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Keeping the blood flowing

Hindrances to systemic viability in a
Norwegian hospital

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Industrial Economics and Technology Management
Submission date: June 2018
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Original problem definition

In this thesis, I have diagnosed the Department of Orthopaedic Surgery at St. Olav's Hospital, using the Viable System Model. This has been done in order to identify what hindrances to systemic viability that exist in a Norwegian hospital today.

Foreword and acknowledgements

This thesis completes my fifth and final year of a Master of Science Degree in Industrial Economics and Technology Management at the Norwegian University of Science and Technology (NTNU). The thesis was initiated through a collaboration between NTNU, Regional Centre for Development of Health Services (RSHU) and the Clinic of Orthopaedy, Rheumatology and Dermatology at St. Olav's Hospital. A fellow student was working on a project on Managerial Economics and Operations Research and a supporting project, dealing with implementation and change management became much wanted and this thesis was born.

The object of this thesis is to highlight challenges in the Norwegian hospital from a systemic perspective and throw light on how a systemic diagnostic tool can help reveal challenges that might hinder systemic viability. It is important because of the central position the hospital has in the Norwegian welfare state and the increasing need for a holistic approach to health services. The work with this thesis began with a specialization project during the fall of 2017 and the thesis is built upon the initial work I did then.

There are several people that have helped me along the way, and to whom I want to express my sincere gratitude.

I want to thank Vigleik Jessen and the rest of the management at the Clinic of Orthopaedy, Rheumatology and Dermatology, at St. Olav's Hospital, as well as all the informants. Thank you for letting me ask questions, observe and discuss my project. It has been an interesting, rewarding, and above all inspirational encounter! You have provided me with lessons and insights that will form my professional future. I also owe a big thank you to RSHU for bringing me on to this project and to Thomas Reiten Bovim for having the idea to ask me. Thank you for being a great discussion partner. A great thank you to all my fellow students, friends and family who have supported me and cheerfully being there as sparring partners. Furthermore, I want to thank Jonas A. Ingvaldsen for being an inspirational lecturer during TIØ4276 Change Management the spring of 2017, which made me change my mind about my master's specialization.

I want to direct my humble gratitude to my main supervisor, Hanne O. Finnestrand. She is the kind of supervisor everyone wish for, but that the fewest have the honour of having. Knowledgeable, strong and caring make for a great combination. She knows when to push and when to pull and can make a stone feel confident. You make social sciences cool, Hanne. Thank you for inspirational and helpful conversations!

Bob (Robert L. Flood), my second advisor, has the rare ability to spread knowledge, insight and motivation through a screen, an email or text and of course, in person. Thank you for introducing me to the VSM and for your guidance: It has been an honour!

This thesis marks the end of five years of higher level education and it should not be completed without some reflection upon this journey. My apologies to any English speaking reader, this next part I need to do in Norwegian, because this thesis strikes me as an appropriate place for an ever so little thank you speech:

Jeg vil, foruten å takke de som har vært direkte involvert i arbeidet med denne oppgaven, få takke noen som har gjort det mulig for meg å nå levere inn denne masteroppgaven. Det er en begivenhet jeg selv ikke tar lett på. Jeg vil derfor få takke dem som har sittet på første rad og fulgt meg nøye på ferden. Først vil jeg uttrykke min ydmykhet og takknemlighet ovenfor min mor, Mona og min far, Rune. Hele oppveksten har dere støttet meg i alle drømmer, gode og mindre gode ideer og påfunn og slitt med leksehjelp og heiarop slik at det kunne bli sivilingeniør av meg også, som min far. Fortsatt er dere noen av mine aller største støttespillere og fans som engasjerer dere, støtter meg og minner meg på hva jeg kan klare. I tillegg vil jeg takke dere for å la meg vokse opp i et hus fullt av bøker, som spilte en sentral rolle i alt fra kveldsstell til diskusjoner rundt middagsbordet. Mormor, takk for at du har ofret nattesøvn for å be for meg og mine gjøremål: Takk for at du alltid er der i mot- og medvind og for alle de gode verdiene du puttet i ryggsekken min som jeg tar med meg over alt. Du minner meg stadig på hva som er viktig i livet. Håkon, det har vært en ære å få dele både feiring og tøffe nøtter med deg og gratulerer, vi klarte det!

