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VALUE-BASED PERSPECTIVE IN KNOWLEDGE MANAGEMENT

Case: Specialized healthcare in Finland

Master's Thesis
Anna-Rosa Lehto
Aalto University School of Business
Information and Service Management
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Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

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Author Anna-Rosa Lehto

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Thesis advisor(s) Virpi Tuunainen, Paulus Torkki, Anu Maksimow

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Abstract

The rising costs of health care are a globally known problem. Due to increasingly limited resources, creating high value for patients has become an essential goal for healthcare service delivery. Moreover, a shift from monitoring merely process outputs to measuring patient-relevant outcomes has emerged. The framework of value-based health care (VBHC), introduced by Porter and Teisberg (2006), presents an established approach for addressing these issues by maximizing patient-value. However, research on what utilizing value-based knowledge requires in the managerial context of healthcare remains scarce.

The objectives of this research are to 1) examine the current stage of value-based knowledge management in specialized healthcare and 2) look into management's perspectives on utilizing value-based knowledge. Assessing the current situation of and expectations towards value-based knowledge management was approached by searching the knowledge management (KM) literature for applicable methods for the VBHC context. Earlier research was thus studied in terms of 1) value-based health care, 2) knowledge management, and 3) utilizing value-based knowledge in healthcare management.

The study is a qualitative single case study in the context of specialized healthcare in Finland. The case organization used in the empirical part of the study is HUS Helsinki University Hospital. The empirical data was collected by conducting 11 semi-structured interviews on the case organization's middle-/top-level management. The resulting data were analyzed using the thematic analysis method.

The results of this study indicate knowledge management maturity modeling to provide a promising tool for application in the VBHC context. Value-based knowledge management was found to remain in its early stages, though the awareness and motivation towards its advancement are already present among managers. Processes were identified as the aspect with the most room for improvement to enable wider utilization of value-based knowledge. Despite the currently low maturity stages, managers illustrated high expectations for utilizing value-based knowledge across a wide range of managerial purposes. Additionally, new insight was generated by mapping the requirements for value-based knowledge from the management's perspective. Finally, suggestions to guide the way forward were identified in relation to the current maturity stage and the management's expectations for value-based knowledge management.

Keywords Value-based health care, Value-based knowledge, Knowledge management, Value-based knowledge management, Specialized healthcare

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Tiivistelmä

Terveydenhuollon nousevat kustannukset ovat globaalisti tunnistettu ongelma. Yhä niukemmiksi käyvien resurssien vuoksi terveydenhuollon palveluiden keskeiseksi tavoitteeksi on tullut luoda mahdollisimman paljon arvoa potilaille. Sen lisäksi huomio on siirtynyt vain prosessisuoritteiden seuraamisesta potilaille oleellisten vaikutusten mittaamiseen. Porterin ja Teisbergin (2006) esittelemä vaikuttavuusperusteisen terveydenhuollon viitekehys tarjoaa vakiintuneen lähestymistavan näiden asioiden huomioimiseen maksimoimalla potilaille luodun arvon. Tutkimus siitä, mitä vaikuttavuustiedon hyödyntäminen terveydenhuollon johtamisessa vaatii, on kuitenkin edelleen vähäistä.

Tutkimuksen tavoitteet ovat 1) tutkia vaikuttavuustiedolla johtamisen nykytilaa erikoissairaanhoidossa ja 2) kartoittaa johtajien näkemyksiä vaikuttavuustiedon hyödyntämisestä. Vaikuttavuustiedolla johtamisen nykyisen tilanteen ja siihen kohdistuvien odotuksien arviointia lähestyttiin etsimällä vaikuttavuusperusteisen terveydenhuollon kontekstiin soveltuvia metodeja tiedolla johtamisen kirjallisuudesta. Aiempaa kirjallisuutta tutkittiin siksi 1) vaikuttavuusperusteisen terveydenhuollon, 2) tiedolla johtamisen sekä 3) vaikuttavuustiedon hyödyntämisen terveydenhuollon johtamisessa näkökulmista.

Kyseessä on laadullinen yksittäistapaustutkimus suomalaisen erikoissairaanhoidon kontekstissa. Tutkimuksen empiirisessä osiossa käytetty organisaatio oli HUS Helsingin yliopistollinen sairaala. Empiirinen data kerättiin 11 puolistrukturoidulla HUS:in keski-/ylemmän johdon haastattelulla. Data analysoitiin temaattisella analyysimetodilla.

Tutkimuksen tulokset osoittavat, että tiedolla johtamisen kypsyysmallit tarjoavat lupaavan työkalun käytettäväksi vaikuttavuusperusteisen johtamisen kontekstissa. Vaikuttavuustiedolla johtamisen todettiin olevan vielä varhaisessa vaiheessa, vaikka johto onkin jo tietoinen siitä ja motivoitunut edistämään sitä. Prosessit tunnistettiin tärkeimmäksi kehityskohdaksi vaikuttavuustiedon hyödyntämisen edistämisen kannalta. Nykyisistä matalista kypsyysasteista huolimatta johtajilla oli korkeita odotuksia vaikuttavuustiedon hyödyntämiseksi moninaisissa johtamisen tilanteissa. Lisäksi uutta tietämystä luotiin kartoittamalla vaikuttavuustiedon edellytykset johdon näkökulmasta. Lopuksi työssä tunnistettiin ehdotuksia ohjaamaan kehitystyötä suhteessa nykyiseen kypsyysasteeseen sekä johdon odotuksiin vaikuttavuustiedolla johtamista kohtaan.

Avainsanat Vaikuttavuusperusteinen terveydenhuolto, Vaikuttavuustieto, Tiedolla johtaminen, Vaikuttavuustiedolla johtaminen, Erikoissairaanhoito

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1 Introduction

1.1 Background and motivation

Value-based health care has emerged as a prominent trend in health care over the past several years. While the costs of care rise and the population ages in the Western countries, it becomes crucial to maximize the health benefits of care in relation to resources deployed. As a certain amount of resources are invested in patient care the results ought to transfer in creating value for the patient (Porter, 2010). Value-based health care has provided a suggested solution and framework for this need. Instead of measuring merely outputs or other process measurements in healthcare delivery, the focus has shifted towards measuring outcomes of care. The outcomes achieved are a measurement of the value provided in healthcare (Porter, 2010). Ultimately, providing patients with high value to advance their health and well-being ought to be the preeminent goal of care (Malmivaara, 2013; Porter, 2010). As that is the idea behind value-based health care, the significance of measuring outcomes, and effectiveness of care has been widely accepted (cf. Porter & Guth, 2012). By measuring outcomes, value creation may be evaluated and maximized, both in terms of health benefits and resource deployment.

Maximizing value is especially relevant in specialized healthcare where a significant amount of resources is deployed and many outcomes of care are determined. It is hence no wonder that research on value-based health care is high on the agenda for many hospitals (Simonen, 2012). The HUS Helsinki University Hospital has listed such research high on its new strategy with an intent to initiate broader research focused around value-based health care. While the hospital is not new to research on the field, they have identified a need for a more coherent and coordinated research agenda on the concept (HUS, 2017, 2019b). Additionally, the hospital currently has no data on utilizing the results of such research in decision-making, as was found in notes given by the HUS review panel in its Evaluation report 2017.

Although the research streams of effectiveness in healthcare and knowledge management have been studied quite widely, there seems to be little research on combining theories of knowledge management with value-based health care. Simonen (2012) studied the views of specialized healthcare managers on effectiveness and the use of effectiveness knowledge in specialized healthcare strategic and operative management in Finland. In her study, she found that while the use of effectiveness knowledge was perceived important,

there was a need for a more coherent definition and understanding of the concept among managers (Simonen, 2012). Furthermore, she found the availability and usability of the relevant data to be at an insufficient level resulting in several challenges for utilizing it in decision-making at the time. Similar results were found by e.g. Axelsson and Engström (2001) and Rosen (2000) in their studies, where they found that while the concept of effectiveness was thought of as crucial, a lack for a uniform definition across different organization levels was apparent and the available research on the topic was insufficient for managerial decision-making.

Since then, value-based health care has gained much attention both internationally and nationally with research and development of patient-reported outcomes and experience measures (ICHOM, 2020) and state-level initiatives on national quality registries. It is now that value-based health care is the highest on hospital agendas with such initiatives and developments pushing healthcare providers to base their decision-making on value-based knowledge. In Finland, promoting effectiveness of care is high on state-level agendas as improving and developing the quality and effectiveness of care is listed as a goal for both the state-funded development of national quality registries and the new Health and social service center program of the current government (Jonsson, Pikkujämsä, & Heiliö, 2019; Sosiaali- ja terveysministeriö, 2019). However, while the state-level intent on developing and improving the access to and utilization of value-based knowledge in social and healthcare is strong, the current steering mechanisms remain vague or insufficient. Indeed, while the future vision and the requirements and challenges it involves are described in new reports by both STM (2019) and THL (Jonsson et al., 2019), value-based health care and the use of value-based knowledge specifically are left with little concreteness or focus in the reports. State-level steering thus leaves healthcare providers and management with no concrete steps and guidelines which in turn promotes independent research.

To utilize the now more developed research information and value-based knowledge in managing specialized healthcare, there is a need for more extensive research on the topic. Furthermore, there is a gap in research for identifying how managers in specialized healthcare would like to utilize value-based knowledge, and what type of knowledge that would require. Indeed, a demand for a deeper understanding on value-based knowledge management has been recognized in both literature and practice. As Simonen (2012) referred to it, utilizing value-based knowledge aims at ensuring that the management only endorses activity that maximizes value. In this study, the knowledge management research stream will be examined to identify an approach for assessing the current state of value-based knowledge

management and to discover implications for promoting the utilization of value-based knowledge in the managerial context of specialized healthcare.

1.2 Research objectives and research questions

The study aims at contributing to the research on value-based knowledge management and the utilization of value-based knowledge in managing specialized healthcare. Additionally, the objective is to provide insight into how the middle/top-level managers of university hospitals would like to utilize value-based knowledge and what sort of knowledge they would like to utilize. The main research questions revolve around understanding the current maturity of value-based knowledge management as well as the expectations for utilizing value-based knowledge. Additionally, the status quo of how the middle/top-level management of university hospitals perceives the relevant concepts regarding value-based health care are briefly covered to lead the way to the main research questions. The research questions are listed below. The questions include two main questions, with the more case-specific sub-questions, and are thus not in chronological order.

R1: What is the current state of utilizing value-based knowledge in the managerial context of specialized healthcare?

- How do middle/top-level managers perceive value-based health care at university hospitals?

R2: What are the expectations for value-based knowledge management in specialized healthcare?

- What kind of value-based knowledge would middle/top-level managers like to utilize at university hospitals?
- How would middle/top-level managers like to utilize value-based knowledge?

1.3 Scope of the study

Several delineations define the scope of this study. Firstly, the current situation of utilizing value-based knowledge will be examined through the perspective of knowledge management, which provides the primary theory base in this study. Moreover, the current information systems and the usability of the currently available data will be taken as given in this study. The scope does thus not cover information systems research. Secondly, studying the utilization of value-based knowledge will be focused on strategic middle/top-level management, meaning the department and division level directors and managers in the

context of this case study. The middle-/top-level management does not cover the nursing directors of the case organization. Nonetheless, the management and decision-making processes in this study will thus only cover situations relevant for middle-/top-level management such as decisions relating to resources and service availability, and communication based on the knowledge.

In this paper, studying value-based knowledge and its use will be limited to the internal knowledge of the organization, meaning knowledge produced by the organization itself. External knowledge such as outside research knowledge will thus be left outside the scope. Following, as mentioned earlier, the context of the study will be in specialized healthcare, focusing on the case hospital HUS Helsinki University Hospital. Finally, the focus will be on the concept of effectiveness over cost-effectiveness hence leaving cost information and cost analysis outside the scope of this study.

1.4 Structure of the thesis

The structure of this study is built upon seven Chapters. Following the introduction, previous literature is presented in Chapter 2, including literature regarding value-based health care, knowledge management, and earlier research on utilizing value-based knowledge in healthcare management. After the literature review, Chapter 3 introduces the theoretical grounding chosen for this study, based on the literature review on knowledge management. In Chapter 4, the methodology of this study is outlined in terms of the selected research design, case organization's presentation, data collection, data analysis, and finally the validity of the study. The structure then moves onto the empirical part of the study with the findings from the empirical data presented in Chapter 5. Following, the results will be further elaborated on in Chapter 6, where the managerial implications, theoretical contribution, limitations of study, and suggestions for future research will also be discussed. Finally, the conclusions are summarized in Chapter 7.

2 Literature review

This Chapter focuses on presenting and reviewing the earlier research from the relevant literature for this study. First, Section 2.1 introduces the background for value-based knowledge management by presenting the framework of value-based health care and related concepts. Following, knowledge management literature is explored to identify relevant theories in Section 2.2. Lastly, in Section 2.3 the literature is examined to pinpoint earlier research in relation to the research questions of this study.

2.1 Value-based health care

In this Section, the framework of value-based health care is presented by going through different, relevant concepts that relate to its background or implementation. The Section includes a discussion on what value and effectiveness mean in healthcare, an introduction of the relevant frameworks, and the concept of value-based knowledge, and finally a look into the literature regarding the implementation of the framework. The aim of the Section is to introduce the reader to the context of the research before moving onto reviewing knowledge management literature.

2.1.1 The concepts of value and effectiveness in healthcare

In its essence, healthcare delivery ought to aim at achieving high value for patients (Porter, 2010). There are several ways to define what is value in healthcare, however. Different views vary for instance on whether value is limited to clinical outcomes or whether it comprises the patient's experience of care, and whether it ought to address societal aspects of value. In the following paragraphs, some of these different views are presented briefly.

In its narrowest sense, value may be perceived as achieving clinical outcomes through the care given. According to Porter (2010; 2016), value in healthcare is defined as patient-relevant outcomes relative to costs. As value ought to be defined around the customer, it does not depend on inputs and can't be measured by the volume of delivered services (Porter, 2010). Instead, value depends on results and is measured by the outcomes, or in other words health status, achieved in health care (Porter, 2010). More specifically, it is measured by outcomes that matter to patients (Porter et al., 2016), which may involve both positive or negative outcomes in relation to value creation (Porter, 2010). Moreover, the element of costs is essential in Porter's definition of the concept. Despite agreeing that value in health care revolves around the customer or patient, Porter (2010) limited the concept of value

creation to achieving results measured as health outcomes. The patients' subjective experiences were hence left out of the original definition. That being said, it should be noted that the definition has since been elaborated on with more subjective elements of value, emphasizing the importance of relevance to patients (Porter et al., 2016).

A broader view has been presented by e.g. Nelson et al. (1996), where value comprises the elements of clinical outcomes combined with costs and the patient's subjective perceptions. Indeed, the framework of Clinical Value Compass introduced by Nelson et al. (1996, p. 243) list four cardinal points of "*(1) functional status, risk status, and well-being, (2) costs, (3) satisfaction with health care and perceived benefit, and (4) clinical outcomes"*, in relation to value of health services. The aspect of the patient's perception and satisfaction with the benefits of care have thus been incorporated in the view.

Finally, the concept of value in health care may also encompass the societal perspective. As Nordgren (2009, p. 124) specifies, "*values such as experienced health, quality of life, accessibility, trust, communication, avoidable suffering and avoidable deaths, and not only reduced costs, activities and outcomes"* ought to be considered. In his list, a link to a system view is indicated through elements of system outputs such as "accessibility". Comparatively, Jørgensen et al. (2018) summarize how value can be evaluated from three perspectives, those being medical, patient-centered, and/or societal viewpoints. In their definition, both direct and indirect costs for the society in terms of resource usage and economic issues are covered in the societal perspective (Jørgensen et al., 2018).

To sum up, the concept of value in healthcare has various meanings in the literature. The scope of the term varies from comprising of clinical outcomes to covering also the patient's subjective experiences, and the societal aspects. Depending on the definition, the emphasis on costs of care also varies. In this study, value is defined to comprise of measuring both clinical outcomes of care as well as the more subjective perceptions and experiences of a patient. Conversely, the societal aspect of value as well as costs are left with little to no attention in the scope of answering the research questions of this study.

Compared to value in healthcare, effectiveness is a well-established concept in the health economics literature (Drummond, Sculpher, Claxton, Stoddart, & Torrance, 2015; Pitkänen et al., 2019; Simonen, 2012). However, the concept has been rarely defined explicitly in studies examining effectiveness, as was found by Simonen (2012). Instead, effectiveness in healthcare can be defined in many ways with different research streams all having their own viewpoint on the concept (Simonen, 2012). Some consensus does exist, however. The concept of effectiveness in health care is typically referred to as the changes

or effects in a person's health or quality of life which have been produced by healthcare interventions (Malmivaara, 2013; Pitkänen et al., 2019; Simonen, 2012; Sintonen & Pekurinen, 2006, p. 53). Similarly, in this study effectiveness is defined as the verifiable changes in one's health, ability to function, or wellbeing which have been achieved through healthcare interventions. The definition has been elaborated on to suit the scope of this study in relation to the definition of value in healthcare.

In addition to having been given several varying meanings in the literature, effectiveness may be easily confused with other similar concepts such as cost-effectiveness and efficacy (cf. Simonen, 2012). Cost-effectiveness as a concept may be derived from effectiveness through the costs of achieving certain effects (Pitkänen et al., 2019). Cost-effectiveness thus refers to what Porter (2010) defines as value in healthcare, as was discussed earlier in this Section. As has been found in the health economics literature, the shift to assessing both clinical effectiveness and cost-effectiveness has been driven by e.g. tightening health care budgets (Drummond et al., 2015, p. 11). Efficacy, on the other hand, refers to intervention-specific effectiveness in ideal circumstances, where interventions or treatments are typically carried out in randomized, controlled settings (Malmivaara, 2013, 2018; Sintonen & Pekurinen, 2006, p. 53). The concept thus describes the specific effect of a specific intervention, that has been carried out in ideal or experimental settings, under optimal conditions (Drummond et al., 2015, p. 274; Malmivaara, 2018; Simonen, 2012). Comparatively, the concept of effectiveness allows considering potential factors outside the intervention that could occur in routine settings, and may thus include non-specific effects and placebo effects (Malmivaara, 2013, 2018).

Other elements of healthcare production such as efficiency or productivity have also been found to relate to the concept of effectiveness both in literature and terminology (Axelsson & Engström, 2001; Simonen, 2012). In the scope of this study, rather than discussing the differences of these concepts further, Figure 1 presented by Pitkänen et al. (2019) presents the value chain of health and demonstrates the connections between some of the concepts discussed in the above paragraphs:

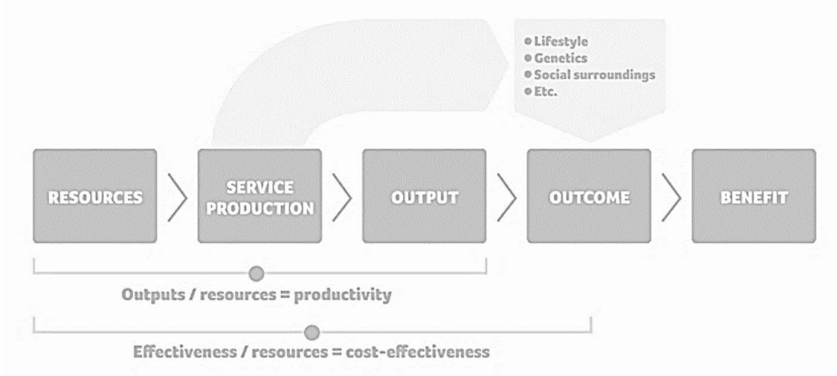

Figure 1. The value chain of health by Pitkänen et al. (2019, p.7)

2.1.2 Value-based health care and real-effectiveness medicine

From the concept of effectiveness, and the aim to provide high value and effective treatment for patients (Malmivaara, 2013; Porter, 2010), several frameworks have been introduced to provide means for achieving that aim. Overall, it has been recommended that effectiveness be measured by medical conditions (Malmivaara, 2017; Porter et al., 2016). Next, the frameworks of value-based health care by Porter & Teisberg (2006), and real-effectiveness medicine by Malmivaara (2013) will be presented concisely.

Value-based health care (VBHC), introduced by Porter and Teisberg in 2006, may be viewed as one of the main frameworks in the studied field. Drawing from the context of health care in the U.S. and its problems in growing costs, uneven quality, and failed competition, Porter and Teisberg (2006, p. xiii) suggested a management system called value-based health care (VBHC) as a solution for improving the healthcare system. In the framework, Porter and Teisberg sought to address the less popular, managerial viewpoint of strategy in the medical field (Porter & Teisberg, 2006, p. xiii). According to them, numerous pursuits to renovate the U.S. health care system had failed due to sub-optimization and focusing on one or two incomplete aspects of the system (Porter & Teisberg, 2006, pp. 1–4). To solve the complex issues, a new perspective was needed where the health care system would revolve around delivering value for patients with value meaning *"the health outcome per dollar of cost expended"* (Porter & Teisberg, 2006, p. 4). Indeed, the framework of VBHC has the primary goal of achieving high value, or in other words, cost-effectiveness, for patients and thus brings the patient-perspective to the center of things (Harvard Business School Institute for Strategy and Competitiveness, 2020; Jørgensen et al., 2018; Pitkänen et al., 2019). Since its introduction, the framework has gained much momentum and is nowadays broadly known. To sum up, the framework of value-based health care as defined

by the Harvard School of Business Institute for Strategy and Competitiveness (2020) based on professor Michael Porter's research is:

> *"A framework for restructuring health care systems around the globe with the overarching goal of value for patients."* (Harvard Business School Institute for Strategy and Competitiveness, 2020)

In brief, Porter has presented six major elements as part of the VBHC framework. The six elements, as summarized by the Harvard School of Business Institute for Strategy and Competitiveness (2020), are: 1) Organizing care around medical conditions over the full cycle of care and delivering into integrated practice units (IPUs), 2) Measuring outcomes and costs for every patient, 3) Aligning reimbursement with value by moving to bundled payments by condition, 4) Integrating multi-site care delivery, 5) Expanding the geographic reach of care, and finally, 6) Building an integrated, enabling information technology platform. To sum up, these elements are needed to achieve a value-based health care delivery system (Harvard Business School Institute for Strategy and Competitiveness, 2020).

