn gekomen, zijn verwerkt;
- Zorg voor het interview dat het opname apparatuur klaar staat en werkt;
- Het vastleggen van de interviews zal gebeuren middels een spraakopname. Verder kunnen er eventueel extra aantekeningen gemaakt worden

Tijdens het interview

- Er is sprake van een semi-gestructureerd interview;
- Wanneer de respondent een ontwijkend antwoord geeft, zal de vraag moeten worden herhaald op een iets andere manier. Wanneer de respondent wederom de vraag ontwijkt, zal de vraag later in het interview nog eens terugkomen als de respondent zich meer op zijn gemak voelt;
- Bij tegenvraag van respondent aangeven dat daar niet op ingegaan kan worden op dat moment, maar dat er na het interview wel tijd voor is;
- Wanneer de geïnterviewde afwijkt van de opgestelde vragenlijst qua antwoorden kan hier verder op ingegaan als de onderzoeker van mening is dat dit relevantie informatie zou kunnen zijn.

Afronding van het interview

- Vraag of de respondent verder nog wat wilt toevoegen aan het gesprek;
- Bedank respondent en vraag of er nog eventueel contact kan worden opgenomen wanneer er nog meer informatie achteraf nodig blijkt voor het onderzoek.

Na het interview

- Upload de opname zodat er een back-up gegarandeerd is;
- Zal er een transcript gemaakt worden van de opname;
- Zal het interview geëvalueerd worden, alvorens het volgende interview wordt gehouden.

Introductie

Goedendag. Allereerst wil ik u bedanken voor de mogelijkheid van het interview. Ik zal mijzelf eerst kort voorstellen: Ik ben Timothy Hoolhorst en ben momenteel bezig met mijn afsluitende scriptie voor de master Bedrijfskunde. Graag zou ik een kort interview doen van maximaal een uur, waarin ik een aantal onderwerpen belicht die relevant zijn voor mijn onderzoek. Het interview bestaat daarom uit een aantal onderdelen, gebaseerd op de onderdelen in het onderzoek.

Geen enkel antwoord is goed of fout, het gaat hierbij echt om uw eigen ervaringen en ideeën. Graag zou ik het interview opnemen, omdat het een onderdeel is van mijn onderzoek. Met de verkregen informatie zal uiteraard ethisch worden om gegaan en alle namen en/of bedrijfsgegevens zullen ook anoniem worden verwerkt. Uiteraard kunt u altijd aangeven als u bepaalde informatie liever niet zou willen delen. Het uiteindelijke rapport zullen we ook terugkoppelen met de afdeling en kunnen we ook sturen naar u als u dat graag zou willen

1. **Algemeen**

1.1. Zou u uzelf kort kunnen voorstellen met welke rol of functie u heeft?

2. **Introductie**

In het onderzoek onderzoeken we vier verschillende interactie-modellen (laat nu een plaatje zien van het overzicht), waarbij met name de interactie tussen deze interactie-modellen op de afdeling centraal staat.

We kennen natuurlijk het traditionele consult, communicatie via EPD's, video- en e-consulten en netwerkgeneeskunde als Parkinsonnet.

2.1.1. Van welke interactie-modellen wordt er voor patiëntenpopulatie gebruik gemaakt?
   - 2.1.2. Naast elkaar?
   - 2.1.3. Wanneer, welke?
   - 2.1.4. Historie van gebruik
   - 2.1.5. Hoe en waarom bevalt welk model (niet)?
   - 2.1.6. Toekomst plannen?

2.2. Hoe draagt volgens u elk model bij aan de kwaliteit, bereikbaarheid en
   1. betaalbaarheid van zorg in uw ogen?

3. Interactie tussen de interactiemodellen

Er worden dus de …. Interactiemodellen gebruikt.