My first encounter with systems theory has felt like meeting an old friend that I very much hope to stay in touch with and learn more about; it's like I forgot how much I liked you through my years studying all these reductionist fields. I have been overwhelmed and had epiphanies - dear systems, please stay in touch.

And frankly, I do not think I could have done this without myself: Thank you, Maren, for not giving up, it was a great fight.

I end this by quoting Beer (1985); "This FOREWORD is over - so: FORWARD…"

Trondheim, 10th June 2018

Maren Berge Vik

Abstract

Purpose: The purpose of this thesis is to identify what hindrances to systemic viability that exist in a Norwegian hospital.

Background: Norwegian hospitals experience a substantial increase in the number of patients, the complexity in diagnoses, and chronic health problems due to an ageing population, lifestyle-induced diseases, and longer life expectancy. However, resources are not correspondingly inexhaustible, which creates a gap between demand and the resources needed to fulfil it. This again call for efficiency improvements. However, research shows that there exist little knowledge about why Norwegian hospitals are performing differently and seeing a slower increase in productiveness than could be expected and that is required.

Approach: As the Norwegian hospitals are highly affected by its environment, in addition to being complex and in need of a holistic approach to management, the theoretical foundation for this thesis is systems theory. Furthermore, the Viable System Model (VSM) is applied to answer the problem statement. The empirical foundation for the thesis is a case study of the Department of Orthopaedic Surgery at St. Olav's Hospital in Trondheim; one of the largest hospitals in Norway. The VSM is applied to create a diagnosis of the case department, which in turn points to hindrances to systemic viability.

Findings: The VSM diagnosis revealed six main hindrances for systemic viability in the department. First, interdisciplinary management functions are not clearly defined in some of the units and the border between operations and management is not clear. Second, the systems for obtaining knowledge about the environment (i.e. future activity load) are weak. Third, the VSM reveals an unsteady information flow across the department and the fourth finding is that the department's co-ordination function is not fully implemented and supported. The fifth finding claim that there are few and unstable interdisciplinary meeting points in the department. Finally, the diagnosis points to the need for systemic thinking because it serves as a prerequisite for viability. In addition, the two Fast Track pathways are described as guiding stars for implementing the VSM principles into the organization.

Conclusion: I believe that the VSM diagnosis serves as a good starting point for addressing hindrances to systemic viability. Additionally, the thesis contributes to the current debate about management in Norwegian hospital as well as the need for knowledge about and tools to help increase efficiency and effectiveness to meet the increasing need for the hospitals' services.

Sammendrag

Formål: Formålet med oppgaven er å identifisere hvilke hindringer for systemisk levedyktighet som finnes i et norsk sykehus.

Bakgrunn: Norske sykehus opplever en betydelig økning i antall pasienter, samt kompleksitet i diagnoser, kroniske helseproblemer knyttet til en aldrende befolkning, livsstilssykdommer og økt forventet levealder. Ressursene øker derimot ikke i samme takt, og dette skaper ubalanse mellom etterspørselen og de ressurser som må til for å møte den. Dette skaper behov for effektivisering. Forskning viser likevel at det ikke finnes tilstrekkelig med kunnskap om hvorfor det er store forskjeller i hvor effektive norske sykehus er og hvorfor man ser en mindre produktivitetsvekst enn man skulle forvente, og har behov for.

Metode: Norske sykehus er i stor grad påvirket av sine omgivelser, de er komplekse organisasjoner, og man ser et økt behov for en helhetlig tilnærming til ledelse. På grunn av dette, er det systemteori som er det teoretiske grunnlaget for denne studien. Videre er «The Viable System Model» (VSM) anvendt som et rammeverk for å besvare problemstillingen. Det empiriske grunnlaget for oppgaven er innsamlet ved ortopedisk avdeling ved St. Olavs hospital, et av Norges største sykehus, gjennom en case-studie. VSM er anvendt for å diagnostisere case avdelingen.