Another framework in the field has been suggested by Malmivaara in 2013, where the best effectiveness of patient care in routine settings is pursued through four systematic layers. The pursuit of "real-effectiveness medicine", as he refers to it, requires four layers of information used in the decision-making processes: "*1) the clinical know-how, 2) the best, current scientific evidence, 3) quality assessment in the form of documented data of own unit's or clinical pathways' performance, and 4) benchmarking of own data with peers*" (Malmivaara, 2013, p. 103). The information from the four layers ought to then be used for improving treatment practices continuously in both one's own unit and throughout the whole clinical pathway (Malmivaara, 2013). In brief, the framework aims at bringing the best effectiveness of care to the routine, real-world settings, and at advancing the pursuit of *"effective and high-value (cost-effective) health care for each patient and for society"* (Malmivaara, 2013, p. 103).

In this study, alongside Porter's value-based health care, Malmivaara's real-effectiveness medicine will act as the primary theoretical foundations for examining the concept of effectiveness in healthcare delivery systems. To conclude, both frameworks aim at ensuring the best outcomes and thus high value for patients and recommend measurement around medical conditions. The concepts of value and effectiveness in healthcare have now

been presented and discussed. Next, deriving from the above Sections, the concept of value-based knowledge will be examined.

2.1.3 Value-based knowledge

As has been concluded in the previous Sections, the framework of value-based health care is based on maximizing patient value by measuring outcomes of care and their costs (Porter, 2010; Porter & Teisberg, 2006). To determine value, the measured outcomes ought to be connected with the patient-specific resource deployment in order to know how much resources are needed to gain certain effectiveness (Nordic Healthcare Group, 2016). Although measuring and allocating resources and costs have their own features and challenges, it may be argued that there are well-established principles procedures for doing so (Nordic Healthcare Group, 2016). Measuring and assessing outcomes of care, on the other hand, is arguably a far more complex issue that complicates the measurement of value-based health care, or effectiveness in general (Donabedian, 1966; Nordic Healthcare Group, 2016). Furthermore, it may be argued that outcomes are the predominant validator of effectiveness in health care (e.g. Donabedian, 1966). In the scope of this study, the focus is on the concept of effectiveness over cost-effectiveness in terms of the measurement of value-based health care. Indeed, from here onwards, when *value-based knowledge* is referred to, the focus is on outcome measures. Thus, cost information and its measurement or use are left outside the scope of the study. The definition for the concept of value-based knowledge in the scope of this study and its delineations, as discussed in Section 1.3, is, therefore: The organization's internal knowledge on the outcomes of care and of care processes, produced by the organization itself. Next, the nature and measurement of outcomes are briefly discussed in relation to the concept of value in healthcare, and their use in regard to managerial needs will be considered.

Outcomes as a concept may comprise of several different key focus areas and hence be measured from different perspectives (Pitkänen et al., 2019; Velentgas, Dreyer, Nourjah, Smith, & Torchia, 2013, p. 72). These different focus areas and their measurements reflect the different ways to perceive value in health care, which were discussed in Section 2.1.1. VBHC is based on Porter's (2010) view where value is measured solely based on clinical outcomes. According to him, outcomes of care include the layers of health status that is achieved or retained, the recovery process, and sustainability of health (Porter, 2010). Donabedian (1966, p. 167) argues in a similar way that the traditional way to perceive outcomes of medical care is *"in terms of recovery, restoration of function and of survival"*.

Nevertheless, in this study value in health care is perceived to also encompass the subjective perceptions and experiences of the patient, as was determined in Section 2.1.1. Similarly, outcomes may include the more subjective areas of focus, as is apparent from Donabedian's (1966) inclusion of patient attitudes and satisfactions as measurable outcomes. Therefore, also other perspectives on outcome measurements than merely clinical outcomes are relevant.

There are diverse ways to classify and categorize different outcome measures. As Velentgas et al. (2013, p. 72) summarize, "*key areas of focus in relation to health outcomes include medical conditions, impact on health-related or general quality of life, and resource utilization*". The key focus areas may in turn be classified into broad outcome measure categories by clinical, humanistic, and economic dimensions (Velentgas et al., 2013, p. 73). Comparatively, Pitkänen et al. (2019) synthesize different measurement perspectives to Patient-Reported Outcome measures (PROMs), Patient-Reported Experience Measures (PREMs), Clinical Outcome Measures, and Clinician-Reported Outcome Measures (ClinROMs). Different focus areas serve different informational needs of e.g. patients, health care providers, and other decision-makers on both patient and societal levels (Pitkänen et al., 2019; Velentgas et al., 2013, p. 72). To sum up, it is important to consider the different perspectives in outcome measurement (Pitkänen et al., 2019).

The first category of outcome measures is clinical outcomes which Velentgas et al. (2013, p. 74) refer to as perhaps the most common outcome category in their study context. Clinical outcome measures may be defined as *"Clinical, objective measures of functioning or health status"* (Pitkänen et al., 2019, p. 10). Although clinical outcomes may be arguably considered to be objective in their nature, they may include a varying degree of subjectivity derived from the diagnosis or assessment by a health care provider (Velentgas et al., 2013, p. 74). In addition to objective clinical outcomes, observer-reported outcomes and clinician-reported outcomes, where the assessment is determined by an observer with either no or some recognized professional training, may also be distinguished (Velentgas et al., 2013, p. 75).

The second broad category by Velentgas et al. (2013, p. 78) is humanistic outcomes which they divide to measures of health-related quality of life (HRQoL) and measures of patient-reported outcomes (PROs). HRQoLs are referred to as measuring the effect of diseases and treatments on the patients' lives, while PROs refer to data provided by the patients on a number of outcomes (Velentgas et al., 2013, p. 78). In general, patient-reported outcomes may be either generic or disease- or population-specific measures (Velentgas et

al., 2013, p. 79). Pitkänen et al. (2019) classification includes similar elements also under the category of Patient-Reported Outcome Measures (PROMs) though the health-related quality of life measures have not been distinguished. Instead, Pitkänen et al. (2019) add a category of Patient-Reported Experience Measures (PREMs) comprising of patient-reported data on the patients' experience and satisfaction with care.

The final category of economic and utilization outcomes classified by Velentgas et al. (2013, p. 83) represents the payer and societal perspective of outcome measurement and includes aspects such as monetary costs and health resource utilization. However, as was determined in Section 2.1.1, the societal aspect to value in healthcare is left with less attention in the scope of this study, and hence its measurements are also left outside further examination. To sum up, categories of outcomes measures include, by and large, clinical outcomes of both objective and observer-reported measures, and patient-reported outcome and experience measures (Pitkänen et al., 2019; Velentgas et al., 2013). Appropriate outcome measures ought to be selected based on the ultimate objectives and the patient segment, as well as properties such as reliability, validity, and variability (Pitkänen et al., 2019; Velentgas et al., 2013, p. 73). Further examination of different outcome measures and their selection criteria is left outside the scope of this study.

In addition to there being different ways to categorize outcome measures, researchers and practitioners in different locations apply different sets of outcomes for a single medical condition. Consequently, the results may not be compared which causes problems. There are different institutions with initiatives that guide the work for defining standardized sets of outcomes by specific medical conditions, however. The aim of such work is to promote a solution for comparing and combining results across studies and locations (COMET Initiative, 2020; ICHOM, 2020), and thus accelerate value improvement in health care (Porter et al., 2016). The Core Outcome Measurement in Effectiveness Trials (COMET) Initiative aims at advancing the development and application of agreed standardized sets of outcomes that represent the minimum of what ought to be considered in all clinical trials per a specific condition (COMET Initiative, 2020). In comparison, the International Consortium for Health Outcomes Measurement (ICHOM) promotes focusing on patient-centric care by defining standardized outcomes, tools and time points for measurement, and risk adjustment factors that matter most to the patients (ICHOM, 2020). Their role is to hence agree on the global, condition-specific standard sets of outcomes to be used by everyone (ICHOM, 2020; Porter et al., 2016). Both organizations bring multidisciplinary groups of professionals, experts, and patient representatives together to define patient-relevant outcome sets per

medical condition (COMET Initiative, 2020; ICHOM, 2020). While COMET (2020) focuses on outcomes in terms of clinical trials and research more generally, ICHOM's (2020) focus is more on routine care. Moreover, ICHOM's (2020) approach has been built on the framework of value-based health care. Therefore, ICHOM's work, in particular, has been recognized to promote and speed up the definition, measurement, collection, and comparison of outcomes in the VBHC literature (Porter et al., 2016; van der Nat et al., 2017).

There are several requirements, challenges, and limitations for measuring and using outcomes which will now be summarized in brief. First of all, outcomes ought to be measured on the patient level and ought to be relevant for patients (Donabedian, 1966; Porter, 2010). Patient-level outcomes may then be aggregated to suit managerial needs (Pitkänen et al., 2019). Risk adjustments are also needed to address combinations of different medical conditions with their own outcome measures (Porter, 2010) and to enhance comparability (Pitkänen et al., 2019). Secondly, instead of measuring the outcomes of single interventions, the effectiveness of the whole clinical pathway encompassing all services and activities ought to be assessed (Malmivaara, 2013; Porter, 2010). Measuring outcomes is further complicated by different treatment outcomes being either patient or disease group-specific, or generic. Moreover, while standardized outcome measures are needed to enable evaluation and comparison at an aggregated level, they also need to remain sensitive enough to remain relevant for individual patients (Elf et al., 2017) Healthcare providers need to thus balance between measures that are too narrow or too broad for them to matter to patients (Porter, 2010).

In addition to the requirements of measuring outcomes described above, there are two particularly challenging elements of assessing effectiveness that cause problems for utilizing value-based knowledge. Those are the non-deterministic relation between outputs and outcomes, and the time dimension of outcomes. Firstly, the relationship between process outputs of healthcare and the resulting outcomes is not straightforward (Pitkänen et al., 2019). Instead, many outside factors such as the validity of the diagnosis, genetics, and the patient's adherence to treatment and lifestyle are likely to influence outcomes (Donabedian, 1966; Pitkänen et al., 2019). Furthermore, the different services and activities along a patient's clinical pathway may contribute to the outcomes causing difficulties to distinguish between each contribution (Pitkänen et al., 2019). Secondly, depending on the patient group and treatment process, outcomes and thus value may appear and be measured both short and long term with some outcomes appearing instantly after e.g. surgery while others alongside with the experienced value may occur long after the procedure (Donabedian, 1966; Nordic

Healthcare Group, 2016; Porter, 2010; Sosiaali- ja terveysministeriö, 2019). While managing daily operations require instant and current information, such short-term knowledge may be less reliable in relation to the treatment outcomes and value that occur over a longer period of time (Nordic Healthcare Group, 2016). Indeed, knowledge of the achieved results may not even be available for managerial purposes in the short-term (cf. Donabedian, 1966). On the other hand, the more reliable long-term information may become outdated and less relevant from the management's perspective (Nordic Healthcare Group, 2016). The resulting trade-off between the reliability of value-based knowledge and its relevance for managerial purposes is what causes the time dimension of outcomes to be so challenging. In the scope of this paper, the above-discussed requirements and challenges in measuring and utilizing value-based knowledge will be acknowledged but will not be further evaluated.

2.1.4 Implementing value-based health care

In this Section, some issues regarding the implementation of value-based health care as well as some experiences from case examples will be examined in brief. As Pitkänen et al. (2019) state, the value-based approach may be applied on many different levels, including the societal and the service provider levels. In Finland, too, state-level agendas name promoting effectiveness of care and the access to value-based knowledge as goals for e.g. the development of national quality registers and the new Health and social service center program (Jonsson et al., 2019; Sosiaali- ja terveysministeriö, 2019). The recognition of the need for a value-based approach in the Finnish social and health care system is thus apparent.

Though implementation on the whole social and health care system might be ideal in terms of population health and economic perspectives, only very few or no examples of entirely value-based systems are to be found yet (EIT Health, 2020; Pitkänen et al., 2019). A recent study made by EIT Health (2020) confirmed that only a handful of EU countries are pioneering in implementing the VBHC approach. Though examples of early adopters exist in Europe, including countries like Sweden, the Netherlands, and Great Britain, value-based health care is still in its infancy and successful implementation takes time (EIT Health, 2020; Pitkänen et al., 2019). Van der Nat et al. (2017) support this view by stating that despite a steady movement towards defining and measuring outcomes through developing quality registrations, the actual use of outcome data to improve patient value or quality of care is still lacking behind. Even the measurement of outcomes that matter to patients may be still perceived as limited (Porter et al., 2016). According to Van der Nat et al. (2017), that

successful implementation of the value-based approach still needs to tackle three main challenges faced by physicians. Firstly, a paradigm shift is needed to move towards outcome-based quality improvement, followed by a need for more comprehensive instruments to facilitate such systematic use of outcomes (van der Nat et al., 2017). Van der Nat et al. (2017, p. 141) argue that the targets of measuring outcomes need to be implemented in practice to support a culture where "*outcomes are used to select, implement, monitor, and evaluate improvement initiatives"*. Based on Porter's (2016) views, the measurement of outcomes itself ought to be accelerated, simultaneously. Lastly, new networks with an open and transparent environment are needed to promote the learning and adoption of best practices between physicians and providers (van der Nat et al., 2017).

On a service provider level, on the other hand, several case examples exist on implementing the value-based approach. Examples evolve especially around the field of insurance-financed service production, piloting bundled payment arrangements, or in terms of value-based procurement (EIT Health, 2020; Pitkänen et al., 2019). In their study, EIT Health (2020) found ten case organizations that represented pioneers in adapting VBHC in Europe. The organizations included private and public hospitals, condition-specific providers, outpatient clinics, networks of independent caregivers, third party quality registries, and private payers (EIT Health, 2020). Out of the case studies, three represented public hospitals. Insights from those hospitals are now briefly reviewed.

The Basel University Hospital in Switzerland started implementing VBHC in 2016 (EIT Health, 2020). They organized the implementation around three key strategies of strong top management support, investing in a project management team for coordination, and choosing health conditions with motivated key players that had the potential for quick wins and scaling up the VBHC programs (EIT Health, 2020). Within two years, the hospital had expanded from the original two conditions to nine through their combination of top-down and bottom-up efforts and has achieved improvements in critical metrics alongside national and international recognition (EIT Health, 2020). Another example of VBHC implementation in public hospitals may be found in Sweden, where the Uppsala University Hospital launched a transformational plan in 2013 (EIT Health, 2020). The aim of the program was to develop their processes to match the already long tradition of collecting outcome data in quality registries (EIT Health, 2020). The hospital began with 43/230 clinical pathways across the hospital with designated pathway coordinators that managed patient flows and had interprofessional teams (EIT Health, 2020). As a result, the hospital

achieved a culture of organizational change where teams were empowered and inspired to pursue change and outcome accountability (EIT Health, 2020).

Comparatively, the implementation of VBHC in New Karolinska University Hospital in Sweden faced greater challenges (EIT Health, 2020; Nilsson, Bååthe, Erichsen Andersson, & Sandoff, 2018). The project for the hospital was an ambitious one and included parallel transformational programs such as the creation of new buildings and patient flows alongside the overhaul of operational and managerial models (EIT Health, 2020). The several, simultaneous changes initiatives confronted managers with complex challenges to all aspects of their operations (Körber, Stråât, Henter, & Dabhilkar, 2016). All in all, the approach caused the implementation of VBHC to suffer, though many learning experiences and aspects of its program still remain relevant for others to learn from (EIT Health, 2020; Nilsson et al., 2018). As Nilsson et al. (2018) conclude, learning experiences emerged around needing sufficient resource allocation in terms of time and administration to support implementation. Continuous anchoring to create engagement and commitments among both patients and employees, and dedicated, development-oriented leadership with proper decision-making authority were also needed (Nilsson et al., 2018). Indeed, while dedicated top management facilitated the implementation process, team leaders' would have benefited from a stronger mandate for explicit management (Nilsson et al., 2018). Additionally, a need to adjust essential IT-systems was apparent and the necessary new systems lagged behind in their development (EIT Health, 2020; Nilsson et al., 2018). The three cases presented above demonstrate that while there are success stories in the field of VBHC implementation in Europe, the task is not a simple one, and not many thorough examples yet exist.

Guidelines for implementing the value-based approach do exist in literature. Porter & Kaplan (2013) have offered detailed advice for implementing VBHC. However, local context is of the essence as health care systems differ between countries across the world, as Pitkänen et al. (2019) highlight. Hence, two sets of guidelines that have been adapted to the European context will be briefly referenced here. Pitkänen et al. (2019) have adapted their set of advice from those of Porter & Kaplan. First, they advise the implementation of a value-based approach to be based on organizing service production around customer's health problems or service needs instead of organizations of medical specialty (Pitkänen et al., 2019). To follow, outcomes and costs ought to be measured on a customer level, and achievement of effectiveness goals should be rewarded to encourage the aim of cost-effectiveness (Pitkänen et al., 2019). One could note, however, that such rewards would require for there to be goals set in terms of effectiveness for service providers. Finally,

Pitkänen et al. (2019) underline the importance of building an IT infrastructure for value-based management as enabling the measurement of patient-level outcomes and costs are required. Comparatively, EIT Health (2020, p. 8) has suggested an implementation matrix for the pursuit of tracking outcomes and "*describing, visualizing and implementing a value-based programme"*. Their implementation roadmap, as they refer to it, consists of five dimensions with different building blocks, that all are linked by the condition of identifying a patient group (EIT Health, 2020). The five dimensions include recording, comparing, rewarding, improving, and partnering (EIT Health, 2020). First, internal forces need to be mobilized around a condition and a scorecard, after which investing in a data platform is required to facilitate the benchmarking and continuous improvement (EIT Health, 2020). Additionally, different types of partnerships and collaborations are needed between life science companies, providers, payers, and IT companies (EIT Health, 2020). All in all, the guidelines by EIT Health (2020) suggest that implementing VBHC requires empowering clinical teams, making them accountable for patient outcomes, and encouraging them to pursue a cultural shift.

The research stream of value-based health care has now been examined in terms of relevant concepts and frameworks in the field. The concepts of value and effectiveness in healthcare and value-based knowledge have been covered, and their implementation discussed in the above sub-Sections. Next, the literature stream of knowledge management is reviewed under Section 2.2, to seek relevant theoretical grounding to address the research questions of this study.

2.2 Knowledge management

In this Section, knowledge management (KM) literature is studied. First, the research stream and its background alongside key definitions will be discussed. Following, research on knowledge management in the healthcare context will be looked into. Finally, knowledge management maturity models are examined and discussed, leading to the theoretical framework of this study which will be later discussed more in the following Chapter.

2.2.1 Knowledge management

When discussing knowledge management, it is relevant, to begin with defining what is meant by knowledge as a term. Although the terms knowledge, information, and data are often used interchangeably, knowledge ought to be distinguished from the others (Nonaka, 1994; Zack, 1999). The least meaningful form is data, which represents observations or facts

out of context (Zack, 1999). When data is placed within a meaningful context, often as a message or flow of messages, it becomes information (Nonaka, 1994; Zack, 1999). Finally, knowledge is created and organized when that flow of information is interpreted through experience, communication, or interference, resulting in action where it is believed and valued (Nonaka, 1994; Zack, 1999).

Knowledge in turn can be traditionally categorized into tacit and explicit knowledge (Polanyi M., 1966). While explicit knowledge refers to codified "*knowledge that is transmittable in formal, systematic language"*, tacit knowledge is harder to formalize or communicate due to its personal quality as it "*is deeply rooted in action, commitment, and involvement in a specific context."* (Nonaka, 1994, p. 16). Deriving from this distinction, Nonaka (1994) continues that the creation of knowledge is based on the conversion between tacit and explicit knowledge. Indeed, knowledge creation happens through the four different "modes" of knowledge conversion between the two types of knowledge (Nonaka, 1994), which has become the widely accepted theory in the literature.

Knowledge management (KM) is a broadly studied research stream with various definitions and frameworks. The importance of knowledge management is based on the well-established observation of knowledge society where knowledge plays a key part in the effective competition (Demarest, 1997; Land, 2009, p. 15). As organizations typically fail to fully utilize the knowledge in their possession, they seek to create or acquire potentially useful knowledge and utilize it to influence organizational performance positively through knowledge management (King, 2009, p. 3). To do so, an infrastructure for KM is needed culturally, operationally, and technically (Demarest, 1997). The origins of the concept and term of knowledge management may be traced back to the mid-1990s to the management consulting community (Koenig, 2018; McInerney & Koenig, 2011). During that time, one of the first definitions for KM was introduced by Davenport in 1994 (Koenig, 2018; McInerney & Koenig, 2011). Since then, multiple definitions have been offered in the literature. Some key definitions for knowledge management, including that of Davenport, are synthesized in Table 1.

Table 1: Definitions for knowledge management

Source	Definition
Davenport (1994), in (McInerney & Koenig, 2011, p. 1)	*Knowledge Management is the process of capturing, distributing, and effectively using knowledge*
Duhon (1998), in (McInerney & Koenig, 2011, p. 1)	*A discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously uncaptured expertise and experience in individual workers*
King (2009, p. 4)	*Knowledge management is the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed*
Gupta et al., (2000, p. 17)	*Knowledge management (KM) is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning and decision making.*

Alternatively, knowledge management can also be seen as a concept falling under the roof term of information management (Laihonen et al., 2013). Information management is another broadly studied field of research with a considerable number of varying definitions (Leskelä et al., 2019). In their study, Laihonen et al. (2013) concluded that information management can be roughly divided between a more strategic concept of utilizing and applying knowledge or data in managing the organization (knowledge management/knowledge-based management), and the process of generating new knowledge or data, and managing it (information management). The approach will be applied in this study too, with the focus being on knowledge management or knowledge-based management. Figure 2 presents the two-fold definition of information management, under which knowledge management can be seen to fall (Laihonen et al., 2013).