3.1. Hoe ziet volgens u het samenspel tussen de interactiemodellen er uit?
3.1.1. Aanvulling
3.1.2. Overlap
3.1.3. Conflict
3.1.4. Gaps?
3.2. Hoe wordt het samenspel en de afwisseling van de verschillende interactiemodellen georganiseerd?
3.3. Hoe verhouden de verschillende interactie modellen zich tot elkaar qua kosten?
3.3.1. Zijn daar (extra) kosten mee gemoeid?
3.3.2. Zo ja, hoeveel?
3.4. Hoe werden de verschillende interactie modellen geïntroduceerd en geïmplementeerd?
3.5. Wordt het gebruik van de verschillende interactiemodellen gestimuleerd?
3.6. Wat is de algemene reactie van patiënten over het gebruik (of niet-gebruik) van de verschillende interactiemodellen?
3.6.1. Kwaliteit
3.6.2. Bereikbaarheid
3.6.3. Betaalbaarheid
3.7. Waarom is er gekozen voor het gebruik van verschillende interactiemodellen?

3.8. Draagt het samenspel bij aan de kwaliteit van zorg in uw ogen?
3.8.1. Of is er potentieel dat dit kan gebeuren?
3.9. Draagt de interactie bij aan de bereikbaarheid van zorg in uw ogen?
3.9.1. Of is er potentieel dat dit kan gebeuren?
3.10. Draagt de interactie bij aan de betaalbaarheid van zorg in uw ogen?
3.10.1. Of is er potentieel dat dit kan gebeuren?

7.6. Appendix F: Semi-structured interview protocol – Insurance Company

Interview instructies:

Voor het interview

- Maak de interviewruimte klaar voor het interview;
- Eventuele aanpassingspunten die iteratief en met voortschrijdend inzicht gedurende het onderzoek en of na afloop van een eerder gehouden interviews naar voren zijn gekomen, zijn verwerkt;
- Zorg voor het interview dat het opname apparatuur klaar staat en werkt;
- Het vastleggen van de interviews zal gebeuren middels een spraakopname. Verder kunnen er eventueel extra aantekeningen gemaakt worden

Tijdens het interview

- Er is sprake van een semi-gestructureerd interview;
- Wanneer de respondent een ontwijkend antwoord geeft, zal de vraag moeten worden herhaald op een iets andere manier. Wanneer de respondent wederom de vraag ontwijkt, zal de vraag later in het interview nog eens terugkomen als de respondent zich meer op zijn gemak voelt;
- Bij tegenvraag van respondent aangeven dat daar niet op ingegaan kan worden op dat moment, maar dat er na het interview wel tijd voor is;
- Wanneer de geïnterviewde afwijkt van de opgestelde vragenlijst qua antwoorden kan hier verder op ingegaan als de onderzoeker van mening is dat dit relevantie informatie zou kunnen zijn.

Afronding van het interview

- Vraag of de respondent verder nog wat wilt toevoegen aan het gesprek;
- Bedank respondent en vraag of er nog eventueel contact kan worden opgenomen wanneer er nog meer informatie achteraf nodig blijkt voor het onderzoek.

Na het interview

- Upload de opname zodat er een back-up gegarandeerd is;
- Zal er een transcript gemaakt worden van de opname;
- Zal het interview geëvalueerd worden, alvorens het volgende interview wordt gehouden.

Introductie

Goedendag. Allereerst wil ik u bedanken voor de mogelijkheid van het interview. Ik zal mijzelf eerst kort voorstellen: Ik ben Timothy Hoolhorst en ben momenteel bezig met mijn afsluitende scriptie voor de master Bedrijfskunde. Graag zou ik een kort interview doen van maximaal een uur, waarin ik een aantal onderwerpen belicht die relevant zijn voor mijn onderzoek. Het interview bestaat daarom uit een aantal onderdelen, gebaseerd op de onderdelen in het onderzoek.

Geen enkel antwoord is goed of fout, het gaat hierbij echt om uw eigen ervaringen en ideeën. Graag zou ik het interview opnemen, omdat het een onderdeel is van mijn onderzoek. Met de verkregen informatie zal uiteraard ethisch worden om gegaan en alle namen en/of bedrijfsgegevens zullen ook anoniem worden verwerkt. Uiteraard kunt u altijd aangeven als u bepaalde informatie liever niet zou willen delen. Het uiteindelijke rapport zullen we ook terugkoppelen met de afdeling en kunnen we ook sturen naar u als u dat graag zou willen

1. Algemeen

1.1. Zou u uzelf kort kunnen voorstellen met welke rol of functie hier heeft?
1.2. Zou u in dit interview vanuit uw organisatie willen en mogen spreken?