Funn: VSM diagnosen pekte på seks hindringer for systemisk levedyktighet i avdelingen. For det første, så har ikke avdelingen klart definerte tverrfaglige ledelsesfunksjoner i flere seksjoner, og skillet mellom drift og ledelse er ikke klart. For det andre så er systemene for å skaffe seg kunnskap om omgivelsene (fremtidig aktivitet) svake. For det tredje så avslører VSM en ujevn informasjonsflyt gjennom avdelingen og det fjerde funnet er at koordineringsfunksjonen ikke er fullt ut implementert og understøttet. Det femte funnet handler om at det finnes få og ustabile tverrfaglige møtepunkter i avdelingen. Til slutt peker diagnosen på behovet for systemisk tenkning fordi det er en forutsetning for levedyktighet. I tillegg blir de to Fast Track-løpene trukket frem som potensielle ledestjerner i implementeringen av prinsipper fra VSM i organisasjonen.

Konklusjon: Diagnosen, som er laget ved hjelp av VSM, fungerer som et godt utgangspunkt for å adressere hindringer for systemisk levedyktighet i avdelingen. I tillegg bidrar funnene til diskusjonen om ledelse i norske sykehus, likedan til behovet for kunnskap om hva som påvirker effektivitet i en tid hvor behovet for sykehusenes tilbud stadig øker.

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1 Introduction

Norway has seen a substantial increase in the number of patients, the complexity in diagnosis, and chronic health problems due to an ageing population, lifestyle-induced diseases, and longer life expectancy (Andersen, 2015; Grund, 2007). However, the resources are not correspondingly inexhaustible, and this is a central topic in Norwegian health policy. The Norwegian newspaper VG wrote 5th December 2016 about cuts in financial resources for the hospitals and 7th February 2017 they published a study that described both losses in resources and Norwegian hospitals being unable to meet their budgets. The Norwegian Minister of Health, Bent Høie, also pointed to these issues in his annual Hospital Speech on 10th January 2017 (my translation):

> *"*The population is growing, we are getting older, and the number of possible treatments is growing. That is good, but it also means that the gap between opportunities and resources is growing.*"*

Implied in this statement is that the Norwegian hospitals will have to treat more patients with less human and economic resources. If the challenges are not met with a sufficient willingness and the capability to develop new solutions, then ironically we will see so-called progress actually threaten the Norwegian Welfare State as we know it (Ministry of Health and Care Services, 2009). This calls for efficiency improvements. Efficiency improvements require any organization to adapt internal capabilities to the external demands. In the case of the Norwegian hospital, the hospital's resource utilization and operation must be aligned with the number of care-needing patients and available monetary governmental resources and available personnel.

However, Jon Magnussen, Director of Research at SINTEF Unimed in 2001, claimed in Aftenposten 25th October 2001 that historically Norwegian hospitals have not been able to create the production growth, as one should expect. He argues that this is partly due to the hospitals being large and difficult to handle; they are complex organizations. There are great differences in how productive Norway's hospitals are, but there exists little knowledge explaining these differences and what hinders an increase in productivity (The Office of the Auditor General, 2013). Complexity might help explain this lack of knowledge.

The late, highly renowned management consultant, author and educator Peter Drucker (2006) described the hospital as "altogether the most complex human organization ever devised" (p.54). The renowned organizational researcher Henry Mintzberg (1997) declared the following:

> *"*What is amazing today is not just that hospitals get managed at all but that anyone is willing to do so. Running even the most complicated corporation must sometimes seem like child's play compared to trying to manage almost any hospital.*"* (p.23)

It is demanding to grasp the complexity of a Norwegian hospital. Twenty-seven different health professions are represented in a hospital (Høie, 2015), with doctors and nurses representing just *one* aspect of it. Every hospital has clinics for the numerous medical

categories, representing numerous unique patients and diagnoses. Additionally, non-medical occupations form an integral part of the hospital organization, e.g. information scientists and economists. On top of this, there are other stakeholders involved and affected, for example, politicians, patients and citizens, each making inputs and offering criticism, described by the media, creating a complex environment influencing the organization every day. To top it off, substantial parts of their activity, emergency patients, are next to impossible to predict and hence plan.

The structure of the hospitals, the professions' diversity, and the fundamental need for communication and coordination, all point to a rather unique organizational complexity rarely found elsewhere (Høie, 2015). Chapman (2002) also claims that communication technologies and thus more frequent interaction between organizations and agencies increase the complexity of the health services. Additionally, he argues that organizations now involved in delivering public services are becoming more diverse and diversity further increases complexity.