Information management	
Utilizing and applying knowledge or data in managing the organization	The process of generating new knowledge or data, and managing it

Figure 2. The two-fold definition of information management, adapted from Laihonen et al. (2013)

According to Leskelä et al. (2019), when information management is a part of an organization's strategic activities, the aims and needs of decision-making processes ought to

direct the collection and creation of data and not vice versa (Figure 3). While metrics that support decision-making in an organization are traditionally largely based on the type of data being gathered and the type of analysis based on available data, the process ought to be reversed with the type of decisions the organization wishes to make determining the rest of the process (Leskelä et al., 2019). One can assume that similar logic applies to knowledge management, too. The approach will be applied in this study as well, with the research problem being derived from what the aims and decision-making needs are in the case organization. In other words, the approach is to first determine how and what type of knowledge the focus group would like to utilize which ought to set the aim for the rest of the process.

Figure 3. The process of information management, adapted from Leskelä et al. (2019).

The terms and concepts of knowledge and knowledge management have now been briefly presented and discussed. Following, the concept will be linked to the context of healthcare to justify its relevance in the context of this study.

2.2.2 Knowledge management in healthcare

The concept of knowledge management has been applied also in the healthcare sector, and many studies have emerged in the field (Abidi & Sibte, 2001, 2007; Bordoloi & Islam, 2012; Chen, Liu, & Hwang, 2011; Lin, Tan, & Chang, 2008; Shahmoradi, Safadari, & Jimma, 2017). As Abidi & Sibte (2007, p. 1) argue, healthcare knowledge management (HKM) is, however, *"an active, yet not a well characterized research topic."* The research to guide the implementation of KM practices in healthcare is still limited (Bordoloi & Islam, 2012). The emergence of KM in the healthcare field has been driven by the recognition that healthcare today is knowledge-based and knowledge-rich, with knowledge-driven processes (Abidi & Sibte, 2007; Bordoloi & Islam, 2012; Lin et al., 2008). Indeed, the health care industry is nowadays powered by sophisticated knowledge and information resources and may be perceived as "data-rich" due to the vast amount of data being generated (Abidi & Sibte, 2001). Utilizing healthcare knowledge aptly and in the right time may result in improved levels of "*patient safety, care quality, team-care, patient centeredness and cost-*

effectiveness", as was argued by Abidi & Sibte (2007, p. 2). Indeed they describe the practical aspect of healthcare knowledge management in terms of knowledge-centric services with the goal of improving healthcare delivery and health outcomes (Abidi & Sibte, 2007). To conclude, healthcare knowledge management is defined as *"the systematic creation, modeling, sharing, operationalization and translation of healthcare knowledge to improve the quality of patient care",* to enable "*high quality, well-informed and cost-effective patient care decisions*" (Abidi & Sibte, 2007, p. 2).

As earlier research has argued, however, KM is systematically more complex in the healthcare domain (Bordoloi & Islam, 2012). Although healthcare organizations may be characterized as data-rich due to the massive amount of data they generate, they may also be argued to be "knowledge-poor", as the data is rarely transformed into strategic knowledge and is typically used in a suboptimal manner (Abidi & Sibte, 2001, 2007). Despite the extensive amounts of "knowledge-rich" data, the asset is not yet utilized to its full capacity in improving healthcare service delivery and its management (Abidi & Sibte, 2001). For now, a lack of general understanding of KM practices and their potential as well as a lack of ability, willingness, or capacity for utilizing or managing the knowledge occurs among healthcare stakeholders and professionals (Abidi & Sibte, 2007). As a result of under-utilizing healthcare knowledge even wrong clinical decisions, medical errors, bad use of resources, and high costs may occur (Abidi & Sibte, 2007). Compared to other fields, improving performance in the healthcare context is further complicated by the plethora of different, often conflicting goals that relevant stakeholders have in regards to e.g. service availability, high quality, cost containment, and patient safety and satisfaction (Porter, 2010).

Due to the reasons described in the above paragraphs, knowledge management has been identified as a relevant approach for improving the efficiency, efficacy, and quality of healthcare delivery and processes (Abidi & Sibte, 2001; Bordoloi & Islam, 2012; Lin et al., 2008). While the need for value-based knowledge, too, is starting to be recognized in healthcare management, achieving the successful utilization of knowledge requires the principles and practices of KM, as Abidi & Sibte (2007) argue. Moreover, they suggest that a strategy for health knowledge management with specific steps and traits is required (Abidi & Sibte, 2007). Next, some relevant applications of KM practices and theory in the healthcare context will be briefly presented.

In their study, Bordoloi & Islam (2012) investigated KM practices in healthcare delivery through a conceptual framework in terms of 1) social practices of knowledge acquisition and sharing, 2) knowledge acquisition and sharing through electronic medical

records, 3) knowledge assimilation and application through clinical decision support systems and 4) contingency factors. Firstly, Bordoloi & Islam (2012) found that involvement in social practices and especially informal opportunities to interact with peers contributed to the exchange of knowledge and to keeping in touch with the most updated information and evidence. Secondly, previous experience and appropriate training were found to help in adopting KM practices (Bordoloi & Islam, 2012). Finally, though IT infrastructure and support were found to contribute to adopting and implementing KM practices, appropriate integration of IT systems was discovered to be an important factor to allow for smooth information flow (Bordoloi & Islam, 2012). To sum up, Bordoloi & Islam (2012, p. 117) outlined that successful adoption of KM practices in healthcare requires "*leadership, IT infrastructure (and integration), and supporting policies in HRM*" alongside an organizational culture which promotes knowledge sharing.

Chen et al. (2011) also studied KM adaptation among healthcare professionals. They found user participation to be integral in terms of IT introduction to ensure better use of resources (Chen et al., 2011). They suggested that hospitals make early planning, look into appropriate resource allocation, and identify and encourage key members of personnel with experience relating to KM (Chen et al., 2011). Additionally, Chen et al. (2011) found that as KM practices are still new in the sector, understanding of the concept is still marginal, and hence sufficient support and managerial participation are needed. In terms of barriers for the flow of knowledge in healthcare organizations, on the other hand, Lin et al. (2008, p. 331) found barriers relating to "*knowledge source, knowledge receiver, knowledge transfer, knowledge flow context, and the organizational context*". Moreover, the different barriers were found to affect one another (Lin et al., 2008). Relating to these barriers, Lin et al. (2008) underlined how knowledge barriers cause incorrect decision making and poor judgment. Absorptive capacity was found important to ensure knowledge transfer (Lin et al., 2008), thus providing further evidence for the need for sufficient support and training in adapting KM practices (Bordoloi & Islam, 2012; Chen et al., 2011).

Although KM hasn't seemingly been directly applied in terms of effectiveness of care or the VBHC context, several applicable implications may be identified from the healthcare KM literature discussed above. Furthermore, the literature of healthcare KM included several indications of a link between utilizing and managing healthcare knowledge resulting in potentially better outcomes of care or cost-effectiveness. A similar link between KM practices and VBHC implementation or the use of value-based knowledge may hence be assumed. Next, the tools of KM maturity modeling will be examined.

2.2.3 Assessing the maturity of knowledge management

As was outlined in Chapter 1, the first research question of this study focuses on evaluating the current situation regarding value-based knowledge management. To address that aim, the knowledge management literature was examined for tools to assess the maturity of an organization's KM practices. Indeed, as organizations grow, more specialized indicators for assessing and managing the organizational knowledge, and more sophisticated dimensions are needed (Khatibian, Hasan gholoi pour, & Abedi Jafari, 2010). As a result, various frameworks have been developed to assess the maturity of an organization's knowledge management. In their literature review, Leskelä et al. (2019) identified different maturity and assessment models under the roof term of information management. Alongside knowledge management maturity models, they found models for e.g. performance management and business intelligence (Leskelä et al., 2019). All in all, they concluded that most of the identified maturity models were general instead of context-specific and were narrowed down to consider a specific aspect of information management, such as knowledge management (Leskelä et al., 2019).

Only around half of the maturity models identified Leskelä et al. (2019) had been applied in practice. When it comes to the contexts of applying the maturity models, Leskelä et al. (2019) found that only one of the models by Brooks et al. (2015) had been applied in the healthcare context, and the model in question was used for assessing business intelligence maturity instead of knowledge management maturity. Furthermore, the model had not yet been applied in practice. Maturity modeling has been applied in the healthcare context also in another research domain relating to healthcare information systems, however (Carvalho, Rocha, & Abreu, 2016; Carvalho, Rocha, van de Wetering, & Abreu, 2019). While these models are not suitable for the context of this study due to their different areas of focus, they indicate that maturity modeling as a tool may be applied in the healthcare context, in general. Next, the characteristics of knowledge management maturity models are reviewed, based on the KM models that were identified by Leskelä et al. (2019) in their literature review and that had been tested in practice.

Based on the identified knowledge management maturity models (KMMM), the models tend to share some characteristics as was found in work by e.g. Teah et al. (2006), Khatibian et al. (2010), and Hsieh et al. (2009). All studies also summarized the KMMM literature before suggesting a model of their own. Based on these literature reviews, it can be concluded that most KMMMs may be classified to either *CMM-Based KMMM* and *Non-*

CMM-Based KMMM (Hsieh et al., 2009; Khatibian et al., 2010; Teah, Pee, & Kankanhalli, 2006). CMM-Based Knowledge Management Maturity Models are derived from Capability Maturity Modelling (CMM) that was originally developed to help software organizations in progressing in KM and in determining process maturity (Teah et al., 2006). Since then, numerous maturity models have been developed and refined based on the CMM, resulting several different CMM-Based KMMs (Khatibian et al., 2010). Conversely, the literature includes also well-known maturity models that are non-CMM-based (Hsieh et al., 2009; Teah et al., 2006). All in all, though the CMM- and non-CMM-based knowledge management maturity models have differences such as different naming and characteristics of different maturity stages, many similarities across all KMMMs may be identified (Hsieh et al., 2009; Khatibian et al., 2010; Teah et al., 2006).

Typically, KMMMs define five different levels of maturity for an organization's knowledge management and each level possesses its own set of characteristics with the maturity of an organization's knowledge management growing and enhancing in each one (Hsieh et al., 2009; Khatibian et al., 2010; Teah et al., 2006). A maturity level indicates the level of KM capabilities that the organization possesses, and higher levels may be achieved step by step as the organization develops those capabilities over time (Khatibian et al., 2010). Similarly, the maturity models all cover different major key process areas (KPA) that are being identified at every maturity level, and that indicate and specify the areas of focus for an organization to address before achieving the targeted maturity level (Khatibian et al., 2010; Teah et al., 2006). As e.g. Teah et al. (2006) and Khatibian et al. (2010) found, three major KPAs typically found in different KMMMs include people/organization, process, and technology. The KPAs can be seen corresponding to the cultural, operational, and technological infrastructure that knowledge management requires (Demarest, 1997).

As was briefly mentioned, no known applications of KMMMs in the healthcare context seem to exist in the literature, guiding the theoretical framework for this study to be chosen among the identified KMMMs that were discussed in this Section. However, relating to the barriers to knowledge flow that have been studied also in the healthcare context, Lin et al. (2012) have studied the barriers to knowledge flow regarding different KM maturity stages. Although their study was not in the healthcare context, the results may be assumed to be applicable as their previous study was indeed focused on identifying similar knowledge flow barriers in healthcare organizations (Lin et al., 2008, 2012). Hence, their findings are relevant as they might offer indications that serve the purposes of this study. The barriers to knowledge flow within health organizations were briefly discussed in Section 2.2.2. In their

study, Lin et al. (2012) discovered that such barriers are different at different stages of KM maturity and that they change in line with KM development. When an organization's KM maturity develops, the characteristics and barriers to knowledge flow also change and new barriers may occur (Lin et al., 2012). All in all, the early stages of KM maturity require special attention to issues such as people and contextual domains, powerful leadership, and support from top management (Lin et al., 2012). Comparatively, during more mature KM development issues regarding mechanisms and intervention, lack of authority over KM systems, and lack of systematic knowledge documentation appeared to need particular attention (Lin et al., 2012).

In this Section, the concept of knowledge management maturity modeling has been presented. Before moving on to Chapter 3 where the chosen theoretical grounding for this study is presented, previous literature relating to answering the research questions of this study is examined in Section 2.3.

2.3 Value-based knowledge management in specialized healthcare

The final Section of this Chapter focuses on reviewing previous research related to answering the specific research questions of this study. The literature is searched for prior insights on value-based knowledge management in healthcare and utilizing value-based knowledge in healthcare management.

2.3.1 Utilizing value-based knowledge in managing specialized healthcare

Although KM practices and implementation have been studied in the healthcare context, they have not been applied in the context of value-based health care or directly to the use of value-based knowledge. Comparatively, though studies on implementing the value-based approach exist, they do not focus specifically on the managerial viewpoint or incorporate methods from knowledge management. It can thus be concluded that research that combines KM literature with VBHC implementation is still limited. However, some research does exist in terms of healthcare managers' views on the concept of effectiveness and on utilizing value-based knowledge. The findings of these studies are now briefly gone through.

Most studies that relate to the research phenomenon of this study have focused on examining the healthcare management's perceptions of effectiveness as a concept. The findings of previous studies have concluded that while the concept of effectiveness has been perceived as important, a clear or uniform definition is lacking (Axelsson & Engström, 2001;

Rosen, 2000; Simonen, 2012; Simonen, Blom, & Viitanen, 2011). Instead, the concept has been considered complex and multi-faceted, and different audiences give it different meanings and value depending on their role and organizational level (Axelsson & Engström, 2001; Rosen, 2000; Simonen et al., 2011). More specifically, Axelsson & Engström (2001) studied the perceptions of three key groups in Swedish health care. They found that each group defined the concept in their own way which in turn could cause problems in cooperation and target setting between actors from different levels in the field. Effectiveness was given varying meanings in terms of business development, resource management, planning, rationalization and responsibility (Axelsson & Engström, 2001). Overall, the healthcare managers closer to the care process were found to emphasize patients' needs over more administrative objectives, and connect business development and rationalization with e.g. budgetary issues and cutting costs (Axelsson & Engström, 2001).

In comparison, Rosen (2000) discovered that higher level managers in the field were more prone to consider issues relating to performance at the hospital level. Again, effectiveness was found to gain varying interpretations between a clinical and economic emphasis (Rosen, 2000). Simonen (2011) found similar results to apply also in the Finnish context, where the managers in specialized healthcare perceived effectiveness as a difficult concept to define or understand in a unified manner. The concept was linked to the outcomes of treatment, but received various meanings and interpretations (Simonen et al., 2011).

Simonen et al. (2012; 2011; 2012) have also studied the application of knowledge of effectiveness in the strategic and operational management of Finnish specialized healthcare, alongside factors hindering or promoting its use. In their studies, they found there to be great variance in the levels of using effectiveness knowledge and in different level managers' emphasis between administrative or clinical use (Simonen et al., 2011). At the time of their studies, effectiveness knowledge was mostly used by department-level management, and was used for example for support in decision-making and as background information for treatment realization and decisions regarding different units of treatments (Simonen, 2012; Simonen et al., 2011). Overall, however, both the amount of effectiveness knowledge produced and its usage were found to remain rather low and its full potential as a tool for management was yet to be recognized (Simonen et al., 2011).

According to Simonen et al. (2012; 2012), the use of effectiveness knowledge was promoted by factors such as external generation of data, management's interest towards the issue and a universal demand for effectiveness both organizationally and nationally. Conversely, the laborious process of generating effectiveness research, deficiencies in

managerial expertise or prioritization, ethical issues relating to the benefit of a single patient, and poor data management systems were seen as factors to hamper the use of effectiveness knowledge (Simonen, 2012; Simonen et al., 2012). In their study, Simonen et al. (2012) concluded that there was a need for a greater quantity of effectiveness data with better quality, usability, accessibility and visibility. Earlier on, Rosen (2000) had also determined that at the time research failed to provide managerial decision-makers with needed 'evidence' relating to effectiveness on a broader level than the benefit of an individual patient.

As has been discussed in this Section, some research on the perceptions of effectiveness as a concept and the use of effectiveness knowledge exists. All in all, the findings of previous studies have indicated the complexity of utilizing value-based knowledge, and its novelty as a resource in the managerial context. However, as previous research on utilizing value-based knowledge in middle-/top-level management of specialized healthcare remains marginal, the phenomenon and its requirements aren't yet properly understood. Value-based knowledge management as a research phenomenon thus remains novel and complex. Next, based on the literature review conducted in this Chapter, the theoretical grounding for this study will be presented in Chapter 3.

3 Theoretical grounding

This study aims at assessing the case organization's current status and expectations for utilizing value-based knowledge for managerial purposes. To do so, the chosen approach is to apply knowledge management maturity modeling as a tool to evaluate the case organization's maturity in value-based knowledge management. As Teah et al. (2006) argue, knowledge management maturity modeling may provide a useful tool for describing and guiding the efforts to implement knowledge management by offering a clear description of the organization's current state, and indications of the way forward. Khatibian et al. (2010) add that applying maturity models offer a good approach for improving the KM function of an organization. Indeed, KMMMs offer a tool for characterizing the steps of growth needed for an organization to develop its knowledge management (Khatibian et al., 2010). Consequently, research has recommended maturity modeling as a means of assessing the extent to which knowledge management is "*explicitly defined, managed, controlled and effective"*, as was summarized by Teah et al. (2006, p. 401). Knowledge management maturity modeling may be thus seen to provide an appropriate framework for addressing and answering the research questions of this study.

As Leskelä et al. (2019) concluded in their literature review, there is yet no established, research-based method for assessing the maturity of knowledge management, or information management more broadly. Additionally, there are currently no previous applications of knowledge management maturity modeling in VBHC literature, to the researcher's knowledge. Hence, a model had to be selected and applied to the needs of this study despite a different context of application. The choice was based on criteria such as the model having been already applied in practice and not being too extensive in the sense that it would cover areas irrelevant to this study.

As was identified in the literature review, Teah et al. (2006) propose a general knowledge management maturity model (G-KMMM) of their own that describes the characteristics of an organization at every KM maturity level. Typical to KM maturity models (Khatibian et al., 2010; Teah et al., 2006), the G-KMMM defines five stages for an organization's KM maturity, that describe features across three KPAs. As Teah et al. (2006, p. 413) explain in their paper, "*for an organization to attain a particular maturity level, the attributes of that level and lower levels have to be fully achieved"*, and thus the maturity level of the least mature organizational unit determines the maturity stage for the whole organization.

The G-KMMM was applied in the context of a large university in Teah et al. (2006) study. Although the context is different from that of this study, there are in fact similarities to be found as the case organization in this study is a large university hospital. As mentioned earlier, KM tools such as G-KMMM have been identified as a powerful tool for assessing an organization's current state and way forward in terms on knowledge management (Teah et al., 2006). Hence, it can be argued that knowledge management maturity modeling could be applied in assessing the implementation of value-based knowledge management, too. Moreover, Teah et al. (2006) recommended for their model to be applied in different contexts to assess its validity and improve its generalizability.

As was discussed and justified above, the general knowledge management maturity model created by Teah et al. (2006) has been chosen to be the primary theoretical knowledge management framework that will be applied in the empirical part of this research. The maturity model will be applied in analyzing the interview results and thus assessing the maturity of value-based knowledge management in the case organization. Applying the model hence addresses the first research question of this study, in particular. The general knowledge management maturity model proposed by Teah et al. (2006) is presented below in Figure 4. Out of the KPAs in Teah et al. (2006) model the scope of this study will mainly cover the areas of people/organization and process, with technology being left with little to no focus.

Maturity Level		General Description	Key Process Areas		
			People / Organization	Process	Technology
1	Initial	Little or no intention to make use of organizational knowledge	Organization and its people are not aware of the need to manage its knowledge resources	No formal processes to capture, share and reuse organizational knowledge	No specific KM technology or infrastructure in place
2	Aware	Organization is aware of and has the intention to manage its organizational knowledge, but it might not know how to do so	Management is aware of the need for KM	Knowledge indispensable for performing routine task is documented	Pilot KM projects are initiated (not necessarily by management)
3	Defined	Organization has put in place a basic infrastructure to support KM	- Management is aware of its role in encouraging KM - Basic KM training provided - Basic KM strategy is put in place - KM roles are defined - Incentive systems available	- Processes for content and information management is formalized - Metrics are used to measure the increase in productivity	- Basic KM Infrastructure in place (e.g. single point of access) - Some enterprise-level KM projects are in place
4	Managed	KM initiatives are well established in the organization	- Common strategy and standardized approaches towards KM - KM is incorporated into the overall organizational strategy - More advanced KM training - Organizational standards	Quantitative measurement of KM processes (i.e. use of metrics)	- Enterprise-wide KM systems are fully in place - Usage of KM systems is at a reasonable level - Seamless integration of technology with content architecture
5	Optimizing	- KM is deeply integrated into the organization and is continually improved - It is an automatic component in any organizational processes	Culture of sharing is institutionalized	- KM processes are constantly reviewed and improved - Existing KM processes can easily be adapted to meet new requirements - KM procedures are an integral part of the organization	Existing KM infrastructure is continually improved upon

Figure 4. The General Knowledge Management Maturity Model, adapted from Teah et al. (2006, p. 406).

In this study, the proposed G-KMMM will be used as a tool to analyze the maturity stage of the case organization in terms of value-based knowledge management. More specifically, the findings regarding the first research question will be analyzed and interpreted in relation to the two selected KPAs of the maturity model: People/Organization and Process. Additionally, elements of the model are adapted to facilitate the collection of empirical data in this study. In their paper, Teah et al. (2006) also provide a suggested assessment instrument to facilitate the practical application of their model. The instrument aims at helping an organization to determine the effectiveness of its KM practices (Teah et al., 2006). In this study, the instrument was not directly applied in the data collection, however. Indeed, while some elements of the assessment tool proposed by Teah et al. (2006) were incorporated in the data collection, some were left out to meet the case organization's needs and match the research questions.

As stated, the assessment instrument presented by Teah et al. (2006) was not applied directly in the collection of empirical data of this study. Naturally, the assessment instrument can't be expected to suit the needs of this study directly and seamlessly as the context is different. Additionally, as applying KMMMs to value-based knowledge management presents a new form of application for maturity modelling, adjustments were needed in applying the model in practice. For example, the proposed assessment tool was found too heavy for the scope of this study. Furthermore, the research questions of this study include aspects that were not readily met or covered in the assessment instrument. Instead, the G-KMMM and its proposed assessment instrument are applied by incorporating some aspects to the interview structure and interview questions. In the interview structure, the model and assessment instrument are applied through both qualitative questions as well as more quantitative questions where interviewees are asked to self-assess the maturity of value-based knowledge management. The selected approach is supported by Teah et al. (2006), according to whom a KMMM should provide both qualitative and quantitative results. They add that quantitative results may be generated through surveys of the interviewees' perceptions of the KM's effectiveness (Teah et al., 2006). The potential effects of not using the assessment instrument proposed by Teah et al. in collecting the empirical data will be discussed in Chapter 6.