2. Korte introductie

In het onderzoek onderzoeken we vier verschillende interactie-modellen (laat nu een plaatje zien van het overzicht), waarbij met name de interactie tussen deze interactie-modellen op de afdeling centraal staat.

We kennen natuurlijk het traditionele consult, communicatie via EPD's, video- en e-consulten en netwerkgeneeskunde als Parkinsonnet.

2.1. Wat draagt volgens u elk model bij aan de kwaliteit, bereikbaarheid en betaalbaarheid van zorg in uw ogen?

3. Interactie tussen de interactiemodellen

3.1. Hoe ziet volgens u het samenspel tussen de interactiemodellen er uit?
3.2. Hoe wordt de organisatie van de verschillende interactiemodellen
    2. georganiseerd?
3.3. Zijn met organisatie van de meerdere modellen (extra) kosten mee gemoeid?
    3.3.1. Zo ja, hoeveel?
3.4. Hoe werden de verschillende interactie modellen geïntroduceerd en
    3. geïmplementeerd?
3.5. Wordt het gebruik van de verschillende interactiemodellen gestimuleerd?
3.6. Wat is de algemene reactie van patiënten over het gebruik (of niet-gebruik)
    4. van de verschillende interactiemodellen?

3.7.Waarom is er gekozen voor het gebruik van verschillende interactiemodellen?
3.8.Draagt de interactie bij aan de kwaliteit van zorg in uw ogen?
3.9.Draagt de interactie bij aan de bereikbaarheid van zorg in uw ogen?
3.10. Draagt de interactie bij aan de betaalbaarheid van zorg in uw ogen?

7.7. Appendix G: Tables of conclusion

Medical Records – Effecting hospital organisation

Hospital Organisation – Parameter	Hospital Organisation – Dimension
Planning personnel	Structural change (meso)
Required type of staff-members	Structural change (micro)
Coordination and planning of care	Process change
Process of hospital intake	Process change
Process of aftercare – 'follow-up'	Process change
Task differentiation	Process change
Communication-time-cycle	Process change
Information exchange	Process change
Collaboration between medical staff	Process change

Medical Records – Related to Healthcare performance

Healthcare Performance – Parameter	Healthcare Performance – Dimension
Attention to prevention	Quality
Patient centredness	Quality
Quality of Care	Quality
Shared decision making	Quality
Patient satisfaction	Quality
Preventing appointments	Quality
Travel-time to healthcare utility	Accessibility
Total expenditures	Affordability
Coordination costs	Affordability

Live e-consulting – Effecting hospital organisation

Hospital Organisation – Parameter	Hospital Organisation – Dimension
Centralisation of care	Structural change (macro)
Specialisation of medical staff	Structural change (macro)
Vertical decentralisation	Structural change (macro)
Hospital facilities	Structural change (meso)
Required type of staff-members	Structural change (micro)
Coordination and planning of care	Process change
Process of hospital intake	Process change
Monitoring of chronic patients	Process change
Process of aftercare – 'follow-up'	Process change
Task differentiation	Process change
Communication-time-cycle	Process change

Live e-consuling – Related to Healthcare performance

Healthcare Performance – Parameter	Healthcare Performance – Dimension
Attention to prevention	Quality
Quality of Care	Quality
Shared decision making	Quality
Patient satisfaction	Quality
Preventing appointments	Quality
Travel-time to healthcare utility	Accessibility
Number of utilities	Accessibility
Waiting time	Accessibility
Total expenditures	Affordability

Healthcare Networks – Effecting hospital organisation

Hospital Organisation – Parameter	Hospital Organisation – Dimension
Specialisation of medical staff	Structural change (macro)
Vertical decentralisation	Structural change (macro)
Specialisation of knowledge	Structural change (macro)
Monitoring of chronic patients	Process change
Communication-time-cycle	Process change

Healthcare Networks – Related to Healthcare performance

Healthcare Performance – Parameter	Healthcare Performance – Dimension
Attention to prevention	Quality
Quality of Care	Quality
Shared decision making	Quality
Patient satisfaction	Quality
Travel-time to healthcare utility	Accessability
Total expenditures	Affordability

7.8. Appendix H: Code scheme