However, complexity as an issue is not the sole reserve of management. Complexity strongly affects the patients' experience and if not handled in a suitable manner can create hardship and frustration for patients. In a report issued by the Ministry of Health and Care Services (2008) a cancer patient is quoted commenting on his expectations and experiences with his hospital stay (my translation):

> "I thought it would be like a package tour where everything was planned and prepared for me, but it became more like a backpacker trip, where I had to take care of and be responsible for everything myself!" (p. 9)

This experience indicates a lack of internal co-ordination and it is one of very many such incidents. Insufficient interaction and co-ordination in and between different parts of the health service frequently present itself as the greatest challenge that the Norwegian health and care service are trying to cope with. This problem particularly affects patient groups in need of coordinated services, e.g. patients with composite diseases and elderly people experiencing complex sufferings that requires the attention of several specialists (Ministry of Health and Care Services, 2009). Tools are desperately needed to cope with poor co-ordination and related organization problems, especially with the inevitability of more stringent economical demands and fewer resources. More holistic thinking in the Norwegian hospitals offers a start.

Chapman's (2002) *System Failure: Why Governments Must learn to Think Differently* argues that the British National Health Service needs to focus less on reducing complex problems into separate so-called manageable components because the challenges faced today span many of these 'components'. The complexity of the health service makes it hard to predict how the system will react to policy interventions. Mazzocato, Savage, Brommels, Aronsson, and Thor (2010) support the recognition that hospitals need a holistic approach to management and organization. Studying organizational improvement initiatives, they found that the foci of many activities/projects were too narrow with limited organizational reach and that healthcare organizations must work across traditional functional divides in order to pursue value creation for patients.

In the Norwegian medical newspaper, *Dagens Medisin,* 13th October 2011, Lars Erik Kjekshus, associate university professor at the Institute of Health and Society, UiO, claimed that a holistic evaluation of a hospital's efficiency is needed to ensure that efficiency is not created one place and bottlenecks appearing somewhere else. He further claims that this is why improving efficiency in larger hospitals, can be difficult.

Up until now, these and other critiques surface three main considerations that should be borne in mind during studies of a hospital. First, the organizational complexity and second, the need for a holistic approach to management and change in the organization. Third, that the Norwegian hospital is both highly influenced and, to a considerable extent, controlled by the 'environment' (social, economic, political etc.). These three considerations are indeed core issues addressed by systems theory and this is why systems theory is drawn upon in this thesis to tackle issues in the Norwegian hospital. Let me explain this further.

Systems theory provides a framework for dealing with complexity (Flood & Carson, 1988). The first consideration 'complexity', according to Beer (1979), is a concept central to any management function. Beer argued that the changes in the world are occurring faster, and things are becoming more interconnected through globalization and enabling technology. In 2018, Beer's vision of growing complexity has become an everyday reality. Beer also saw that management is 'complexifying' at every level (making things more complex throughout organizations!) with ever-growing interference in affairs as an attempt to handle ever-growing complexity. Complexity has been so complexified that organizations are unmanageable using the traditional managerial tools. Indeed, traditional tools themselves contribute to complexification. According to Senge (1990), systems thinking actually has its greatest benefit in situations that are highly complex, because it enables us to see complexity, rather than looking through it. With traditional management tools, we find a reductionist approach to management and problem-solving.

This brings us to the second consideration, the need for a holistic approach. Systems thinking in many ways is a response and critique of reductionism and its way of dealing with the 'real world' (Flood, 2010). The tools that systems thinking offers, help to destroy the illusion that the world is created of separate, unrelated forces (Senge, 1990), the basis of reductionism. The original meaning of the word 'system', derived from the Greek *synhistanai,* is 'to place together', thus a systems understanding implies to put things into context, to establish the nature of their relationships (Capra, 1996). This is meaningful because internal co-ordination and cooperation, i.e. putting things together, was lacking, but very important for the cancer patient mentioned above and, consequently, it should be important to Norwegian hospitals.