To conclude, the selected framework of knowledge management maturity modelling will be applied first and foremost in analyzing the empirical data of this study. Also, elements of the model will be applied in the data collection, though the assessment instrument is not fully incorporated in this study.

4 Research methodology

In this Chapter, the research methodology of this study is presented. The choice of methodology, the case organization, and the choice of data collection method and data analysis are presented and considered. The first Section presents the chosen research approach while the second introduces the research environment and case organization. Following, the data collection and data analysis processes are discussed, and finally, the quality and validity of the chosen methodology is evaluated. The Chapter aims at justifying the methodology process and its reasoning.

4.1 Research design and approach

The chosen methodology for this study is a qualitative research methodology. More specifically, a qualitative single case study is employed as the research method. Yin (2018, p. 33) outlines case studies as an appropriate method for understanding a contemporary real-world case in its contextual conditions. Similarly, Eisenhardt (1989) describes case studies as an acceptable research strategy when the focus is to understand the dynamics of a single setting. Indeed, as Eriksson and Kovalainen put (2008a, p. 3), "*case study research should be understood more as a research approach or research strategy rather than a method*". While both qualitative and quantitative data may be used, the qualitative spirit of case study research makes it particularly applicable for addressing complex phenomena in their context (Eriksson & Kovalainen, 2008a, p. 3). Consequently, the selected approach in this study is qualitative as it allows the concepts to be studied "*in terms of their meaning and interpretation in specific contexts of inquiry*" (Ketokivi & Choi, 2014, p. 233). As Kvale (2011a, p. xi) puts it, concepts and hypotheses are developed and refined during the qualitative research process. This approach serves the meaning of this study, as no well-defined concepts or ready-formulated hypotheses were made in the beginning due to the limited prior knowledge of the research phenomenon.

The studied phenomenon in this research is value-based knowledge management and the use of value-based knowledge in managing specialized healthcare. As concluded before, the phenomenon is complex in many ways and only limited prior research exists in its application. Eisenhardt (1989) states that building theory from case study research has the strength of likely generating theory that is novel, testable, and empirically valid. Such strengths derive from the deep connection to empirical evidence, typical to case studies (Eisenhardt, 1989). As it doesn't rely on previous literature or prior empirical evidence, the

case study approach is specifically relevant and suitable for studying new research areas where the phenomenon remains uncharted, or research areas in which existing theory seems insufficient (Eisenhardt, 1989). Comparatively, another strength of case study research is its ability to present and address complex issues resulting in its use as a common research strategy (Eriksson & Kovalainen, 2008a, p. 3). Hence, the novelty and complexity of the studied phenomenon (Eisenhardt, 1989; Eriksson & Kovalainen, 2008a, p. 3) supports the choice of qualitative case study further as the appropriate research method in this study.

According to Yin (2018, pp. 33–34), the definition of a case study as a research method is twofold, covering the scope and features of a case study. Firstly, in terms of the scope: "*A case study is an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between the phenomenon and context may not be clearly evident.*" (Yin, 2018, p. 33). Secondly, regarding its features: "*A case study copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one results benefits from the prior development of theoretical propositions to guide design, data collection, and analysis, and as another result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion.*" (Yin, 2018, p. 34). While case studies tend to focus on one or two fundamental issues to understand the research phenomenon (Tellis, 1997), the approach enables the use of different cases from the same organization or researching a single issue across different contexts in the same organization (Voss, Tsikriktsis, & Frohlich, 2002). All in all, case study research is known to be particularly suitable for examining "how" or "why" questions about a contemporary set of events in a setting where the researcher has only limited or no control (Yin, 2018, p. 32). The approach thus suits the research questions of this study and their aim at understanding how the phenomenon and its application is perceived in the case organization.

According to Eriksson and Kovalainen (2008a, pp. 5–6) a case study can be either intensive or extensive by its type. An intensive case study aims at understanding and interpreting a case deeply from the inside to provide a holistic, context-specific description (Eriksson & Kovalainen, 2008a, pp. 5–6). In contrast, an extensive case study focuses on discovering common patterns and properties by comparing cases to develop, elaborate, or test theory (Eriksson & Kovalainen, 2008a, pp. 5–6). In the latter, the real-life case and its detailed description is not the focus but rather a means for developing generalizable theoretical constructs (Eriksson & Kovalainen, 2008a, p. 5). Hence, as the key interest in

this research is in the case itself instead of pre-given theoretical propositions, this case study is of intensive type (Eriksson & Kovalainen, 2008a, pp. 5–6).

As Eisenhardt (1989, p. 535) summarizes, case studies may be used for diverse purposes such as to *"provide description, test theory, or generate theory*". Similarly, other authors have concluded that case studies can serve different research objectives which are typically classified into exploration, theory building/generation, theory testing and theory extension/elaboration (Ketokivi & Choi, 2014; Voss et al., 2002). According to Voss et al. (2002), the typical "how" and "why" formulation of case study research questions tends to lead towards both theory-testing and particularly theory development. While in an intensive case study the main focus is on the case itself and its interpretation, the case type is equally theoretically informed and may be used for theory elaboration or theory generation (Eriksson & Kovalainen, 2008a, p. 6). To sum up, case studies are ideal for elaborating on or developing new ideas or theories which is beneficial for the aims of this study.

As e.g. Tellis (1997) states, case studies can have a single or multiple-case design. Typically, a single case study approach is applied when a theory is to be confirmed or challenged or a unique case is represented, while multiple case studies follow replication logic (Tellis, 1997; Yin, 2018, p. 72). More specifically, Yin (2018, p. 72) lists the single-case study as a suitable research design under five single-case rationales which are when the case is critical, unusual, common, revelatory, or longitudinal. The chosen design in this research is a single-case study as the focus is on the particular case of the selected case organization. While single case studies are criticized for their limitations, particularly in terms of the generalizability of the resulting conclusions, models, or theory, they tend to enable a greater depth of observation (Voss et al., 2002; Yin, 2018, p. 40). The case study approach may be further divided into more specific strategies depending on it being either holistic or embedded (Yin, 2018, p. 75). A single-case study may involve units of analysis at several levels and thus include subunits, making it an embedded design (Yin, 2018, p. 75). Conversely, a holistic case study focuses on the global nature of an organization with only a single unit of analysis (Yin, 2018, p. 76). In this study, three departments of the case organization are covered as subunits of analyses making it an embedded single-case study. However, the main focus remains on the larger, holistic unit of analysis, the original "case" itself, which according to Yin (2018, pp. 76–77) is important to avoid shifting the orientation of the whole case study.

All empirical research studies have research designs that are purposed to avoid having evidence that doesn't address the research questions (Yin, 2018, p. 48). Typically, research

design comprises many multi-layered decisions that cover everything from the theoretical grounding, the methodological choices, the data collection, and analysis to the writing process (Eriksson & Kovalainen, 2008c, p. 13). According to Yin (2018, p. 48), a case study research design ought to include defining five important components: "*1. A case study's questions; 2. Its propositions, if any; 3. Its case(s); 4. the logic linking the data to the propositions; and 5. The criteria for interpreting the findings.*" The three first components will lead the design towards identifying the needed data while the two last ones will draw the design into anticipating the analysis (Yin, 2018, p. 48). As Eriksson and Kovalainen (2008c, p. 13) point out, the design process is rarely linear but rather an iterative process where different stages are revisited throughout the process. Moreover, qualitative research design in particular tends to allow deviations and surprises during the research process (Eriksson & Kovalainen, 2008c, p. 3). Similarly, the research process of this study was iterative. The process began by identifying the research topic together with the case organization, after which some literature was reviewed before formulating the research questions. Following, the case units were defined more specifically and the data to be collected were identified and determined. Literature was revisited several times during the gathering and analysis of data before findings were reported. All in all, the research process was thus much alike the circular qualitative research process described by Eriksson and Kovalainen (2008c, p. 13) and included the core components listed by Yin (2018, p. 48).

4.2 Research environment and case organization

The research environment of the study is the health and social care in Finland, and more specifically the Finnish specialized healthcare. In Finland, service providers include hospital districts, municipalities, joint municipal authorities, private companies, and non-profit organizations. As for specialized healthcare, the services are organized by 20 hospital districts which in turn are funded by the municipalities that are all members of a certain hospital district (Sosiaali- ja terveysministeriö, 2020). Each hospital district has a central hospital and other hospitals. Five out of the Finnish hospitals are university hospitals and provide highly specialized medical care (Sosiaali- ja terveysministeriö, 2020).

The case organization in this study is the HUS Helsinki University Hospital. The Helsinki University Hospital comprises 17 hospitals situated in three municipalities (HUS, 2020). In addition to serving the population of its hospital area, the hospital is responsible for *"providing care for demanding and rare diseases for its catchment area's hospital areas and also to the patients from all over Finland"* (HUS, 2020). Indeed, HUS is the biggest

health care provider in Finland with over 680 000 patients annually (HUS, 2020). Out of the different departments of the hospital, three were selected to take part in this study. The choice of the three departments was made together with the case organization. The three selected departments were chosen as together they were thought to give a comprehensive and diverse enough idea and understanding of the studied phenomenon that would represent the case organization well. Altogether, the selected three departments employ around 3 300 employees and treated more than 160 000 patients in 2019 (HUS, 2019a).

As briefly mentioned in the first Chapter of this study, the case organization's new organizational strategy calls for promoting value-based care and research around the phenomenon. The strategic goals of the organization's new strategy underline the effectiveness of care and its measurement. Furthermore, the HUS review panel has called for research on value-based health care and has assessed the value of the current research on the phenomenon to be minor in relation to its importance (HUS, 2019b). All in all, the case organization had recognized interest and a need for wider and more coordinated research around value-based health care and the utilization of value-based knowledge. The initiative for this study is thus derived from the case organization's strategic goals.

4.3 Collection of empirical data

In this study, the primary data was collected through qualitative semi-structured interviews. According to Eisenhardt (1989, p. 534), case studies tend to "*combine various data collection methods such as archives, interviews, questionnaires, and observations*". Eriksson and Kovalainen (2008a, p. 13) argue that in-depth interviews often form the primary source of empirical data used in case studies while other sources may be used as complementary data. Moreover, the interviews in case studies are typically open-ended rather than structured while both forms are possible (Eriksson & Kovalainen, 2008a, p. 14). As Rabionet (2011, p. 563) describes, "*qualitative interviewing is a flexible and powerful tool to capture the voices and the ways people make meaning of their experiences.*"

The primary data collection method was semi-structured interviews, as already mentioned. As Kvale (2011a, p. 65) states, qualitative interviews are typically semi-structured. Semi-structured interviews generally include a script with an outline of the topics to be covered with suggested questions (Kvale, 2011a, p. 57). While a sequence of themes and some questions are prepared in advance, the interview type allows changes of sequence and question forms enabling the interviewer to follow up the stories and answers that come up (Kvale, 2011a, p. 51). The level of predetermination in the questions and their sequence,

and how closely the interviewer follows them or follows up new directions brought up in the answers depends on the study in question (Kvale, 2011a, p. 57). Some level of predetermined themes is important though, as a completely unstructured interview risks failing to elicit the relevant topics in regards to the research questions under consideration (Rabionet, 2011). In this study, the interview guide had a thematically structured form with prepared questions but the sequence and exact form of the questions were dynamic depending on the interviewees' answers. While the themes to be covered and their sequence remained the same throughout the interviews, some changes to the question forms and sequences were made according to the answers and insights brought up in the interview in question.

The interview structure was designed together with the case organization in accordance with the research questions. For this specific context, the interview questions and themes to be covered were agreed with the case organization while some key elements were also derived from the knowledge management maturity model by Teah et al. (2006). To ensure that all themes were to be covered, it was necessary to predetermine most interview questions which included both structured and more open-ended questions. Although the questions were predetermined to a large extent, their exact wording and sequence varied as is typical for semi-structured interviews. The interview questions all fell under predetermined themes which determined the outline of the interviews. These themes are to be discussed later in this paper.

The interviewees consisted of HUS Helsinki University Hospital's department and division heads. The respondents were chosen through the selection of the three departments to be covered in the study, and all department and division heads of the chosen departments were invited to participate. As each department and division in the case organization only has one director/manager, the anonymity of the respondents becomes a critical issue due to their easy recognizability. Thus, the department names or other attributes about the interviewees are not listed to protect the respondents' anonymity. The interviewees represented all three departments. Table 2 presents a summary of the interviews.

Table 2: Summary of interviews

Interviewee code	Department	Interview date	Length of recording
I1	1	20.2.2020	77 min
I2	2	20.2.2020	69 min
I3	1	21.2.2020	63 min
I4	2	25.2.2020	49 min
I5	1	28.2.2020	74 min
I6	3	5.3.2020	93 min
I7	3	6.3.2020	72 min
I8	1	11.3.2020	66 min
I9	2	24.3.2020	59 min
I10	3	30.3.2020	56 min
I11	1	17.4.2020	74 min

As may be seen from Table 2, altogether 11 qualitative semi-structured interviews were conducted for this study. The interviews took place from February to April 2020. The request for interview participation was sent via e-mail to the research participants together with the case organization's contact person. The invitation to take part in the study was sent to 15 HUS department and division heads. The e-mail invitation included relevant information in terms of ethical guidelines for an interview study. In the e-mail, the participants were debriefed with the background and objectives of the study and the level of anonymousness. Additionally, they were informed of the ways the interview would be documented and of the ways the data might be used. The invitation also stated that participation was voluntary, and the participants were asked to express willingness to participate by replying to the email and by suggesting a timing inside a given time. Thus, the ethical guidelines of informed consent, confidentiality, and consequences listed by Kvale (2011b, pp. 6–10) were met.

Before the interviews, the interview structure was sent to the interviewees for voluntary familiarization. However, the interviewees were not required to familiarize themselves with the interview questions in advance as the interviews did not require any preparations from the interviewees. The interview script can be found in Appendix A: Interview structure. The interviews were planned to last a maximum of 90 minutes and to happen face-to-face in the interviewees' offices. Due to the global COVID-19, pandemic some of the interviews were at the end held via Skype. For the same reason, the maximum length of the interview was reduced to approximately one hour, if needed, to secure the interviews fitting into the interviewees' schedules. On average, the interviews lasted 69 minutes. All interviews were audio-recorded with the consent of the interviewees. As

Rabionet (2011) points out, audio recording is the most recommended recording method in the literature for conducting interviews. Later, all interviews were transcribed.

At the beginning of each interview, relevant information regarding the background and objectives of the study, the documentation of data, and respondents' anonymousness were revised in a briefing by the interviewer, following the guidelines of Kvale (2011a, p. 6). During the interview process, the findings started to reach saturation which suggested further interviews would be unlikely to produce more unique data to the case. The interviews were held in Finnish. Interview quotes that were used to underline the findings were translated into English to retain the original tone and purpose of the interviewee. Supplement words and pauses have been removed to achieve a more simple and straightforward result.

4.4 Analysis of empirical data

The chosen data analysis method in this study was thematic analysis (TA) which is a widely recognized method in qualitative research (Braun & Clarke, 2012, p. 57). As Braun and Clarke (2012, p. 57) define it, "*TA is a method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set"*. The method enables the researcher to discover and understand the collective meanings and experiences that appear in a dataset, and to identify the relevant commonalities in relation to the research questions (Braun & Clarke, 2012, p. 57). Indeed, the purpose of thematic analysis in essence is to identify the relevant patterns across the data set to answer the particular research questions of the study (Braun & Clarke, 2012, p. 57). Furthermore, Braun and Clarke (2012, p. 58) argue that as a data analysis method TA allows the researcher to adopt a more systematic approach to analyzing qualitative data and then link it to a broader theoretical or conceptual issue.

When doing thematic analysis, a researcher must make a series of choices including whether the approach to data coding and analysis is inductive or deductive (Braun & Clarke, 2012, p. 58). In this study, both approaches were used which in reality is often the case, according to Braun & Clarke (2012, p. 58). The chosen approach was mainly inductive as the codes and themes were driven bottom-up from the data, meaning the content of the data itself had a great impact on what was mapped in the analysis ((Braun & Clarke, 2012, p. 58). However, the interview structure including certain predetermined themes to be covered, and their sequence guided the concepts that were used to analyze and interpret the data to some extent. Consequently, the analysis of data also had some elements of a deductive approach,

where the themes derive from ideas which the researcher brings to the data top-down (Braun & Clarke, 2012, p. 58).

Thematic analysis typically includes six phases as outlined by Braun & Clarke (Braun & Clarke, 2012, p. 60). First, the researcher must familiarize oneself with the data whether that be through listening to audio recordings or reading interview transcripts and by taking notes during the process (Braun & Clarke, 2012, p. 60). Second, the process includes generating initial codes hence beginning the systemic analysis of the data as Braun & Clarke (2012, p. 61) put it. Following, phases three and four involve shifting from coding to shaping themes for the analysis by first searching for themes and then reviewing and refining them (Braun & Clarke, 2012, pp. 63–65). Searching for themes is an active process according to Braun & Clarke (2012, p. 63), where important themes in relation to the research questions are generated or constructed rather than discovered. When the coded data has been reviewed to identify relevant themes, those themes ought to be further reviewed in relation to the data set recursively to ensure and check for quality (Braun & Clarke, 2012, p. 65). As a result, the researcher ought to derive a unique, coherent set of themes concerning to both the coded data extracts and the entire data set as well as the research questions (Braun & Clarke, 2012, pp. 65–66). The fifth phase of thematic analysis consists of defining and naming themes making sure those names state the unique and specific features of each theme (Braun & Clarke, 2012, p. 67). Finally, the process is brought to an end with the production of a report, although the writing process should take place parallel with the analysis of data (Braun & Clarke, 2012, p. 69). The process of data analysis in this study was adapted from that described by Braun & Clarke (2012) and is discussed next.

In this study, the process of data analysis began by listening to the audio recordings of the interviews and transcribing them. The familiarization with the data thus took place naturally, as the researcher was the one conducting the interviews and transcribing them. Following, as the transcribed data was reviewed further, key quotes and ideas were identified and transformed into initial codes while taking notes. As mentioned earlier, the analysis had some elements of a deductive approach as those codes were then organized and put into context inside the lines of predetermined interview themes and Sections. However, the content of the data and codes themselves guided the formulation of relevant themes in an inductive manner. Furthermore, refining and reviewing the potential themes, particularly, was done bottom-up, again, guided by what could be found in the data. The process of refining the themes to be covered and defining their names was iterative as initial findings were gone through and discussed with the case organization throughout the process.

Similarly, the writing process took place concurrently with the data analysis. The findings were first formulated and refined in a separate report to be presented to the case organization, following with producing the written report. As stated, the data analysis in this study used the method of thematic analysis and applied the process outlined by Braun & Clarke (2012). Next, the validity of the study will be discussed.

4.5 Validity of the study

According to Yin (2018, p. 66), the quality of research design can be judged based on four logical tests. The criteria for the quality of research design incorporate construct validity, internal validity, external validity, and reliability, as listed by Yin (2018, p. 66). Eriksson & Kovalainen (2008b, p. 3) list similar concepts of reliability, validity, and generalizability as the basic framework for evaluating the quality of research. Each of the logical tests ought to be met with several tactics throughout the research process of a case study, not only the design phase (Yin, 2018, p. 66). Yin (2018, p. 67) summarizes and gives examples of such tactics for each of the four logical tests. The four logical tests and the justification for meeting them in this study will now be briefly discussed and demonstrated.

Yin (2018, p. 67) describes the test of construct validity as particularly challenging in case study research. Construct validity points at selecting appropriate measures for the concepts being studied, and can be met by 1) defining what is meant by the research concepts in question and 2) identifying operational measures that suit those concepts (Yin, 2018, pp. 66–68). To meet this criterion, the preliminary results of this study were reviewed with the case organization's representatives multiple times in an iterative way and a report on the empirical findings was gone through with some of the key informants of the study, as was suggested as appropriate tactics by Yin (2018, p. 67). The second criterion is internal validity which is only relevant for explanatory or causal studies and refers to establishing causal relationships (Yin, 2018, p. 66). Hence, that particular logical test is irrelevant for this study. Thirdly, the test of external validity concerns the generalizability of a case study in terms of whether the empirical findings may be generalized and how (Yin, 2018, p. 66). The criterion may be addressed by identifying suitable theories or theoretical propositions alongside the careful formulation of research questions in the research design phase (Yin, 2018, pp. 69–70). In this study, the relevant theoretical background was identified early on in the research design process and research questions were formulated accordingly.

Finally, the last logical test of reliability refers to ensuring that the data collection procedures of the study allow reaching the same results if the same study was to be

conducted over again, at a later time (Yin, 2018, p. 70). The reliability of a study may be ensured by being as explicit as possible about the research procedures, as Yin (2018, p. 70) states. This Chapter, and especially Sections 4.3 and 4.4, have aimed at doing just so by describing the research methodology and process exhaustively. To conclude, this Section has demonstrated and justified the validity of this study by reflecting on the four logical tests of research design quality suggested by Yin (2018, pp. 66–71).

5 Findings

The empirical findings of the study are presented in this Chapter. The findings will be introduced and discussed in accordance to the topics that were covered in the semi-structured interviews Although themes that relate to answering the main research questions directly deserve the main focus, the Chapter will also include findings that are otherwise of interest to the case study as they lead to answering the research questions.