In light of this, the problem statement for the thesis is:

Problem statement: *What hindrances to systemic viability exist in a Norwegian hospital?*

In this context, the need for *viability* might seem at odds with actual events; is it not the case that Norway will deliver hospitals no matter what? Isn't that viable? Espejo (2003) following Stafford Beer's original work defines *viable systems* in a manner that is different from the word's everyday sense: viable means, "those that are able to *maintain a separate existence.* Such systems have their own problem-solving capacity" (p. 4) and thus operate as an autonomous unit. Espejo further argues that such viable systems need both the ability to adapt to changes in routine events on a day-to-day basis, and to counter-intuitive events that are more challenging and require great effort. Espinosa and Walker (2011) use machines as an example of non-viable systems because "they don't repair themselves or run away when a room catches fire" (p. 28). 'Living systems', however, translate information from their surroundings and accordingly respond to them. This suggests that viability incorporates the ability to make autonomous decisions whereby the organization adapts and survives.

As already mentioned, there exists little knowledge explaining why Norwegian hospitals are not as productive as they should be. Looking more closely at systems theory, numerous models are offered that claim to help describe an organization, improve it, or both. However, one stands out in the context of the current study because it emphasizes the capability to absorb complexity and to take into account communication internally and with the so-called environment. The model is called the Viable System Model (VSM) and has its origin in organizational cybernetics (Beer, 1984). The VSM is a major part of the work of Stafford Beer and it addresses management functions that are necessary and sufficient for an organization to be able to survive (be viable) and the relations that need to exist between those functions to survive (be viable) (Achterbergh & Vriens, 2010). Beer specifies in the VSM what an organization must do in order to be viable. The VSM is a model and as such can be drawn on a page of A4, but it is better understood as principles for diagnosing organizational viability. Beer's work on the VSM focuses on the problem of dealing with complexity and so the interaction between organizations and environments, and organizations and their management are treated as especially important.

To tackle the problem statement I apply the VSM as a tool for diagnosis of the viability of a department in one of Norway's largest hospitals – The Department of Orthopaedic Surgery at St. Olav's Hospital. Through this qualitative case study, I surface several hindrances to viability in the department and thus create the basis for dialogue with the stakeholders with the aim of co-resolving those hindrances.

In the first part of the thesis that follows, I present a theoretical base by introducing both systems theory (Chapter 2) and the Viable System Model (Chapter 3) which combined give support to the rest of the thesis. This is followed in Chapter 4 by an account of the research methodology that I applied for gathering empirical data on which I based my subsequent diagnosis. Thereafter, a description of the case is given in Chapter 5, system diagnosis is presented in terms of an empirical analysis using the VSM in Chapter 6, and the system diagnosis is discussed in Chapter 7. I conclude my thesis in Chapter 8.

Part I
Theoretical fundamentals

2 Systems Theory

This chapter gives a brief overview of the development of systems, systems theory, and systems/systemic thinking. It provides a basis for describing the Viable System Model (VSM) in the next chapter as a part of systems theory. It is not my intention to present a detailed account of the history of systems theory, its many trends and directions, but to highlight the elements of systems theory that I consider of greatest importance to the remainder of this thesis. Systems theory is a huge topic that has been applied to many fields of study. The following short review concentrates on managerial applications of systems thinking that are directly relevant to this thesis.

2.1 What is a system

A definition of systems within organizational theory is requisite before moving further into the world of systems theory. O'Connor and McDermott (1997) use the human body as an analogy to define system, “a system is something that maintains its existence and functions as a whole through the interaction of its parts” (p. 2) and with that, they highlight the importance of internal relationships. They further differentiate a system from a *heap*, claiming that while a heap is just a collection of parts that is simply the sum of its parts, a system has interconnecting parts functioning as a whole. Along the same lines, Checkland (1981) states that a defining idea of a system is that it is something more than the sum of its parts

> *“*a *system* embodies the idea of a set of elements connected together which form a whole, this showing properties which are properties of the whole, rather than properties of its component parts*”* (p. 3).

Leonard and Beer (1994) add a final and important feature to the definition of a system, namely interaction with an environment so that a system is “an entity made up of interacting parts operating in relationship to an environment” (p. 4). Beer (1979) states that “both the nature and the purpose of a system are recognized by an observer within his perception of (sic) WHAT THE SYSTEM DOES” (p. 9). Beer thus emphasizes that it is what the observers perceive the system does that defines the system and gives it value. A system is not something that exists in the world but is something that exists in the mind of the beholder. This and related ideas are emphasized more generally throughout Checkland’s and others’ works (more on this later).

2.2 The idea

The traditional/conventional problem-solving method within management for many years was the reductionist method, which deals with elements in isolation and might attempt to combine them one by one. The reductionist method has proven to be a valuable method when problems are well defined, and where the goals are clear, but fewer and fewer of the challenges we see today are of that nature. Modern-day problems tend to be composite and complex (Leonard & Beer, 1994). Checkland (1981) put it another way, that it is hard to apply reductionism to real-world challenges that do not occur well defined inside a laboratory. In

this Checkland refers to the traditional reductionist scientific method. Senge (1990) explains that from an early age we are taught to break problems apart and to fragment the world in line with the traditional scientific method. This might make complex challenges look more manageable, but we lose the ability to see the wider consequences of our actions and interventions.

Systems thinking is in many ways a response to and critique of reductionism and its way of dealing with real-world problems. The critique fronted by von Bertalanffy (1968) and coworkers emerged in the early twentieth century in studies of living things that cannot be understood solely in terms of their parts. Von Bertalanffy (1968) described *system theory* as a broad view exceeding technological problems, serving as a mindset crucial for science in general and that it is needed in disciplines from physics and biology to the behavioral and social sciences and to philosophy. While von Bertalanffy's realist view of the world has lost favor, i.e. real systems in the world, the basic principles that he advocated have not. Mele, Pels, and Polese (2010) exemplify this by saying that:

> "Within management and marketing authors and scholars have adopted a vision of organizations as systems with the aim of analyzing the relationship between organizations and their environment" (p. 126).

Another systems pioneer, Emery (1969), states that one must consider all living systems as open-systems, whether considering individuals or larger populations. By 'open systems', Emery understands "open to matter-energy exchanges with an environment" (p. 8). This applies to human organizations and requires us to study highly complex environmental interactions. To be able to treat systems as open systems requires a characterization of their environments. An example of an open system could be a hospital, dealing with numerous stakeholders and providers in the environment, like patients, taxpayers and media, which directly and mutually affect each other. Leonard & Beer (1994) explain that it is these exchanges with the environment that enables the continued existence of the system. They call the processes regulating these exchanges *homeostasis* and provide a fitting example:

> "Individuals maintain constant levels of body temperature (thermostasis, hence thermostat), blood sugar, alkali reserve, and so on. Communities and organizations seek population growth to maintain numbers, positive cash flow to maintain purchasing power, and trade to exchange their goods for those they cannot or do not wish to make. If one of these variables goes out of its safe range and does not return the health and probably the survival of the system is at risk" (p.6).

Further, Gibson (1996) and Tomkins (1953) (as cited by Emery, 1969) argue that all living systems learn and adapt because they are able to react to their general environment, not because they are sensitive to concrete events. Emery, therefore, argues that the primary duty of management is to control the boundary conditions surrounding the system, the exchanges that enable the system to survive and grow. Mele et al. (2010) additionally argue that the decision maker modifies the borders between the system and the environment by studying the structure of both the system itself and the environment. This enables a system to survive and adapt.

The tools that systems thinking provides, overcome the illusion that the world is created of separate, unrelated forces (Senge, 1990). According to O'Connor and McDermott (1997), systems thinking requires looking beyond isolated and independent incidents, recognizing the connections between them, and being able to understand and influence them. Adapting a systems approach is about emphasizing 'the big picture' and considering both the system's context and the function of the system based on relations of parts with one another (Senge, 1990; Leonard & Beer, 1994). Capra (1996) argues,

> "Ultimately ... there are no parts at all. What we call a part is merely a pattern in an inseparable web of relationships. The shift from the parts to the whole can also be seen as a shift from objects to relationships" (p. 37).

By this, Capra describes moving from a reductionist mindset toward a mindset that attaches primary importance to relationships.