The structure of this Chapter is derived from the sequence in which different themes were covered in the interviews. First, the interviewees' perceptions of effectiveness and value-based knowledge as concepts were mapped. The case organization's current state in value-based knowledge management was then discussed, corresponding to the theoretical framework of KM maturity modeling as stated in Chapter 3. The questions covered themes in relation to the maturity model KPAs of people/organization and processes. Interview themes also covered the current state of data collection and availability regarding value-based knowledge, and the current level of utilization. Following, the structure moved onto discussing the desired state and expectations for value-based knowledge management with the interviewees. The subject was approached by asking the interviewees' opinions and perceptions of what kind of value-based knowledge they'd like to have available, and how they would like to utilize this knowledge in their tasks in middle-/top-level management. The findings are presented in respective order to that listed above. In the Chapter that follows, the findings will be further discussed and reflected upon in correspondence to the chosen framework and earlier research.

5.1 Interviewees' perceptions of value-based health care

This Section briefly presents and discusses the interviewees' perceptions of the relevant concepts of this study. The middle-/top-level management's perceptions of VBHC were examined through the concepts of effectiveness in healthcare, more generally, and of value-based knowledge. The findings in Section 5.1.1 focus on effectiveness while Section 5.1.2 presents the managers' perceptions of value-based knowledge as a concept.

5.1.1 Perceptions of effectiveness in healthcare

The concept of effectiveness was familiar to all interviewees. The interviewees perceptions of what effectiveness in healthcare means derived from the underlying thought that the care they provide ought to create better results for the patient, and thus result in benefitting the

patient. Moreover, effectiveness was strongly linked to the concept of health benefits. Overall, all interviewees associated the concept to either generating health or to health benefit gained from the care given. As was pointed out by the interviewees, the health benefits ought to appear and be gained both in the case of an individual patient as well as on population level. The following interview quotes illustrate well the interviewees' perceptions of effectiveness relating to generating benefit for patients:

> *"In short, effectiveness in my opinion means that we achieve some sort of health benefit through our actions to that individual patient but, on the other hand, also at the population level. So, an individual patient should manage better after the care we give." I9*

> *"Effectiveness in healthcare is what we achieve in patients' state of health with these kinds of treatments or actions in these kinds of normal operational environments." I7*

> *"From my own perspective I see that effectiveness is the long-term benefit gained by the patient." I2*

As the interviewees highlighted, the health benefit they referred to as effectiveness of care could mean different things depending on the types of diseases in question. They illustrated the different meanings of benefitting the patient through examples of different patient or disease groups. In these groups providing benefit could mean either survival or improving the patient's quality of life or capacity to function, for example. The interviewees also tended to consider these different potential meanings throughout their answers in the interviews even though they wouldn't have pointed it out specifically in the beginning. The following quotes indicate how the interviewees referred to this aspect of effectiveness.

> *"(Effectiveness in healthcare means) That the health service which the person is getting improves something, and it depends greatly on the type of disease in question." I3*

> *"Well, it (effectiveness in healthcare) is achieving either being able to prevent something or being able to ease a patient's sickness or treat it. Achieving a better outcome or quality of life for the patient." I4*

Overall, the interviewees saw effectiveness as a clear, separate concept when compared with other concepts such as cost-effectiveness, quality or efficiency. They all seemed to understand the difference between the different terms and concepts, demonstrating the existing understanding on the phenomenon. However, while the difference from cost-effectiveness was recognized by the interviewees, the concept was closely tied to that of effectiveness. Although the two concepts were not seen as substitutes for each other, the interviewees thought they go hand in hand. When it comes to other terms such as efficiency or quality, the distinction between the concepts seemed clear to all interviewees. Still, the concepts are not seen as mutually exclusive but rather as concepts that often complement each other and thus have a connection. Indeed, the interviewees highlighted that the different concepts are dimensions that all ought to be regarded simultaneously. These perceptions may be observed from the following quotes:

> *"Effectiveness is directly tied (to cost-effectiveness), of course – we formulate a division so that it's the effectiveness divided by the costs…Efficiency, of course, has nothing to do with effectiveness as they are completely separate concepts. Efficiency can be for example how we produce a service in relation to the labor input or money and in that way the two things can actually be seen to support each other…" I2*

> *"In my opinion, cost-effectiveness and that especially must be regarded beside that effectiveness, although they do not replace each other, either. And efficiency, in my opinion, is more about how we use our resources efficiently but that is a bit further away from effectiveness." I4*

> *"Well, quality is self-evident and efficiency will not go away – the lack of resources is never-ending so efficiency must be monitored as well. We can then gain good effectiveness but by wasting resources inefficiently so it's an equation where all those things must be in order." I11*

5.1.2 Perceptions of value-based knowledge

The other relevant concept covered in the interviews was value-based knowledge. Although the concept or term was not as familiar to the interviewees, they shared a somewhat common

understanding of what it meant. According to the interviewees' perceptions, value-based knowledge ought to, on one hand, be simply seen as knowledge about the effects or health benefits of a certain method of treatment. However, it could be noted that the concept was not as clear as that of effectiveness. Such observation was apparent as interviewees included cost information as value-based knowledge later during the interviews, though the definition of value-based knowledge as outcomes of care and care processes was disclosed with them. Hence, some confusion between effectiveness and cost-effectiveness as concepts was indicated. Otherwise, interviewees mentioned indicators such as survival, mortality, quality of life, and capacity to function as examples of what value-based knowledge could be. Again, the answers reflected the potentially different meanings of health benefits depending on the context of a patient or disease group in question, as was observed in the previous Section. The first dimension of value-based knowledge identified by the interviewees, representing knowledge about the benefits of different methods of treatment is apparent in the quotes below:

> *"All the existing knowledge from those studies where the treatment method effectiveness has been examined for some discomfort or disease, or then the assessment of all the methods of treatment of a certain disease." I7*

> *"As perfect as possible and as timely or non-delayed as possible knowledge on the effectiveness of one's own activities" I1*

On the other hand, value-based knowledge was linked to the ability or capability to assess the effectiveness of one's performance or activities and the achieved outcomes of care. Furthermore, it was emphasized that such capability requires monitoring one's own activities with different measures. Hence, the importance of measurement and metrics becomes underlined to enable the assessment of the effects and outcomes of the organization's performance or activities. As for generating value-based knowledge, a single study was seen to have only marginal use. Instead, value-based knowledge ought to be derived from applying the results of several different studies. Moreover, the interviewees underlined the need for metrics that are monitored in order to produce value-based knowledge. Ideally, these metrics would further enable the outcomes to be distinguished to different components. The following quotes indicate this second dimension of value-based

knowledge, based on assessing the effectiveness of the care given and the need to monitor the activities with different metrics:

> *"Indeed, effectiveness is the production of health and one ought to be able to analyze and measure it somehow." H11*

> *"We should get ongoing information on whether our treatments are beneficial or harmful to that patient meaning whether the patient's quality of life and coping are improved through these treatments or not." I9*

> *"Knowledge on knowing that our care has effectiveness and metrics for that and assessing the effectiveness of our activities." I10*

5.2 The current situation of value-based knowledge management

In this Section, the current state of things regarding value-based management in the case organization is presented and discussed. The focus is thus on answering the first main research question this study. The current situation was approached from two viewpoints provided by the framework chosen. First, the aspects relating to the case organization's culture and organizational strategies and policies are covered in Section 5.2.1. Following, findings relating to the process aspects are presented in Section 5.2.2. Both viewpoints were first examined via a set of quantitative claims where the interviewees were asked to self-assess the present state of the people /organization or processes in their departments and in the whole university hospital. Following, the current situation was mapped via qualitative questions regarding themes such as the current state of data collection and the current availability and usability of value-based knowledge.

5.2.1 People /Organization

Overall, the case organization's management at different levels was perceived to be aware of the importance of value-based health care and of utilizing value-based knowledge as a tool for strategic management. All interviewees found the collection and utilization of value-based knowledge important and worth investing and development in terms of time and effort. Comparatively, most also believed the upper-level management to be aware of the importance of value-based knowledge management as a phenomenon. As interviewees pointed out, the current organizational situation in terms of value-based management is not

due to a lack of awareness of the importance of the issue. That being said, the phenomenon was recognized as one that would also require some effort:

> *"I somehow feel that everyone is really looking forward to that (value-based) knowledge and wants (it), I don't believe that there would be shortages in terms of motivation or in recognizing or realizing the need for this. So, then we just need handy enough tools to that support for decision-making." I1*

> *"In my opinion, HUS management does listen to the departments alright, (that is) my perception of HUS management but maybe that the budget-based managing would get value-based management alongside it. Well, that would probably be quite a big task for HUS management." I11*

Although the interviewees agreed on the awareness of the need for value-based knowledge management, the link to organizational strategies and policies and their practical implementation was found insufficient or lacking. In other words, the basic infrastructure regarding organizational aspects to support the application of value-based knowledge management was not in place yet. Such conclusion became observable through many elements pointed out by the interviewees. First of all, the interviewees pointed out a need for a more pronounced role of top-management in raising awareness about the phenomenon throughout the organization and in promoting its importance:

> *"I think that on the level of the entire HUS raising awareness would perhaps be the most important – that we need this knowledge and then that we would have some way of getting that knowledge. And advocating for real-effectiveness medicine in particular so that there wouldn't be just so-called fancy research data." I9*

Currently, the interviewees found there to be a need for coordination over the roles in relation to generating, collecting and utilizing value-based knowledge. Furthermore, the interviewees emphasized and called for a common policy aligning that such activities are a necessary part of the organization's way of doing things and its culture. Although there were some divisions where a culture of collecting and utilizing value-based knowledge as a part of the everyday job description was established, the majority of the studied divisions still recognized a need for a deeper link to the organizational policies and strategy. Such needs

were brought up on both department management level as well as on the level of the whole university hospital. A stronger integration with the organizational culture was thus called for by the interviewees. The following interview quotes illustrate the points discussed above:

> *”In my opinion we should first of all make such a decision on the department management level that it is an obligatory part of our operations…there should be that kind of a mutual will and decision to advance this issue. And then the management ought to commit to pursuing us gaining the tools and also to assess the resource allocation according to that value-based knowledge – committing to that. And being prepared to taking the action relating to that…” I4*

> *“Well first of all they should inform people here or sort of make (it) part of people’s jobs so that they recognize that this effectiveness is part of our patient groups’ care… I would say that this (value-based health care) should be recognized on the organizational level of HUS as a factor that guides our way of doing things.” I10*

Another organizational aspect underlined by the interviewees was the need for support from the organizational level of the university hospital. The interviewees wished for support in many different ways such as support in the form of tools and reporting as well as in terms of training and ensuring adequate organization-wide know-how in relation to interpreting and utilizing value-based knowledge. One implication of the need for support was the lack of time and resources experienced by the interviewees to manage the tasks and responsibilities they felt were needed to advance value-based knowledge management. Another indication was a shortage of common tools for reporting or for utilizing the knowledge. Overall, it became evident the basic infrastructure regarding the organizational aspects to support the application of value-based knowledge management currently had deficiencies in terms of efficient support and training provided in the organization. As mentioned, the interviewees pointed out aspects such as training, IT support and tools for e.g. reportage:

> *“And then HUS ought to acquire know-how for analyzing and reporting value-based knowledge. The reportage is also very important in this.” I7*

> *”The other (factor currently hindering the utilization of value-based knowledge) is that we don’t have the support for it, that all the data needs to be retrieved practically on our own…And another is that we haven’t been separately allocated with that sort of help to get this kind of standard reports which would benefit the everyday management. Right now, the data is being collected in the perspective that the knowledge is important and useful for HUS top management and for budgeting but it is not for daily management nor useful data in terms of effectiveness that is being collected.” I11*

> *”Well the chief physicians and others in our department should get to go to a real effectiveness class, meaning training that would be for one day or one hour” I5*

Overall, it can be concluded that while the management in different levels of the case organization was believed and found to be aware of the importance of the issue, the practical implementation and link to organizational policies still had room for development. Such shortcomings were visible via the interviewees’ experiences and examples of missing organizational structures to enable the wider and deeper application of value-based knowledge management in their departments.

5.2.2 Process

When it comes to the processes of value-based knowledge management in the case organization, it can be stated that the current situation differs depending on the interviewed department or division in question. While other interviewees experienced a total lack of access to value-based knowledge and a shortage of processes for collecting or sharing such knowledge, others already had in place some patient-group-specific, systematic processes that enabled the collection and utilization of value-based knowledge. However, even those interviewees found that the processes were still sporadic by their nature. The interviewees hence shared the experience of a lack of processes that would enable the collection and hence use of comprehensive, systematic value-based knowledge. Overall, it can be concluded that the processes regarding value-based knowledge are a key area of development in the case organization. Even though there was variation in the current situation regarding the process aspects, all interviewees experienced and identified room for improvement regarding both

department level and the university hospital level processes. The variation was, however, also recognized by the interviewees:

> *"There's a terrible spread in this – that is maybe the problem that we have awfully good units that react to value-based knowledge quickly and systematically and then there are maybe some where it still seeks its form." I6*

The greatest variation between different divisions or departments was found relating to the collection of value-based knowledge. While other divisions had some systematic, patient or disease group-specific processes in place to collect value-based knowledge, others experienced a shortage of any processes or available data. These interviewees explained that apart from single, manual knowledge retrievals or clinical trials there was currently no value-based knowledge available and the current processes or information systems did not enable its collection. Other interviewees experiences that the knowledge did exist or could already be collected in theory but the current processes did not facilitate getting it out from the systems for utilization. Interviewees with the most advanced processes, on the other hand, felt that there was a need for processes that would enable a more comprehensive and systematic collection of value-based knowledge. Such observations are apparent from the following quotes:

> *"Yeah there are no processes, we don't yet have any actual formal process. …We do collect components that could be utilized for value-based knowledge, even quite precisely, but the synthesis is missing. Meaning what is their joint impact as a whole, and that is still lacking badly. And nevertheless, I strongly feel that the whole is what matters." I5*

> *"Well systematically – there should be a definition for that too – if we collect systematically then value-based knowledge should be collected for every single patient. …But when it comes to carrying out quality of life surveys that were done for many years, that hasn't been reached to the level that it would be collected for all patients. And it isn't a part of the routine operations of HUS organization but rather carried out in different research projects. …And that sort of routine-like collection is not possible to be carried out with the current system as it isn't a part of HUS normal processes, but it definitely ought to be." I2*

> *"There are no formal processes as that value-based knowledge can't be accessed, (it isn't) available at the moment except by reading the medical record of each patient and checking it from the computer…" I3*

It may be concluded from the interviews that despite the different situations regarding processes relating to data collection, all the interviewees called for more coordinated and aligned processes regarding what is to be measured, and thus collected. The interviewees recognized a lack of mutual metrics that would be defined and coordinated organization-wide. Such metrics could either be patient or disease group-specific on a department level, or represent all patients in specialized healthcare on a hospital or even national level. Indeed, a link between the case organization's current situation in terms of its organizational aspects as well as its processes could be found. The lack of implementing organization-wide policies and coordination was found to affect the current situation of processes as well:

> *"…I myself and us in our department have considered it so absurd that the collection of this kind of knowledge on real-effectiveness medicine hasn't been coordinated nationally but instead everyone's keeping busy by themselves with what they're keeping busy with." I7*

> *"On a national level THL should take control of the whole quality registries or assign it to be the mission of a designated university hospital, which naturally as the largest operating unit would be HUS. And then on a hospital level HUS should found and expand the current effectiveness unit to monitor different – or like coordinate and monitor the value-based knowledge of different units." I2*

All in all, the interviewees underlined manual labor, lack of proper tools and lack of systematic processes, as well as responsibilities being scattered across the organization as the main factors behind hindering the current situation relating to processes. Key aspects of the issue are synthesized well in the quote below:

> *"…And this particularly has been the problem earlier that HUS has wanted to acquire these quality registries but has not allocated a person who would put the data in the quality register…Yes all quality registries must be filled in a structured form overall*

> *but that it would come in a way along with the work so that it isn't an additional task. The structured documentation means that it is documented to that patient record system in a structured form, not so that somebody is documenting it separately." I3*

Comparatively, it was evident from the interviewees answers that there were currently no formal processes for sharing and utilizing value-based knowledge at department level nor at the level of the entire university hospital. Again, some interviewees gave examples on how value-based knowledge had already guided the operations of their division or department but the utilization was found to be sporadic. Furthermore, there are currently no processes to report value-based knowledge in a single, common form. The lack of formal processes for utilizing or sharing value-based knowledge may be linked to not coordinating the measurement and collection of value-based knowledge on a hospital-level. To conclude, coordination and stronger organizational policies regarding the process aspects of value-based knowledge management, too, were called for.

5.2.3 Results of the maturity model

As mentioned earlier, the current situation and maturity of the case organization's value-based knowledge management were examined both via a set of quantitative claims as well as qualitative questions. The former was used to allow the interviewees to self-assess the present state of the people/organization or processes both in their department and in the whole university hospital while the latter was used to allow the researcher to gain a deeper understanding of the current situation. This Section goes through the results of the current state of the case organization's maturity in value-based knowledge management through the self-assessment of the interviewees, followed by a reflection about the interviewees' answers to other themes covered in the interviews.

The interviewees were first asked to assess the current state of their organization on the level of a) their department and b) the entire university hospital. The interviewees were given a set of five claims and were advised to choose the one best suited to describe the current state of their organization. The results are presented below in Figure 5.

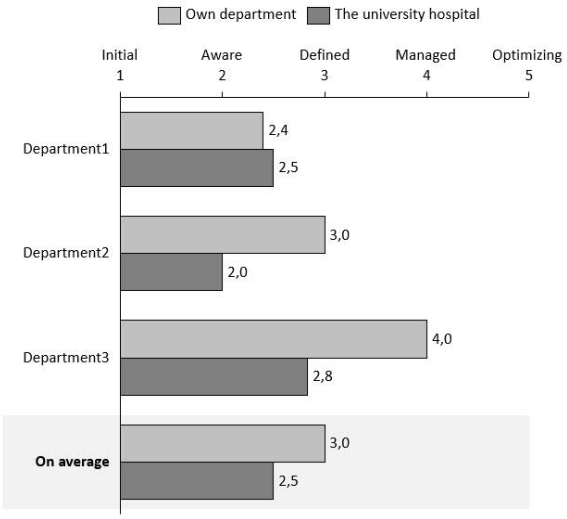

Figure 5. Interviewees' assessment on the current organizational maturity level

As can be seen from Figure 5, on average the interviewees assessed the maturity level of their department to better or at least neck to neck with that of the entire university hospital. For one's own department, the maturity of the aspects of people /organization was evaluated to be at stage three (*Defined)*, while the maturity stage of the whole university hospital was placed between stages two and three, on average. However, also on the department-level, only one department assessed value-based knowledge management to be above level three in maturity in terms of organizational aspects. In that department, the maturity stage was evaluated at stage four (*Managed)*, implicating value-based KM to be a well-established and clear part of the organization's strategy and to be incorporated into the organizational norms and dialogue. Overall, the given assessments imply the interviewees found the management to be aware of the importance of the phenomenon. Yet, the link to the organizational strategy was assessed to be insufficient on the department-level. Comparatively, on the level of the university hospital also the basic infrastructure for promoting value-based knowledge management was found to have shortcomings.

Similarly, the interviewees were then presented with a set of claims regarding the maturity of their processes and asked to choose the one that best suited the current situation on each organization-level. Again, the results are presented below in Figure 6.

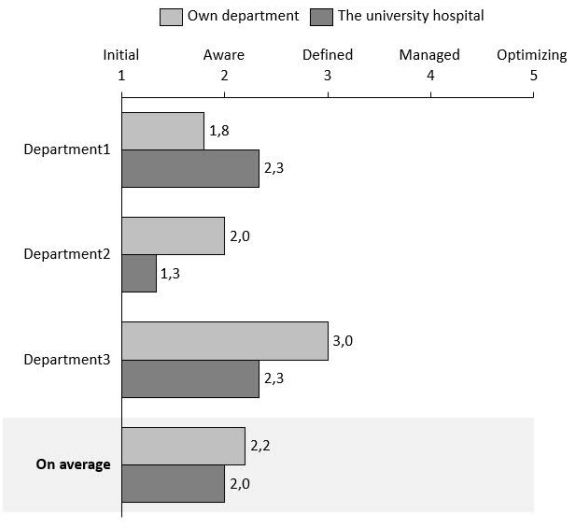

Figure 6. Interviewees' assessment on the current process maturity level.

From Figure 6 it can be concluded that the interviewees assessed the current maturity level regarding the processes to be weaker than that of the organizational aspects. Now, either department- or hospital-level maturity stages were not evaluated to be higher than at stage two (*Aware*), on average. Indeed, all three departments assessed both the level of their process maturity as well as the level of the entire hospital's process maturity to be weaker than the maturity of the organizational aspects (Figure 5). On average, the interviewees assessed the maturity level of their department to be slightly better than that of the entire university hospital, though the difference is smaller when compared with the results of the organizational aspects. Finally, only one department evaluated themselves to have formal processes in place to collect and utilize value-based knowledge. Furthermore, it can be noted that that department was the same to assess the highest organizational maturity level for themselves. The results indicate a link between the organizational policies and strategy and the process maturity, as was also suggested in the earlier Sections.

When reflecting on the results of the interviewees' self-assessment on their current maturity of value-based knowledge management, many similarities may be found in comparison to the findings discussed in Sections 5.2.1 and 5.2.2. Those are, for example, the acknowledgment of the management's awareness of the importance and need for value-based knowledge management, with deficiencies in implementing and integrating it in practice to the organizational policies and culture. Comparatively, it was found that not many formal and systematic processes were in place to enable the collection and utilization of value-based management. While sporadic processes existed, as is also visible in the

interviewees' department-specific evaluations, no comprehensive mechanisms were in place on the hospital level.

To conclude on the current situation of value-based knowledge management in the case organization, the qualitative and quantitative findings support each other. While the case organization's overall maturity level could be assessed to be at level 2 (*Aware)* regarding both key process areas of organization and process, there were divisions and departments, where the maturity level of processes could be evaluated to be at level 1 (*Initial*) based on the interviewees' answers in the interview questions. Hence, the overall maturity level of the case organization's value-based knowledge management remains at level 1 (*Initial*). This conclusion will be further discussed and reflected upon in the next Chapter.

5.3 The expectations for value-based knowledge management

The focus of this Section is to present the findings relating to the second research question of this study. The findings cover the interviewees' expectations on how they would like to apply value-based knowledge management in their organization. The results are presented in two Sections, first of which focuses on what kind of value-based knowledge the interviewees would like to utilize. The following Section discusses the ways how the interviewees would like to utilize value-based knowledge.