Flood (2010) along with other systems researchers of the time (notably C. West Churchman, P. B. Checkland, R. Fuenmayor, M. C. Jackson, W. Ulrich) adopt the systems idea but reject the realist conclusion that systems exist as independent entities in a real world. Flood states that systems thinking is a tentative conclusion that the world is inherently systemic given that systemic ideas resonate strongly with the human experience. Understanding of phenomena becomes especially meaningful when they are understood to be an emergent property of an interrelated whole". Flood further states that "with systems thinking ... it is argued that valid knowledge and meaningful understanding comes from building up whole pictures of phenomena, not by breaking them into parts." (Flood, 2010, p. 270). This process necessarily should include all things, including people, involved and affected by issues under discussion (Ulrich, 1994).

In summary, many definitions and descriptions of systems thinking are made as confrontations against the drawbacks in the method of reductionism. Most agree that systems thinking is a response to the familiar and well-known habit of isolating problems and attempting to solve them independently, disregarding their connections and how they influence each other. However, systems theory is more than a critique. It is a theoretical perspective that enables us to analyze, for example, an organization holistically by focusing on how and why parts might be considered to interact. Systems thinking is a multi-disciplinary approach that can enable us to increase the abstraction level and by this cope with very complex, high-variety interactive problems, and makes its largest contribution when the issues are undefined, chaotic, and there is no proposed solution (Chapman, 2002; Leonard & Beer, 1994). It is crucial to include involved and affect things/people in the process of dealing with problems.

2.3 Defining the system, its boundaries and its environment

Nowadays, most systems approaches accept that ‘a system’ is a creation defined by an observer(s), influenced by the purpose of analyzing or looking at a given complex situation. Some researchers state that a system only exists when an observer has specified its purpose and its boundaries (Beer, 1979; Leonard & Beer, 1994). Different observers might not agree on what is usefully considered the system, its boundaries and its purpose. While the systems approach is concerned with interconnectedness, boundaries and purpose are considered particularly important. Defining boundaries and purpose highlight different perspectives of stakeholders that come into play in dealing with complex situations. In organizational problem solving, the function/part of the organization an ‘observer’ is from will influence how they ‘see’ the system, its boundaries and purpose. For example, I found that a nurse have a different opinion on certain issues than a doctor, who in turn has a different opinion than employees from finance or logistics, and so on.

It is vitally important to be aware of this because a change considered preferable by stakeholders from one part of the organization might contradict preferences expressed elsewhere in the organization, and indeed might not be considered in the best interests of ‘the whole system’ by other stakeholders. So, to be systemic, any systems approach to organizational problem solving must ‘sweep in’ the viewpoints of all stakeholders (Churchman, 1968) and be carried out in a dialogical process where all viewpoints are valued and considered. Further, it must be fair in giving all stakeholders an equal opportunity to contribute and influence the outcomes and should not be subject to processes of power that predefine meaning and boundaries (Flood & Romm, 2018).

2.4 Systemic principles that underpin the current research

Systemic thinking, to be true to its principles, must continuously develop and evolve through discussion and dialogue. In many ways, it evolves through a process of reflection and constructive criticism. Flood and Jackson (1991b) describe how continual reflection on the systems idea generated development in systems thinking. They describe the development as three-phased, starting with “hard systems” and a positivist, objectivist, and quantitative approach. Next came a critique and realization of limitations to these so-called “hard systems”; and through this a more qualitative, interpretivist, constructionist “soft systems” thinking emerged. Hitherto, a third paradigm “critical systems thinking” emerged in partial agreement with the critique of “hard systems” thinking, but critical systems thinking reflected more fully upon the circumstances in which hard and soft approaches can properly be employed. “Critical systems thinking recognizes that hard and soft approaches are subject to various processes of power and that power can undermine dialogical processes leaving monologue and outcomes determined by where power is held in the system” (p.1). This is not systemic. Unfortunately, there is insufficient space in this thesis to elaborate further upon this fascinating evolution of the systems idea. However, we can use the ideas introduced above to establish fundamentals for this thesis.

In this regard, Flood (2010) makes a clear distinction between *systems thinking* and *systemic thinking*. These different concepts are closely related respectively to the ontological and epistemological positions of objectivism and constructionism. The term systems thinking,

according to Flood, is tied up in the history of objectivism and the belief that social systems are real entities that exist in a real world. Employing a systems approach based on objectivism involves modelling real social systems and using models to describe, explain and predict events in the real world. Models typically are not outcomes of dialogical processes and in this respect are not systemic. The term systemic thinking, on the other hand, better reflects the fundamentals of constructionism. This view accepts that what is understood to be 'true' about social phenomena is socially constructed and comes from people's interpretations of events. Typically, there are many different interpretations. Therefore, there are no real systems, just systemic interpretations. To be systemic requires embracing all of these interpretations. This does not preclude the use of models, of course.