5.3.1 Requirements for value-based knowledge

Several aspects were brought up by the interviewees regarding what type of value-based data they would like to have at their use. While some features entailed characteristics on the knowledge itself, others indicated how the interviewees would like to improve the collection and processes of measuring value-based knowledge. Overall, instead of concentrating strongly on which patient or disease group-specific measures value-based knowledge should include, the interviewees tended to name more general units or genres of the type of knowledge they would like to collect and utilize. In summary, interviewees named measures such as mortality, quality of life, the capacity to function, survival, relapses, complications and infections, and side effects of treatments. Regarding observations, it could be concluded from the interviewees' comments that the chosen metrics must be simple enough to ensure the ability to interpret the values and changes in them. Additionally, a need for commonly aligned criteria and metrics for the collected knowledge was called for by the interviewees

both on department-level and nationally. The issues discussed here are illustrated for example in the following quote:

> *"But if the collection (of value-based knowledge) should be developed then we have a need for these kinds of simple enough metrics. And again, I call for us having nationally aligned patient group-specific metrics so that one doesn't report one thing and someone else another. And those metrics need to have specified criteria. The metrics have to be for example such that we understand what a change in the metric value means…" I7*

When it comes to the processes of collecting value-based knowledge, currently, they were typically found to be manual and laborious. Consequently, it is important to ensure a sufficient level of automation for the processes and that the knowledge is being collected in a structured form, as was emphasized by the interviewees. As the current processes often required documenting information in different systems by different people across the organization, the collection of value-based knowledge suffered. Instead, the collection of value-based knowledge ought to happen and transfer to the relevant systems automatically as practitioners document knowledge in the case records:

> *"…But its problem was that, it had all these elements with it, but the problem was that manual data input was required. And there were simply no resources and that kind of data will remain unfilled which needs to be manually put. So automatic data collection methods, otherwise it won't work for sure. And the same information that goes to the medical record will be gotten from there, it doesn't have to be filled to another system by somebody else" I1*

> *"When heading to the future then a legal obligation to monitor effectiveness of care ought to be an essential part relating to a period in specialized healthcare, per se. Which would mean that the system should automatically approach the patient. The value-based knowledge received by Kela and the complication register ought to be combined with the period in specialized healthcare without having to combine them separately." I2*

Another aspect that was highlighted in the interview results was the need for continuity regarding the collection of value-based knowledge. This aspect for the data collection processes was further linked to a requirement of long-term value-based knowledge. The interviewees highlighted that the ability to track and monitor trends in the data over time was crucial in terms of usability and reliability. Indeed, a current, single data point or the comparison between the present and a single data point from the past was seen to only have marginal use. The need for longitudinal collection is indicated in the following quote, for example:

> *"I myself have always favored knowledge presented on a continuous timeline when utilizing information. …There is a big risk for misconception, in my opinion, if we take these kinds of time span based comparisons." I6*

Interviewees had varying views on how real-time value-based knowledge ought to be, and how far from the past it could be to remain relevant. The expected degree of real-time availability was seen to depend on the measure in question, and on the objective for monitoring it. While measures relating to monitoring patient safety ought to be available for utilization even on a daily or weekly basis, value-based knowledge about the health benefits of a medical condition was expected to have a monthly or half-yearly cycle. Nevertheless, it was concluded that the ability to compare value-based knowledge from the past with current data, and over several years was seen to lengthen its life period. The significance for collecting value-based knowledge long-term over time and at regular data points was thus evident:

> *"If we look at old data then 5 years (is the life span), if it can be compared to current data but it's one single data or one year monitoring and it would be that routine data that we have from THL that comes almost 2 years later then nobody does anything with that anymore. As it isn't continuous, the access to data. If getting the data was continuous then the data from last year is pretty good in that sense…" I9*

As mentioned, other requirements or expected characteristics brought up by the interviewees also combined aspects of the process of collecting value-based knowledge and requirements for what type of knowledge it ought to be. For example, the interviewees expect the collection of value-based knowledge to be comprehensive and systematic which

sets requirements for both the collection process and the type of knowledge in question. Firstly, the processes needed to systematically cover large enough patient and disease groups to be comprehensive. Secondly, another viewpoint on the matter included that the metrics ought to enable the measurement of real-effectiveness medicine or in other words value-based knowledge concerning all patients in routine circumstances:

> *"We have awfully many of these kinds of targeted randomized trials which are for a very targeted patient group but this kind of research on real-effectiveness medicine is practically completely missing from us so that we would take a random material and check whether the patients actually cope better, do they self-evaluate to cope better in their lives and is it then linked with less of other support from the social side of medical care then after this intervention of ours."* I9

The type of knowledge expected ought to thus also be multidimensional as it should include both patient or disease group-specific and generic measures, as well as enable the measurement of real-effectiveness medicine. Comparatively, the interviewees expect value-based knowledge to include both objective measures as well as patient-reported measures such as PROMs. In fact, many interviewees underlined the need for patient-reported knowledge on for example patients' perceptions of their quality of life. As for how to create value-based knowledge, interviewees indicated varying emphasis between register-based knowledge and a more research-oriented approach. Registries were highlighted as the way forward for collecting value-based knowledge, however. Moreover, the divisions with more advanced situations tended to have a long tradition of collecting register-based knowledge.

Finally, the interviewees brought up that value-based knowledge should be combinable to other registers and external knowledge. The importance of being able to combine value-based knowledge with e.g. cost information and information regarding the patient's demographics or socio-economic status was highlighted by several interviewees. The requirement was justified by aiming at understanding the effectiveness of the care given as a whole or on population level, for example.

> *"I would like to get wider knowledge also on these kinds of Kela data, for example what kinds of economic effects our actions have when massive treatments are being made and he (the patient) can't go to work after, for example" I10*

To conclude, the interviewees had several expectations and requirements for how value-based knowledge ought to be collected and how the knowledge itself should be. Out of the different viewpoints discussed above, several main requirements that were agreed upon by most of the interviewees can be distinguished. Figure 7 summarizes the expected characteristics and requirements for value-based knowledge and its collection.

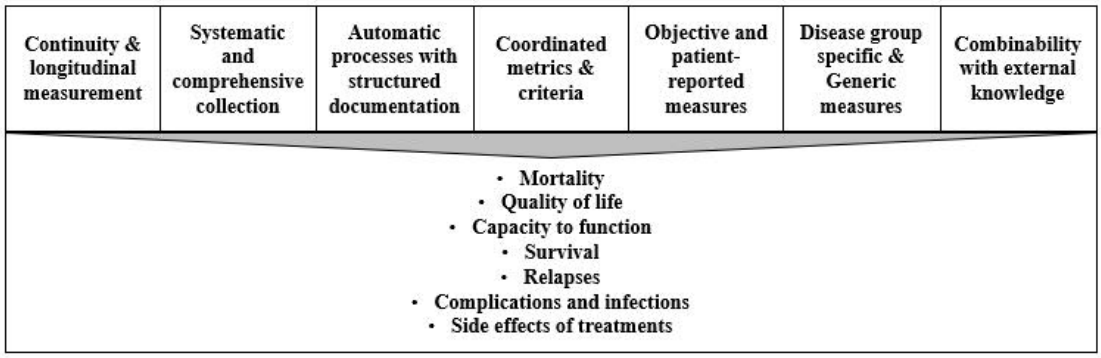

Figure 7. Summary of the characteristics and requirements for value-based knowledge and its collection

5.3.2 Utilizing value-based knowledge

The interviewees raised several different contexts and scenarios where they'd like to utilize value-based knowledge. The different contexts and situations for utilizing value-based knowledge were mapped in terms of managerial situations involving decision-making, information sharing, and dialogue. Overall, all the interviewees demonstrated a will to utilizing value-based knowledge in a wide range of situations relating to their positions in middle-/top-level management.

In terms of managerial situations regarding decision-making, the interviewees brought up a diverse set of decision types where they'd like to utilize value-based knowledge. Several interviewees even experienced that value-based knowledge ought to be an element present in all decision-making. Mainly, value-based knowledge was seen as a potential, useful means for bringing support to arguments when reasoning or justifying different decisions. The decisions in question, brought up by the interviewees, started from deciding on the course of treatment in the case of a single patient. Comparatively, value-based knowledge would be considered useful in deciding on the service availability and service intake criteria for patient group-specific service admittance. The quotes below demonstrate some of the decision-making scenarios mentioned by the interviewees:

> *"Well that can be answered simply that all decision-making scenarios should (utilize value-based knowledge) – those that consider treatment given to a patient and that have the option that the treatment is not given…Well in addition to a single patient there is of course the decision on introducing or dismissing some treatment method which is based on the knowledge that we have from the treatment in relation to a similar but more affordable treatment by its costs. So, the starting point is that no treatment is given if there is no evidence on its effectiveness." I2*

> *"I would like to be able to justify honestly to a patient and my employees why they should do (something) in a certain way. (It) could guide their work and I could guide the patient towards good solutions." I5*

> *"If there are disease groups for which all treatments are costly then it would be better to invest in patients who have the chance of getting better. It would be important to see in what ways new treatments are effective, if there is a subgroup that you shouldn't treat" I8*

On the department-level, scenarios such as planning on the future focus points of the department's operations, or planning on the most effective personnel structure were mentioned. Moreover, allocating operating resources when deciding for the care of different patient groups was further indicated. Overall, resource allocation was brought up by several interviewees as the type of decision where value-based knowledge was seen as potentially useful. Indeed, interviewees also wished that value-based knowledge would act as criteria for resource allocation on the hospital area as well as among departments. The interviewees emphasized how value-based knowledge could provide the necessary means and support for resource allocation to happen based on effectiveness. Not to mention, value-based knowledge was seen as a necessary support for the dialogue regarding that allocation of resources:

> *"So overall for planning the focus of our activity one would need that value-based knowledge" I11*

> *"Okay so if you look at the activity of your own department then yes, the dialogue and communications where you'd need value-based knowledge would indeed be this when*

> *you allocate resources between different agents inside the department. That's where it would be good to get that value-based knowledge - to support decision-making. Or to justify decision-making, shall we say it like that better. And again I present this comment for my own department but even more I call for that in the HUS level steering where at the moment when those resources are being allocated, which are at the moment being used as a heavier steering mechanism than finances, then when those (resources) are allocated and defined then value-based knowledge has no foothold whatsoever in that dialogue." I6*

Finally, the interviewees would like to utilize value-based knowledge in evaluating their own choices, in implementing new treatment methods and in assessing the safety of care. Comparatively, value-based knowledge could help in setting goals for one's operations and could enable benchmarking with other service providers.

> *"In a situation where some group would absolutely want to introduce a new treatment. It would be easier to rationalize introducing that treatment…" I8*

Similarly, in addition to the numerous contexts of decision-making, the interviewees identified and illustrated numerous examples of situations where they would like to utilize value-based knowledge as support for information sharing and dialogue. Again, interviewees started with scenarios relating to dialogue between a single patient or their family. In such situations, value-based knowledge would be utilized to explain and justify the decisions made regarding the patient's care. In terms of internal communication, the interviewees saw value-based knowledge as a good means for supporting and justifying their made choices in e.g. multi-professional meetings. Furthermore, the same application was also seen beneficial for internal dialogue with different specialties regarding choices of treatment to be made.

> *"Yeah, I would see that it's a part of the dialogue we have on this kind of team level practically almost every day, at least on some level when we consider treatment policies in a task force then there that value-based knowledge would be good, and then on the other hand when you reflect on choices made by a single employee with them then it would support that dialogue too as a superior.." I4*

Use cases for value-based knowledge also included communication such as guiding the personnel's work and justifying the need to follow the current care guidelines. However, value-based knowledge was found useful for external information sharing, too. Interviewees mentioned ways to utilize the knowledge such as informing patients, and utilizing the knowledge in communication directed at professionals such as in recruiting. Competition and benchmarking were also mentioned. Finally, value-based knowledge was brought up as an important support and evidence for making and presenting development plans or projects.

> *"(I would utilize value-based knowledge) in both internal and external communication. Internally when I make internal alignments or decisions regarding access to treatment. Externally for example recruiting and competition." I7*

Ethical review presented another dimension of ways to utilize value-based knowledge. When asked about whether value-based knowledge would contribute to ethical review or possibly complicate it, interviewees all agreed that value-based knowledge would bring additional and well-needed support to ethical decisions and assessment. Indeed, a strong consensus appeared over value-based knowledge being an important if not essential element as a means of support in ethical reviews. The interviewees pointed out how it would in fact be unethical to carry out treatment with no health benefit or effectiveness. Hence, value-based knowledge is needed to provide evidence on the effectiveness of treatments and to thus only select and carry out effective treatments, in the long run. Interviewees also brought up the society's perspective in this context, as providing non-effective treatments would ultimately mean that those resources could be better used elsewhere. The following quotes indicate these findings:

> *"Well my own view is that as a matter of fact the mission of every doctor that makes decisions and decides on treatments is to use all value-based knowledge, as the truth is that ineffective treatment given to some patient is away from (giving) effective treatment to some other patient…Well actually the Finnish law is of that sort that it is in a way unethical to give useless or ineffective treatment… And we ourselves see it as very unethical and in some cases also to cause suffering to continue treatment that is of no use. But maybe more from the society's point of view all the resources used on non-effective treatments is (taken) away from something else…" I2*

> *"I think we should learn to having that (value-based knowledge) as support and that it would be an element that we consider always in that decision-making." I9*

All interviewees saw value-based knowledge as a potentially strong, additional support for ethical assessment and for the dialogue with patients and their families in terms of ethical decisions regarding their treatment. Several interviewees even stated that value-based knowledge ought to be always present in ethical decision-making as an element to be considered. The interviewees justified this view point by pointing out how value-based knowledge would contribute to additional support and evidence, referring to evidence-based medicine. Although it was acknowledged by some interviewees that bringing in value-based knowledge could complicate some patient-doctor dialogues, value-based knowledge would nonetheless provide the professionals with support and evidence for justifying their decisions. Such situations could include for example difficult situations where the decision came to denial of treatment or prioritization. The quotes below demonstrate the interviewees perspectives on value-based knowledge as an important element for ethical review and decision-making:

> *"In my opinion, it (value-based knowledge) brings additional support in the ethical review because we aim at our treatment being evidence-based. And evidence and effectiveness, well they aren't exactly the same as evidence comes from research but it would in my opinion anyway support it because non-effective treatment is unethical in my opinion…" I4*

> *"…Absolutely in my opinion it (value-based knowledge) would bring ethical and moral support because it is unethical to start treatment that probably will have no benefit. But to get that person convinced that there is no benefit well that is a big thing and it would be easier if we had our own data to show and to go through." I11*

Mostly linked with the ethical aspect to utilizing value-based knowledge, some interviewees brought up the theme of prioritization. If prioritization was brought up by interviewees, they mostly agreed that for now, there was no dialogue on values in the society, although there should be. The interviewees thought that if such dialogue would surface, value-based knowledge would bring well-needed support for it. Moreover, some interviewees also felt that a dialogue on values would become inevitable in the future in

terms of resource allocation. However, the interviewees had differing opinions on whether prioritization is already taking place and whether it is already a relevant issue to consider. While most interviewees saw that for now there had been no necessity for applying prioritization in practice, some saw it already as a part of the everyday job of a medical professional. The interviewees' thoughts regarding dialogue on values and prioritization are indicated in the following quotes:

> *"But anyway, my point is that without value-based knowledge then we don't even have a chance for objective discussion. We can't even reach that level that we can compare the effectiveness given by different treatments or different patient groups or treatment given by different specialties because that knowledge doesn't exist. We can't even get there or that dialogue on values is forced to be held with defective knowledge, let's say and then this kind of opinion-based rhetoric will resolve to a large extent." I6*

> *"It has been seen that the cost of expensive treatments is accepted year by year – it keeps on rising. It is difficult to say what the cost of such treatment may be. There is a place for political discussion on whether we start to prioritize or not. So far we haven't wanted to go to that…" I8*

> *"Let's say that we haven't quite had to face such an issue that we would have had to limit such treatments that in our own opinion ought to be given. Such a situation at least in our hospital district in this area where I myself am well I would say it hasn't come across yet. This is this kind of play of thought that if such (situation) would come across when the economy is becoming strained. Then of course we should justify that decision somehow and then of course it would be in the scale that we would focus on the most effective activities. But there is the kind of situation right now for example where patients or their family would like some treatment… So, we can only talk on a general level and it may be that the audience is left with a feeling that it (the decision) was indeed prioritized and (it) roils in social media. In such situation the value-based knowledge is essential and value-based knowledge precisely on our own activities even though it would be five years old knowledge. It would anyway be the best that's available because the knowledge comes then not until with a delay." I1*

To conclude, as was demonstrated above, the managers in the case organization would like to utilize value-based management in a variety of situations and contexts that relate to their everyday jobs and managerial tasks. Below, the use cases for utilizing value-based knowledge brought up by the interviewees are summarized. Following, the findings from the empirical data in this study are summarized before moving onto the next Chapter where the findings will be further examined and reflected upon.

Table 3: Summary of the ways to utilize value-based knowledge

Managerial situation	Type of situation	Context /Use case
Decision-making	Service availability	Access to treatment
		Service intake criteria
		Resource and Rota planning
	Treatment evaluation	Patient-specific treatment choices
		Self-assessment (quality and safety of care)
		New treatment methods
	Resource allocation	Personnel structure
		Operational focus areas
		Organizational steering mechanism
Communication	Information sharing	Patient communication
		Multi-professional meetings
		Recruitment
		Competition
		Benchmarking
		Development plans /projects
	Dialogue	Clinical supervision
		Patient-doctor dialogue
		Dialogue between specialties
		Hospital-level dialogue (resource allocation)
Ethical review	Routine care	Ethical assessment
		Ethical choices
	Dialogue on values	Prioritization
		Facilitator for debate on values

5.4 Summary of findings

The empirical findings of this study were presented in the above Sections. The themes that arose from the interviews covered the interviewees' perceptions of effectiveness and value-based knowledge as concepts, the current situation of value-based knowledge management in relation to people/organization and processes, and finally the expectations for the way forward. The expectations were discussed in terms of the requirements and characteristics for value-based knowledge, and the ways the interviewees would like to utilize value-based knowledge in the managerial context. In this Section, the findings are first summarized and then further reflected upon in relation to the chosen theoretical framework.

5.4.1 Key findings on value-based knowledge management

The concept of effectiveness in healthcare was familiar to the interviewees. Although no single, common definition was apparent, all interviewees linked the concept first and foremost to creating and achieving benefit and better results both for a single patient and on population-level. The emphasis shared by the interviewees was on the patient gaining health benefits from the treatment given. The concept was separated from other concepts such as cost-effectiveness, efficiency, and quality. Many interviewees linked cost-effectiveness closely with effectiveness, especially in terms of value-based knowledge. All in all, value-based knowledge was seen as knowledge about the effect or benefit of a certain method of treatment and was linked to the ability to assess and monitor the effectiveness of one's performance or activities and the achieved outcomes of care.

The current situation regarding value-based management in the case organization was found to still remain in low maturity stages. Though variation between departments and divisions existed, many mutual characteristics were also apparent to describe the current state. When assessing the aspects of people and organization, it was clear that there was no lack of awareness on the importance of the issue. Instead, the implementation from strategy to practice and basic infrastructure for that implementation was found lacking. This was indicated by the interviewees through a call for more unified and coordinated policies, and for support in terms of training, IT, and reportage. Additionally, interviewees felt the level of a clear link to strategy and promoting awareness in the organization also had room for improvement. Comparatively, a greater need for improvement was found when assessing the current situation of the processes relating to value-based management. While some interviewees described how they could already collect, and utilize value-based knowledge for some patient groups, others experienced there to be currently no value-based knowledge available and no means for enabling its collection. The overall consensus was that though the metrics and knowledge were already there in theory, the current processes, systems, and tools prevented access to it and its use. To sum up, the interviewees demanded more formalized processes, coordination over measurement and documentation, better tools, and a more systematic and comprehensive collection of value-based knowledge.

Multiple characteristics were identified by the interviewees for what kind of value-based knowledge they would like to utilize alongside requirements for its collection. Firstly, value-based knowledge should be collected with a sufficient level of automation in the processes and it ought to be collected continuously and in a longitudinal manner. Secondly,

the interviewees required a shared consensus and coordination over the aspects that ought to be measured and monitored, and their criteria. Furthermore, value-based knowledge ought to be diverse in two aspects. First, it should represent both patient or disease group-specific as well as generic measures. Second, it ought to have knowledge of objective treatment outcomes as well as the more subjective aspects of patient-reported data. Additionally, interviewees put emphasis on the collection and metrics being both systematic and comprehensive. Finally, another requirement was the ability to combine value-based knowledge with outside data sources such as external registers to ensure an understanding of the effectiveness as a whole, comprising also of the patients' demographics and socio-economic status.

The expectation for value-based knowledge management in the case organization was to utilize value-based knowledge in a great number of situations over several contexts of department-/division-level management. Interviewees gave various examples of use cases in terms of decision-making, dialogue, information sharing as well as ethical review. Value-based knowledge was considered to provide well-needed support for managing both routine care, and department or hospital level scenarios. Above all, interviewees felt that value-based knowledge would provide a means for justifying made decisions, support for communicating them, and for having discussions across different managerial situations. Additionally, interviewees underlined a wish for utilizing value-based knowledge as a basis for allocating resources, and as a means for better dialogue in complicated situations such as resource allocation or ethical problems. To sum up, interviewees had a rather clear idea and consensus on what type of value-based knowledge they would like to have access to, and how they would like to utilize it.

5.4.2 Interpreting the current maturity stage

In the empirical findings, the case organization as a whole was found to still remain at the least mature stage in terms of value-based knowledge management. When reflecting on the empirical findings through the lenses of knowledge management maturity modeling, both the perceptions of the current situation as well as expectations for development ought to be considered. First of all, the variation in the maturity level did not seem to have an effect on the interviewees having a mutual consensus for how things ought to be when it came to the hospital. The shared understanding that management was aware of the issue and its importance, but that further attention and coordination was needed was shared by all interviewees despite their assessment on the organizational maturity level.

Instead, the maturity stage that a division or department assessed the organization to be at seemed to reflect more on the interviewees' perceptions regarding the current processes. Divisions with a lower maturity level also pointed out different types of issues to be improved compared with divisions with more mature practices. All in all, it could be seen that a higher maturity level seemed to result in a higher level of ambition regarding what was expected of the processes and collection of value-based knowledge. The impact became visible especially in terms of naming the type of value-based knowledge the interviewee would like to have access to and in naming measures to be collected, for example. A division with a lower assessment of the maturity level might be content with simpler measures that may even relate more to efficiency than effectiveness. In comparison, an interviewee from a division with more advanced processes was more likely to have more requirements for value-based knowledge for example in terms of expecting the collection to be systematic and continuous. Moreover, expectations for national-level coordination on the metrics to be measured and monitored became more evident in such cases.

While such differences were apparent in the interviewees' answers regarding some aspects or specific wishes for the process aspect of value-based knowledge management, the expectations for their improvement had less variation relating to the maturity levels. Indeed, no matter the self-assessed stage of maturity, all interviewees shared views on how the collection of value-based knowledge ought to happen and what type of aspects it would cover in an ideal world. Similarly, the maturity levels did not seem to affect the ambition level in terms of utilizing value-based knowledge. Instead, all interviewees expressed a will to utilizing value-based knowledge in a broad range of managerial situations which were presented earlier in this Chapter. Indeed, the ambition to utilize value-based knowledge was shared across divisions and departments and reflected the importance of the issue perceived by the interviewees. Next, the results of this study will be further reflected upon in terms of the selected theoretical background and previous literature.

6 Discussion

In this Chapter, the empirical findings are reflected further in relation to the earlier literature and theoretical grounding established in Chapters 2 and 3. The results are first discussed under three Sections in terms of addressing the objectives and research questions of this study. Following, the managerial implications and theoretical contributions will be summarized. Finally, limitations of the study and suggestions for future research will be discussed. Now, the objectives and research questions of this study are briefly revisited.

As was outlined in the beginning, the objectives of this study revolve around contributing to understanding value-based knowledge management as a phenomenon, and the use of value-based knowledge in the managerial context. Additionally, the study aims at providing insight into what their implementation requires from management's perspective. The research questions focus on examining the current state of things as well as the expectations for leading the way forward. The first two Sections of this Chapter (6.1 and 6.2) address answering the first main research question, while the second main research question is focused on in Section 6.3. The Sections after that aim at clarifying the contributions of this study, alongside its limitations and implications for future research.

6.1 Value-based knowledge management currently

The first research question of the study is about understanding the current stage of value-based knowledge management and utilizing value-based knowledge in specialized healthcare. The empirical findings of the current situation will now be discussed in terms of 1) the management's perceptions of the value-based approach, and 2) the organizational aspects and processes in relation to utilizing value-based knowledge.

The research question was first approached by examining the middle-/top-level management's perceptions of the concepts of effectiveness and value-based knowledge. Though a single, organization-wide definition for the concept of effectiveness was still lacking, the understanding of the concept and its importance were demonstrated by managers. Furthermore, the findings of this study indicate that the lack of a single unified definition was not perceived as problematic by management itself. Instead, the absence of organization-wide policies and criteria for measuring effectiveness was seen as a cause for concern, relating more to the concept of value-based knowledge. Indeed, the challenges that earlier research has identified in relation to the concept of effectiveness, were now more apparent in terms of measuring effectiveness and thus collecting value-based knowledge in

a unified manner. When discussing the current state of things regarding value-based knowledge, the findings indicated a demand for stronger coordination over measurement criteria and for policies over the collection, documentation, and use of that knowledge. Additionally, the need for ensuring sufficient support and know-how for interpreting and utilizing value-based knowledge was pointed out.

Earlier literature has concluded the concept of effectiveness to be a complex one to grasp or define in a unified manner (Axelsson & Engström, 2001; Rosen, 2000; Simonen et al., 2011). The perceived importance of the issue among healthcare managers, however, has been established already in prior studies (Axelsson & Engström, 2001; Simonen et al., 2011). While Simonen et al. (2011) argued the multiple definitions given to the concept in different contexts reflect managers' challenges to grasp its meaning, management now seems to share a more common understanding of its multifaceted nature. It seems the since grown attention around the topic both nationally and internationally may have contributed to a more established position of value-based health care among practitioners. Indeed, though the literature offers various views on how to specifically define concepts such as value and effectiveness, and how to measure them, the greater focus is on the predominant shift from monitoring outputs to measuring value and outcomes that matter to patients. Therefore, the perceptions of professionals may indicate a more unanimous view than those of researchers, who focus on examining the issue more specifically.

The current situation of value-based knowledge management was approached more broadly in terms of aspects that covered both organizational issues and current processes. The different organizational units were found to have differences in the current availability and collection of value-based knowledge, and its use. As was discussed in the empirical findings, some divisions experienced a complete lack of means to measure and collect value-based knowledge, some faced challenges in accessing the data, while others already had some systematic processes in place that enabled utilizing value-based knowledge. Regardless of the current situation, it was concluded that when available, value-based knowledge is or would be widely used in the managerial context. The results of this study revealed that managers would like to utilize value-based knowledge across a wide range of different situations relating to decision-making, information sharing, dialogue, and ethical reviews.

In earlier research, the availability of value-based knowledge as a support for administrative needs has overall been referred to as scarce (Rosen, 2000; Simonen, 2012; Simonen et al., 2011). An important consideration is, however, that earlier research seems

to have had a research-oriented approach to defining value-based knowledge (Rosen, 2000; Simonen, 2012). For example, factors relating to the use of value-based knowledge were identified more in relation to the difficulty or lack of resources for conducting effectiveness research (Simonen et al., 2012). In recent years, the development of information systems and electronic medical records alongside initiatives for national-level quality registries have gained momentum. Much development towards defining and measuring outcomes and enabling automated data collection has been carried out (Porter et al., 2016; van der Nat et al., 2017). Indeed, these development initiatives have likely promoted the measurement and creation of value-based data beyond knowledge produced by clinical trials. Such a shift in focus was also evident in the findings of this study, where a focus on register-based data was indicated. In this study, the focus was indeed on the internal knowledge produced by the organization itself. Though similarities between earlier findings and the results of this study are still apparent and applicable, some differences may in turn be explained by this difference in the approach to what is considered as value-based knowledge, and hence e.g. its availability. Regarding the utilization of value-based knowledge, on the other hand, this study complements previous research, where the focus has been mostly on managerial needs in terms of decision-making (Rosen, 2000; Simonen et al., 2011). While the role of value-based knowledge as an important support for decision-making was further enforced by the results, new use cases as e.g. support and facilitator for communication, and basis for ethical review were also identified.

Previous studies have also identified factors that hinder the use of value-based knowledge, such as lacking coordination, deficient systems and processes, and lack of access to knowledge (Simonen, 2012; Simonen et al., 2012). Similar issues were described and elaborated on in the findings of this study. As was discussed in the literature review, Lin et al. (2008, 2012) have studied the knowledge flow barriers in healthcare, and the barriers in relation to KM maturity stages. The suggestion that factors such as a need for powerful leadership and support from top management are most relevant in the early stages of KM maturity were found applicable in the context of this study as well. Comparatively, for departments or divisions with more advanced situations, issues relating to e.g. enabling wider and more systematic measurement and documentation of outcomes are more central, again supported by implications from earlier literature (Lin et al., 2012; Porter et al., 2016).

Conversely to previous findings, on the other hand, while Simonen et al. (2012) discovered factors such as managers' autonomy, professional ethics, or motivation causing potential hindrance to use value-based knowledge, the results of this study indicate

otherwise. The lack of motivation or will to promote value-based management was not recognized as an issue by managers, though organizational coordination and increase in awareness was called for. Furthermore, value-based knowledge was found as strong, potential support for ethical decisions. Reflecting on these differences, a factor to consider is the level of management in question – instead of covering also the views of medical managers, this study studied only middle-/top-level management. Indeed, as the closeness to the care process might contribute to prioritizing the benefit of an individual patient (Axelsson & Engström, 2001; Rosen, 2000; Simonen et al., 2012), and as administrative management is more likely to utilize value-based knowledge (Simonen et al., 2011), the focus on department and division level management in this study could explain such differences. On the other hand, as already suggested, since increased attention on value-based health care may also contribute to the increase in managers' awareness and motivation towards utilizing value-based knowledge.

6.2 Determining the maturity stage

In this Section, the findings are further discussed in relation to the knowledge management maturity model created by Teah et al. (2006). The perspective is on factors that relate to determining the maturity stage of value-based knowledge management. The Section thus continues contributing to the first research question of the study through the use of KM maturity modeling as a tool to evaluate the current state of utilizing value-based knowledge in the managerial context. The findings will first be re-examined in terms of the determined maturity level and the variations between departments and KPAs. Following, the way the maturity model was applied in this study and whether Teah et al. (2006) assessment instrument ought to have been applied will be further deliberated.

In relation to the first research question, the G-KMMM by Teah et al. (2006) was applied to determine the current maturity stage of the research phenomenon in the case organization. As a result, value-based knowledge management was found to remain in its infancy as the basic infrastructure, common organizational policies, formal processes, and coordination over measurement and documentation were found to still be lacking. As a whole, the case organization was concluded to place at the least mature stage for value-based knowledge management maturity. The result was determined based on Teah et al. (2006) model, where the least mature organizational unit determines the maturity level for the whole organization. Comparatively, some divisions and departments from the case organization were already at more advanced stages than others in terms of both organizational aspects

and processes, as was disclosed in Chapter 5. Moreover, management was perceived to be aware of the need for and importance of value-based knowledge management across all organizational units. All the departments were hence evaluated to reach the second maturity level (*Aware*) in terms of the key process area of people/organization. However, as the process KPA was assessed to be only at level 1 (*Initial)* in some divisions, the maturity level of the whole organization was determined to be at the least mature stage.

The determined result might be misleading in the way that it does not provide transparency to the fact that some divisions with more mature and advanced practices for value-based knowledge management already exist in the case organization. Comparatively, the case organization was determined to place at an upper stage regarding its people/organization KPA than its processes, which also is not apparent from the single maturity level given to the organization as a whole. Indeed, the general description of the lowest maturity stage where the organization has "*Little or no intention to make use of organizational knowledge"* (Teah et al., 2006, p. 406) does not resonate with the findings, while the description regarding the process KPA is accurate for some divisions. A single, aggregated maturity stage thus paints a black and white image by hiding the differences between 1) different KPAs, and 2) different organizational units.

One could argue the lack of transparency and multidimensionality to be a potential weakness of the maturity modeling. In fact, similar observations were made by Teah et al. (2006), who state that an organization might indeed be at different stages of maturity for each of the KPAs. While they recognize that the issue could be regarded as a complication within the model, they argue the feature to highlight the model's usefulness as a diagnostic tool (Teah et al., 2006). They further explain that the tool enables organizations to identify aspects that require the most development for the organization to advance to higher levels of KM maturity (Teah et al., 2006). For the case organization, such insight would suggest the need to first focus on improving their processes. It should be noted, however, that for such identification to be possible, the different results and ratings ought to be reported. A similar observation was also made by Teah et al. (2006, p. 415): *"It should also be noted that although a single maturity rating for the organization can be obtained by aggregating ratings for the KPAs, the rating distribution should also be reported to avoid loss of constructive information."*.

Teah et al. (2006) comment on the potential consequences of aggregating results in terms of different KPAs but not in relation to different maturity levels across different organizational units. In the context of this study, a single maturity rating could result in a

misleading interpretation that all organizational units are at the same phase with value-based knowledge management. Furthermore, as was mentioned in the previous Section, different maturity stages include different challenges to knowledge flow, and hence need different tactics to address them. Consequently, the importance of understanding the varying maturity stages across organizational units may also be emphasized to enable identifying appropriate tactics. To conclude, the G-KMMM provided a promising tool for assessing the maturity stage of value-based knowledge management. Moreover, the tool enabled observing that the main aspect in need of improvement in the case organization was its processes. However, an aggregated result of the current maturity level may guide one to a misleading idea of the organization's current state as it doesn't show the rating distribution across different KPAs and different organizational units at different stages of implementing value-based knowledge management. To sum up, the distribution of maturity ratings should be disclosed in terms of 1) different KPAs, and 2) different organizational units.

As was observed in Chapter 3, Teah et al. (2006) provide an assessment instrument in their paper to facilitate the practical application of the G-KMMM. The assessment tool is a diagnostic instrument that was designed to help in assessing an organization's knowledge management maturity (Teah et al., 2006). However, as was justified in Chapter 3, the assessment instrument was not directly incorporated in this study. Reflecting on the empirical findings, it is worth discussing, whether that choice was appropriate and how big of an impact it had on the interpretation of the empirical findings.

The G-KMMM assessment instrument lists the aspects of the different KPAs in detail and from diverse angles. It could be argued the instrument thus helps researchers ensure that all relevant aspects are covered in terms of assessing an organization's KM maturity. Furthermore, the instrument was built based on key relevant literature and existing maturity models (Teah et al., 2006), contributing to its validity and generalizability. It could be argued, that utilizing the suggested assessment instrument could have provided the empirical data with more structure, and ensured that the results are comprehensive and exhaustive in mapping the case organization's KM maturity. Consequently, the analysis of the empirical data could have also benefitted from the assessment instrument by enabling a more systematic and structured approach to the analysis. Furthermore, it is possible that aspects that were now left out of the scope could have been discovered and assessed.

On the other hand, Teah et al. (2006) state that their assessment instrument would result in mainly qualitative results with a possibility to incorporate quantitative dimensions in the assessment. They also state that it is preferable for a knowledge management maturity

model to result in both qualitative and quantitative results (Teah et al., 2006). However, as the assessment tool consists of a list where all items need a positive response for an organization to achieve a certain maturity level (Teah et al., 2006), it seems highly quantitative in its nature. Indeed, the instrument consists of a broad list of yes/no type of questions and would arguably result in quantitative survey-type data, even if the tool was used in an interview. Hence, this study suggests that an approach with more qualitative themes and questions combined with quantitative questions may result in a more diverse and comprehensive understanding of the current state of the organization's KM. Furthermore, such an approach would facilitate the incorporation of both qualitative and quantitative dimensions in the resulting data, which was indeed found to be preferable for maturity modeling (Teah et al., 2006). Additionally, as was concluded in Chapter 3, the suggested tool presents a rather heavy form to be covered in interviews. One could argue that such a detailed survey leaves little room for exploring and deepening interesting themes that may arise during the conversation. All in all, as was discussed and justified in Chapter 3, the choice in this study was to apply and incorporate elements of the G-KMMM assessment instrument in the interview structure. The choice was made to, on one hand, ensure that all relevant aspects would be covered but to, on the other hand, also enable a more flexible and inductive approach for evaluating the maturity of value-based knowledge management in the case organization. While both options surely have their advantages and disadvantages, the chosen approach suited better the scope and aims of this study.

6.3 Implications for the way forward

Now, the discussion on the empirical findings moves onto addressing the second main research question of this study. The objective in regard to the second research question was to examine management's expectations for value-based knowledge management. The question was approached through two sub-questions where the requirements for value-based knowledge and the different ways to utilize value-based knowledge were mapped.

Firstly, the results of this study contribute to the literature with indications about the general requirements for value-based knowledge in terms of its characteristics and collection. The requirements, which were summarized earlier in Figure 7, included the need for coordinated metrics and criteria, with measures covering both generic and disease group-specific, and objective and patient-reported measures. It was concluded, that from the managers' perspective the relevance and usability of value-based knowledge would be promoted by longitudinal, continuous measurement. Additionally, the collection of value-

based knowledge was expected to be systematic in its nature, with a sufficient level of process automation. The resulting knowledge, on the other hand, was expected to be combinable with external registries.

Previous research has provided insight on the requirements for value-based knowledge in terms of measuring outcomes in an appropriate way, and by describing the specific challenges value-based knowledge poses due to its complex nature (Donabedian, 1966; Nordic Healthcare Group, 2016; Pitkänen et al., 2019; Porter, 2010). Instead, research on the user perspective of utilizing value-based knowledge, and the types of requirements the managerial point of view sets for the knowledge is far scarcer. Based on the findings of this study, a link may be established between the two. Indeed, many characteristics discussed in Section 5.3.1 resonate with earlier research such as the need for different categories and different types of outcome measures (Pitkänen et al., 2019; Velentgas et al., 2013), and the requirement for systematic and longitudinal measurement (Porter, 2010; Porter et al., 2016). While literature puts emphasis on measuring outcomes around medical conditions (Malmivaara, 2017; Porter et al., 2016), the findings of this study suggest that generic measures that cover all patients of specialized healthcare are also expected, from the management's point of view. Indeed, both disease group-specific, and more generic measures ought to be incorporated.

The other requirements for value-based knowledge and its collection from the managerial viewpoint are also supported by previous literature. Simonen et al. (2012) found managers to suggest similar factors to advance the use of value-based knowledge, such as wishing for systematically collected, concise, tractable data that represents significant patient groups. The needs for better, more automated and integrated processes and organizational and national-level coordination over measurement criteria and chosen metrics were indicated in earlier research, too (Simonen et al., 2012). Moreover, instead of trying to reinvent the wheel, previous studies recommend considering standardized criteria already applied beyond the organizational limits (Porter et al., 2016), when planning the definitions and classifications for outcome measurement. In addition to complementing earlier research, the results of this study contribute to addressing the challenging trade-off between relevance and reliability in terms of the time dimension of value-based knowledge. Instead of a specific time frame, it was confirmed that the continuous, longitudinal collection of data that enables monitoring trends would lengthen the relevance and usability of value-based knowledge in terms of managerial needs. On the other hand, the more specific degree or cycle in which

data needs to be available was found to depend greatly on the measure in question and its purpose (e.g. monitoring patient safety vs. planning for future alignments).

When it comes to the ways to utilize value-based knowledge, the identified potential for the use cases was great, and support was found from earlier research, as was discussed in the first section of this Chapter. While the empirical findings themselves provide indications for the way forward in terms of advancing value-based knowledge management, previous literature offers several insights to be considered in terms of guidelines and implementation efforts. First of all, providing sufficient support and training has been suggested as an important factor as prior experience and understanding have been found to impact the capacity to adopt knowledge management practices (Bordoloi & Islam, 2012; Chen et al., 2011). While the need for training in terms of VBCH was identified in the findings of this study, the literature thus implies that also administrative training on KM practices would likely prove useful for implementation. Additionally, previous research supports the findings relating to a need for support and training in terms of IT infrastructure, systems, tools, and their integration (Bordoloi & Islam, 2012; Chen et al., 2011; Nilsson et al., 2018).

Involvement in social learning practices and user participation present issues that are strongly recommended in KM literature (Bordoloi & Islam, 2012; Chen et al., 2011). The link to strong leadership, motivational culture, and the management's support have also been established in previous research as factors that promote the adoption of KM practices as well as the use of value-based knowledge (Bordoloi & Islam, 2012; Nilsson et al., 2018; Simonen, 2012). Similar observations were made in this study, as management called for a stronger organization-wide commitment and prioritization around value-based knowledge management in terms of raising awareness and developing common policies. A note worth considering is how big of responsibility ought to be placed on the managers themselves in terms of promoting the issue and advancing its development through their own behavior in their departments. Indeed, an inclination to focus on readily accessible data has been mentioned in terms of measuring and reporting outcome measures (Porter et al., 2016), and department- and division-level managers ought to express commitment and leadership, too. In any case, insights from earlier literature suggest that harnessing pioneers and managers with prior experience and motivation could contribute to promoting value-based knowledge management more widely in the organization. Real-life lessons exist where empowering motivated key players, and development-oriented leadership has proved important factors

for scaling up success stories and inspiring a change in the overall organizational culture (EIT Health, 2020; Nilsson et al., 2018).

As was mentioned in Section 2.2.2, Abidi and Sibte (2007) suggest a strategy for implementing healthcare knowledge management. Their proposed strategy incorporates many of the factors and aspects that have been found relevant in the findings of this study and previous research, which have been discussed in the above Sections. In terms of value-based knowledge management, the implications include educating stakeholders about the value of utilizing knowledge, and demonstrating how applying value-based knowledge might contribute to their work (Abidi & Sibte, 2007). In any case, the point demonstrated by the findings of this study, and further supported by earlier research, is that value-based knowledge management requires effort in terms of implementation. Indeed, as is the case for knowledge management in general, or VBHC for that matter, successful implementation requires more than just sophisticated IT systems and tools, but rather "*a strategy to translate knowledge into policy and practices*" (Abidi & Sibte, 2007, p. 4). Now that the empirical findings of this study have been further elaborated and reflected upon in relation to previous research, the practical and academic contributions of this study will be outlined.

6.4 Managerial implications

The objective of this study is, in essence, to address the practical needs identified both in the case organization and more generally on a national and international level in terms of understanding what utilizing value-based knowledge requires in the managerial context. Indeed, implementing VBHC on an operational level has been studied more profoundly, and the guidelines are clearer in terms of e.g. measurement on patient-level. However, due to the novelty and complexity of the phenomenon and the unique challenges associated with value-based knowledge, it has been unclear what is required in terms of upper-level management when implementing the value-based approach. This study provides several managerial implications by introducing knowledge management literature into the context. The implications will be discussed and examined by first reflecting on the future vision for value-based knowledge management. Second, the practical observations and recommendations for organizations operating in the research context are presented.

Based on the findings of this study, a vision for value-based knowledge management may be described. Based on the managers' views, value-based knowledge management is expected to have a more significant role already in three years' time. Utilizing value-based knowledge will probably have established some role in supporting managerial tasks, and its

use will already be more common. However, three years is also perceived as a short time, and hence value-based knowledge will not yet be systematically utilized. As was discussed in Section 2.2.1 in terms of knowledge itself, the process of creating knowledge requires first placing raw data in a context and then interpreting that information through experience, commitment, and communication (Nonaka, 1994; Zack, 1999). The same process may be assumed to apply to value-based knowledge – it will take time to first develop the systems and processes to enable the measurement and documentation of appropriate data, after which the learning begins towards interpreting and utilizing value-based knowledge. Indeed, fully implementing value-based knowledge management and thus progressing to the upper maturity stages where value-based knowledge would be a standard managerial asset is likely to take a longer time. First, the necessary foundations and infrastructure need to be developed in terms of processes, systems, and organization-wide know-how and policies. After that, starting to apply, interpret, and utilize value-based knowledge systematically may follow.

In this study, the current situation of value-based knowledge management and key focus areas for improvement were identified. Furthermore, the management's requirements and expectations towards value-based knowledge management were examined. Adapting the process described by Leskelä et al. (2019), the management's requirements for value-based knowledge and its utilization ought to provide the case organization with the starting point for guiding the rest of the work. The managerial needs identified in this study ought to thus lead the way, and transfer to e.g. determining shared criteria for measurement, establishing coordination and policies over data collection and documentation, and to development of infrastructure, tools, and support systems. Building on that and other insights generated in this study, multiple practical implications and recommendations are provided for organizations aiming to implement the value-based approach. Figure 8 summarizes the practical implications of this study in terms of current challenges regarding value-based knowledge management and suggestions on how to address them.

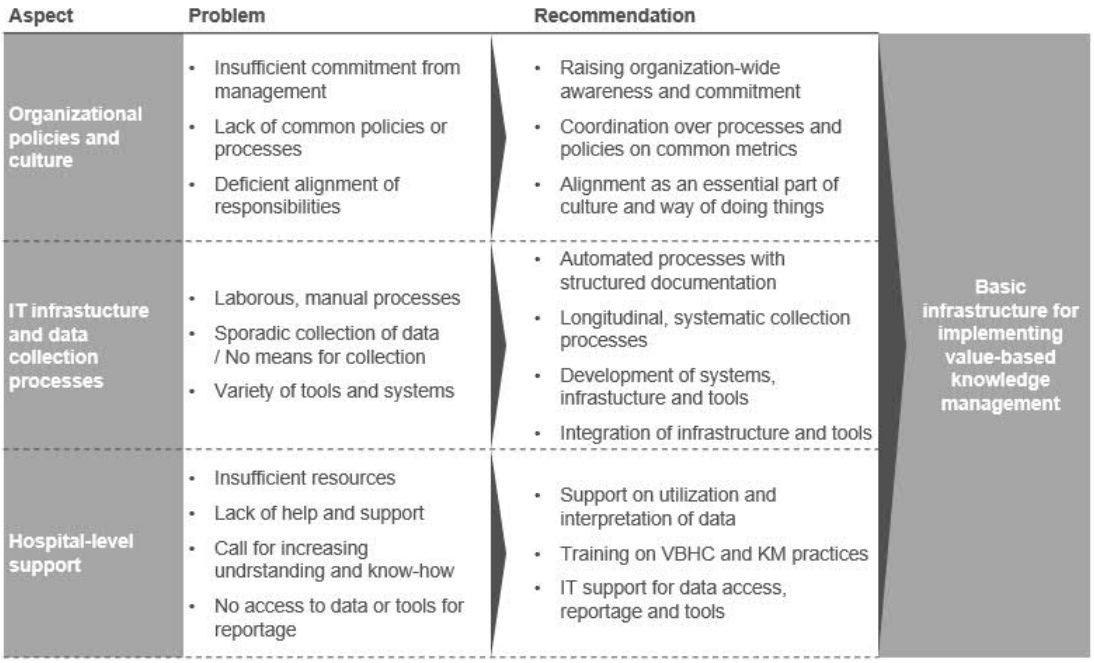

Figure 8. Summary of the practical implications of the study

In terms of implementing the recommendations to practice, knowledge management literature provides further guidelines on how to prioritize them. Overall, the current maturity stage ought to steer the implementation efforts for value-based knowledge management. First of all, as processes were pinpointed as the key development area before being able to advance to the following maturity levels, the first focus point ought to thus be on process improvement that enables documenting knowledge needed in routine managerial tasks (Teah et al., 2006). Moreover, as the critical barrier to knowledge flow in the lowest maturity stages revolves around lack of leadership (Lin et al., 2012), the case organization ought to provide a stronger managerial commitment to facilitate the necessary process development. Indeed, the implementation efforts should first focus on ensuring appropriate organizational support in terms of defining and coordinating measurement based on shared criteria. Additionally, the primary efforts should include working towards sufficient IT infrastructure that enables the structured and explicit documentation of data with a sufficient level of process automation (cf. Lin et al., 2012). Once reaching more advanced maturity stages becomes relevant, the focus in implementation efforts ought to shift towards providing sufficient support in terms of mechanisms and training, defining more formalized processes, and establishing a stronger link to strategy and organizational policies (Lin et al., 2012; Teah et al., 2006). To secure such progress, training and support become essential in terms of

building know-how, securing access to IT resources and tools, and converting the collected data to interpreted knowledge.

6.5 Theoretical contributions

As was demonstrated above, there is a link between the managerial implications and the KM-based theoretical grounding of this study. Indeed, the research also brings with it a two-fold theoretical contribution to the literature. Firstly, this study contributes to the academic discussion by generating insight on applying KM tools and practices in the context of value-based health care. Secondly, the study advances VBHC literature by bringing new understanding to the implementation of value-based knowledge management.

The approach in this study was to apply the tools and practices from knowledge management literature to VBHC implementation in managing specialized healthcare. To the researcher's knowledge, this study represented one of the first applications of combining KM tools with the VBHC literature. Thus, the study provides the literature with a new context for knowledge management practices and KM maturity modeling to be applied to. While the need and appropriateness of KM practices in healthcare have already been established in the academic literature, utilizing value-based knowledge in the managerial context poses its own unique challenges, thus motivating the search for appropriate methods. As a result of this study, a new potential tool for assessing and developing the implementation of value-based management in specialized healthcare was confirmed. Indeed, using KM maturity modeling was found to provide a more structured approach to assessing the current state of value-based knowledge management, with the potential for further application. Applying maturity modeling allows for pinpointing the areas of focus where the most improvement is needed to promote value-based knowledge management. It was also confirmed that the distribution of maturity ratings ought to be disclosed across different KPAs and different organizational units in the VBHC context. As different tactics seem appropriate at different KM maturity stages, a single, aggregated maturity result might present an overly simplified truth of a complex phenomenon and even guide an organization towards misleading conclusions. Consequently, reporting the rating distributions alongside aggregated results is recommended.

The other main theoretical contribution this study has is contributing to the VBHC literature by shedding light on the current situation of value-based knowledge management in specialized healthcare. Based on the theoretical background from KM literature, it was discovered that value-based knowledge management is only starting to emerge when

regarding university hospitals as a whole, though some forerunners already exist among the different organizational units. Moreover, it was confirmed that processes present the central challenge to its implementation. New insight also rose from discovering that implementation efforts for the value-based approach ought to be adjusted and prioritized in regard to the current maturity stages.

The knowledge on implementing value-based knowledge management was further deepened by generating new insight into the requirements for value-based knowledge and its use from management's perspective. Indeed, the newly mapped requirements for value-based knowledge and its collection and expectations for utilizing it ought to guide the academic discussion on implementing the value-based approach in the managerial context. The requirements for measuring value or effectiveness have been discussed in the literature mainly from a research-centric or operational perspective. This study complements previous research by incorporating the managerial viewpoint. Academic discussion is thus steered towards considering how to address and incorporate the managerial expectations for the collected data, and to what extent and emphasis they should be weighed and applied.

6.6 Limitations of the study

Though new, valuable insight has been discovered in this study, some limitations need to be acknowledged. First of all, the generalizability of the results needs to be given consideration. As the findings are based on the perceptions of a sample of the case organization's middle-/top-management, the implications of the empirical findings ought to be considered suggestive. Though the selected departments represent a notable and diverse snapshot of the case organization, it should be noted that factors such as the varying managerial work experience of the interviewees, and the sample of interviewees itself, may affect how reliable and generalizable the results are. Moreover, the generalizability of a single case study is questionable in general. Similarly, though the case organization is the largest university hospital in Finland, it needs to be noted, that the data gathered is industry- and country-specific. The results ought to thus be regarded within the particular context of this study. Indeed, the research phenomenon requires more attention and research to confirm the generalizability and applicability of the results in wider contexts, such as more generally in 1) university hospitals, 2) specialized healthcare, 3) healthcare.

A second point to consider is the reliability of the research findings. First of all, the researcher's interpretations of the collected data play a big role in qualitative studies which ought to be acknowledged. Moreover, the researcher's skills in qualitative interviewing

affect the quality and depth of the resulting data. Though the thought was given to such issues throughout the research process, the above-mentioned factors must be acknowledged, nevertheless. That being said, insights drawn from previous literature support the findings of this study, which supports their reliability.

Thirdly, as there is little to no previous research on applying knowledge management maturity modeling in the VBHC context, there is no prior reference for the suitability of the selected approach. Consequently, the suitability of KMMMs as a tool for evaluating value-based knowledge management could be challenged and needs to be validated by further research. Indeed, the lack of an established way or a single validated model for carrying out the selected approach needs to be considered if conducting similar studies.

Finally, though several delineations were made to narrow down the scope of this study, it is acknowledged by the researcher that the scope of the study remained wide. The research questions of the study approached the research phenomenon from multiple viewpoints. Had the focus of the study been narrowed down further, even deeper insights might have risen. On the other hand, due to the nature of this case study, it was not possible to predetermine or know the exact scope of the research in advance. The mostly deductive nature of this study hence guided the more specific formulation of the research questions, thus determining the final scope of the study. Nevertheless, these limitations present considerations that ought to be kept in mind when reviewing the results of this study.

6.7 Suggestions for future research

The findings of this study alongside the discussion around them indicate several directions for future research. First of all, as knowledge management maturity modeling presents a new tool in the VBHC context, more applications are needed. As applying KM maturity modeling seemed to fit the research context, its wider use ought to be considered in terms of a more systematic review across different case organizations. Additionally, future research could incorporate the now left out KPA of technology. As a result, an even more comprehensive image of the current state of value-based knowledge management and the aspects that require improvement could be achieved. However, while using KMMM provides a promising method for assessing the implementation of value-based knowledge management, more studies are needed to validate the approach. Testing the framework applied in this study could contribute to developing it further, and establishing it as a way to conduct maturity modeling in the context of value-based knowledge management. Alternatively, other

researchers may consider the need for developing a separate framework or model for assessing the maturity of value-based knowledge management, in specific.

On the other hand, a more comprehensive understanding of the phenomenon ought to be built through other case studies. As was discussed in terms of the generalizability of the results of this study, more research is needed on value-based knowledge management and its implementation in other hospitals, in health care in general, and other countries. Moreover, future research should focus on studying and testing the suitability and usefulness of the suggested KM practices more deeply. In addition, the incorporation of the managerial expectations towards value-based knowledge management ought to be addressed in academic discussion. Such research would contribute to understanding the complex phenomenon of value-based knowledge management further.

7 Conclusions

This study focused on examining value-based knowledge management in specialized healthcare. The research phenomenon was approached by studying middle-/top-level management's views on the current situation of utilizing value-based knowledge and expectations towards value-based knowledge management. The HUS Helsinki University Hospital was used as the case organization in the empirical part of the study.

First, the current situation of value-based knowledge management was assessed by applying knowledge management maturity modeling as a tool from KM literature. The insights were deepened by examining the current situations in terms of e.g. current availability and use of value-based knowledge. It was discovered that value-based knowledge management is still in its infancy when considering the organization as a whole. Varying maturity stages may exist among different organizational units with the most advanced ones already having systematic, patient-group-specific processes in place and utilizing currently available value-based knowledge to steer their work, while the less progressed ones struggle with enabling the measurement and collection or value-based knowledge. In general, processes were found to have the most room for improvement. Though awareness around the importance of the issue was apparent, a need for stronger coordination and support was indicated, too.

Second, the expectations towards value-based knowledge management were studied through the requirements for value-based knowledge and utilizing it in the managerial context. Several conditions for value-based knowledge and its collection were identified. Despite the low level of current KM maturity, the expectations for utilizing value-based knowledge already covered diverse managerial situations and needs. Based on the findings and previous research, relevant factors of strong leadership, sufficient support and training, user participation, and IT infrastructure, and integration were discussed as recommendations for advancing value-based knowledge management. In terms of the way forward, it was suggested that implementation efforts should be guided by the current maturity stage, alongside management's needs and expectations.

To sum up, value-based knowledge management represents a novel and complex phenomenon that calls for further research in the context. This study was among the first known to combine the literature on value-based health care and knowledge management. As a conclusion, new insight on implementing the value-based approach in specialized healthcare was generated by incorporating the managerial viewpoint.

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Appendix A: Interview structure

1. **Taustoitus ja esittely**
- Opinnäytetyön aihe, tausta ja tavoitteet
- Haastattelun nauhoitus ja vastaajien anonymiteetti
- Haastattelijan esittely

2. **Haastateltavan taustatiedot**
- pvm
- tulosyksikkö
- Työkokemus: Kauanko olet ollut nykyisessä johtamistehtävässä toimiala-/linjajohtajana
    - Alle 1 vuosi
    - 1-2 vuotta
    - 3-5 vuotta
    - Yli 5 vuotta

3. **Vaikuttavuus käsitteenä ja konseptina**

Käsitys vaikuttavuudesta ja sen suhteesta lähikäsitteisiin

- Mitä on mielestäsi vaikuttavuus terveydenhuollossa?
- Miten koet vaikuttavuuden suhteessa sen lähikäsitteisiin kuten tehokkuus ja kustannusvaikuttavuus?
- Mitä on mielestäsi vaikuttavuustieto terveydenhuollossa? Voisitko antaa esimerkin?
- Miten koet vaikuttavuuden ja vaikuttavuustiedon hyödyntämisen merkityksen…
    - potilaan tai potilasryhmän hoidon kannalta?
    - erikoissairaanhoidon palveluntuottajan kannalta?
    - yhteiskunnan ja palvelujärjestelmän kannalta?

Kysymykset tästä eteenpäin koskevat vaikuttavuutta ja vaikuttavuustietoa erikoissairaanhoidon palveluntuottajan (organizaatio ja siellä tarjottava hoito) näkökulmasta.

- Tutkimuksessa käytettävien määritelmien ja rajausten läpikäynti

4. **Vaikuttavuustiedon nykytila**

Organizaatio ja prosessit

Mikä seuraavista väittämistä kuvaa mielestäsi parhaiten organizaatiosi nykytilaa? (Huom. seuraavan väittämän oletuksena on, että myös edellinen/edelliset väittämät pätevät)

1. Organizaatiomme ja sen jäsenet eivät tiedosta tarvetta vaikuttavuustiedolle ja sen hyödyntämiselle johtamisessa
2. Organizaatiomme johto on tietoinen vaikuttavuustiedon ja sen hyödyntämisen tarpeesta ja tärkeydestä
3. Organizaatiomme johto on tietoinen roolistaan vaikuttavuustiedon hyödyntämisen edistämisessä, ja olennaiset perustukset tämän mahdollistamiseksi on otettu käyttöön (esim. määritellyt roolit ja strategia, koulutukset ja kannustinjärjestelmät)
4. Vaikuttavuustiedolla johtaminen on kiinteä ja selkeä osa organizaatiomme strategiaa ja se on liitetty osaksi organizaatiomme normeja ja dialogia
5. Vaikuttavuustiedolla johtaminen ja tiedon levittäminen ovat kiinteä osa organizaatiomme kulttuuria

Mikä seuraavista väittämistä kuvaa mielestäsi parhaiten prosessien nykytilaa? (Huom. seuraavan väittämän oletuksena on, että myös edellinen/edelliset väittämät pätevät)

1. Vaikuttavuustiedon keräämiselle ja hyödyntämiselle ei ole organizaatiossamme muodollisia prosesseja
2. Vaikuttavuustietoa kerätään ja dokumentoidaan siltä osin, kuin se on työni suorittamisen kannalta välttämätöntä
3. Vaikuttavuustiedon keräämiselle ja hyödyntämiselle on viralliset prosessit, joiden toimivuutta pystytään arvioimaan
4. Vaikuttavuustiedon keräämiseen ja hyödyntämiseen liittyvien prosessien toimivuutta ja tehokkuutta mitataan ja arvioidaan organizaatiossamme systemaattisesti (esim. mittarien käyttö)
5. Vaikuttavuustiedon keräämiseen ja hyödyntämiseen liittyviä prosesseja arvioidaan ja parannetaan jatkuvasti ja niitä pystytään soveltamaan ja muokkaamaan uusiin tarpeisiin

Vaikuttavuustiedon saatavuus

- Mitataanko/Kerätäänkö vaikuttavuustietoa tällä hetkellä systemaattisesti tulosyksikössäsi?
    - Jos kyllä, miten?
    - Jos kyllä, onko käytössä joitakin vaikuttavuusmittareita, joilla tietoa kerätään? Mitä?
- Onko hoitoa tai palveluprosessia koskevaa organizaation sisäistä, systemaattista vaikuttavuustietoa tällä hetkellä saatavilla työsi tueksi?
    - Jos kyllä, millaista?
    - Jos kyllä, pystytkö hyödyntämään sitä työssäsi? Miten?
    - Jos kyllä, miten käyttökelpoiseksi arvioisit saatavilla olevan tiedon?
    - Jos kyllä, miten luotettavaksi arvioisit saatavilla olevan tiedon?
    - Jos kyllä, koskeeko tieto erityisesti joitakin potilasryhmiä tai hoitoalueita? Mitä?
    - Jos kyllä, onko vaikuttavuustieto mielestäsi vertailukelpoista eri palveluntuottajien välillä?

Vaikuttavuustiedon hyödyntäminen - nykytila

- Millaisia johtamisen tilanteita työhösi kuuluu?
- Millaista tietoa käytät nykyisin näiden tilanteiden tukena?
- Hyödynnätkö tällä hetkellä vaikuttavuustietoa työhösi kuuluvissa johtamisentilanteissa?
    - Jos kyllä, millaisissa tilanteissa? Voisitko antaa esimerkin?
    - Jos kyllä, millaista tietoa?
    - Jos kyllä, voisitko antaa jonkin esimerkin tilanteesta, jossa olet voinut hyödyntää vaikuttavuustietoa?
    - Jos et, minkälaisia syitä siihen on?
- Mitkä ovat mielestäsi kolme tiedon hyödyntämistä eniten rajoittavaa tekijää nykyisin?

5. Vaikuttavuustiedon hyödyntäminen - tahtotila

Jos sinulla olisi mahdollisuus vaikuttavuustiedon parempaan keräämiseen ja hyödyntämiseen, niin:

Vaikuttavuustiedon kerääminen

- Miten vaikuttavuutta tulisi mielestäsi mitata?
    - Millaista vaikuttavuustietoa haluaisit kerätä?
    - Miten kehittäisit vaikuttavuustiedon keräämistä ja hyödyntämistä?
- Millaisessa muodossa haluaisit vaikuttavuustiedon käyttöösi?
- Ottaen huomioon vaikuttavuustiedon aikaulottuvuuden ongelmallisuuden tiedon kerääntyessä hitaasti suhteessa käyttötarpeisiin, millaisia edellytyksiä tämä mielestäsi asettaa tiedolle?
    - Kuinka reaaliaikaista vaikuttavuustiedon tulisi mielestäsi olla, jotta se olisi relevanttia?
    - Jotta vaikuttavuustieto olisi mielestäsi käyttökelpoista, kuinka pitkältä menneisyydestä se saisi enimmillään olla?

Päätöksenteko

- Millaisia päätöksentekotilanteita työhösi kuuluu?
    - Missä mainitsemistasi tilanteissa haluaisit hyödyntää vaikuttavuustietoa?
- Millaista vaikuttavuustietoa haluaisit hyödyntää seuraavissa päätöksentekotilanteissa?

  - Resursointiin liittyen
  - Budjetointiin liittyen
  - Palvelujen saatavuuteen liittyen
  - Muut päätöksentekotilanteet
- Miten haluaisit hyödyntää kyseistä tietoa?
- Eettisestä näkökulmasta ajateltuna, miten vaikuttavuustiedon hyödyntäminen vaikuttaa mielestäsi päätöksentekoon
  - Miten se voi tukea sinua päätöksiin liittyvässä eettisessä arvioinnissa?
  - Miten se voi vaikeuttaa päätöksiin liittyvää eettistä arviointia?

Kommunikaatio ja dialogi

- Millaista viestintää, kommunikaatiota ja dialogia työhösi kuuluu?
  - Missä mainitsemistasi tilanteissa haluaisit hyödyntää vaikuttavuustietoa?
- Millaista vaikuttavuustietoa haluaisit hyödyntää seuraavissa viestinnän ja dialogin tilanteissa?
  - Viestintä organizaatiolle
  - Viestintä alaisille/kollegoille
  - Palautteen anto
  - Dialogi organizaation jäsenten kanssa
- Miten haluaisit hyödyntää kyseistä tietoa?

6. Vaikuttavuustiedon tulevaisuus

- Miten näet vaikuttavuuden ja vaikuttavuustiedon roolin tulevaisuuden johtamisessa?
- Uskotko, että vaikuttavuustieto on systemaattisessa käytössä johtamisen tukena 3 vuoden päästä?
  - Jos et, miksi?
- Missä johtamisen ulottuvuudessa uskot vaikuttavuustiedon hyödyntämisen painopisteen olevan 3 vuoden päästä?
  - Päätöksenteko (budjetointi, resursointi, palvelujen saatavuus)
  - Viestintä (informaatio-ohjaus)
  - Dialogi
- Millaista vaikuttavuustietoa haluaisit olevan saatavilla 3 vuoden päästä?
- Miten haluaisit hyödyntää vaikuttavuustietoa 3 vuoden päästä?
- Mitä konkreettisia toimenpiteitä tulosyksikössäsi tulisi tehdä vaikuttavuustiedon hyödyntämisen johtamisessa edistämiseksi? *Mainitse 3*
- Mitä konkreettisia toimenpiteitä koko HUSin tasolla tulisi tehdä vaikuttavuustiedon hyödyntämisen johtamisessa edistämiseksi? *Mainitse 3*
- Mitä konkreettisia toimenpiteitä kansallisella tasolla tulisi tehdä vaikuttavuustiedon hyödyntämisen johtamisessa edistämiseksi? *Mainitse 3*