With systemic thinking, then, it is argued that valid knowledge and meaningful understanding comes from building up whole pictures of phenomena, not by breaking them into parts. Further, being systemic is about building 'whole pictures of social phenomena' in a co-operative process carried out through dialogue between involved and affected stakeholders (where relevant, including wider issues such as environmental welfare) (Flood, 2010). For this to be feasible, building up whole pictures must seek to uncover processes of power that undermine dialogue and promote "anything but" understanding that is meaningful to all of the involved and affected stakeholders. In this thesis, I intend to remain as true as possible to the principles of systemic thinking as just described. I return to this discussion when I present my research methodology in Chapter 4.

3 The Viable System Model

The focus of the previous chapter was systems theory. It provides principles that can aid a holistic and interdisciplinary approach to organizing and operating in a complex system such as a hospital. Systems thinking offers numerous methods and tools to address organizational challenges and above all, to support problem-solving and decision-making. Leonard and Beer (1994, p. 16) mentions the following models as examples of developed and generalized systems approaches: *Interactive Planning, Hiring System Theory, Operations Research, Socio-Technical Systems, Soft Systems Methodology, System Dynamics, Total Quality Management,* and *the Viable Systems Model.*

Ergo, there are several choices. An ever-increasing number of patients and greater scarcity of available resources characterize the future of Norwegian hospitals. Hence, there is a profound need to adapt to be able to meet the requirements and demands currently faced. This is the very foundation of Stafford Beer's VSM; viability requires the ability to adapt to the environment. Additionally, the VSM has numerous merits as a tool to diagnose, understand, and redesign organizations and their communication structures in addition to support change management (Espejo & Gill, 1997; Leonard & Beer, 1994) and is a recognized tool to visualize systemic practice. Therefore, the VSM offers a reasonable choice as a methodology that addresses issues arising from the problem statement for this thesis. This chapter introduces the VSM in the context of the problem statement.

Stafford Beer's VSM is introduced in *Brain of the Firm* (1972) and *Heart of the Enterprise* (1979). These volumes are full of detail and nuances concerning its cybernetic origin. In the last part of the trilogy *Diagnosing the system - for organisations* (1985), Beer gave an accessible review of the model, hence many researchers within management sciences lean on this description of the VSM together with other researchers' interpretations. However, part of the goal of this thesis is to be able to provide a tool for communication in organizations such as the hospital that I worked within. I am therefore faced with a choice of being highly loyal to the original details of the model, or to take a more pragmatic view of it in order to facilitate its use in field studies. I chose the latter because it offered the most promising way of generating useful insights for management of the hospital case, and indeed others who are not necessarily familiar with the theoretical framework.

3.1 The idea

Stafford Beer developed the VSM through his career within the steel industry (Leonard & Beer, 1994). He was under the impression that there was no such thing as an issue too complex to handle. The way to handle it, according to Beer, is to detect invariances and procedures that maintain a stable internal environment as the basis of a viable model. In building the VSM, Beer compared parts of industrial operations to parts of the human nervous system, which he thought of as an instance of an ideal viable system (Leonard, 2009). Many after him embraced the analogy of the body, which is a powerful way by which to understand the VSM. We find an example with O'Connor and McDermott (1997):

> "Your body is the perfect example. It consists of many different parts and organs, each acting separately yet all working together and each affecting the others. The eye cannot see, the legs cannot move without blood supply. The movement of the legs helps pump the blood back to the heart. The heartbeat - and digestion - are affected by your thoughts; the state of your digestion in turn affects your thoughts - especially after a large lunch." (p. XIII)

The VSM "encapsulates effective organizations" (Flood, 1999, p. 38) and can be used to manage organizations facing challenges related to their survival (Leonard & Beer, 1994). It is a tool both for diagnosing organizational problems and redesigning organizations. Put simply, diagnosing a system utilizing VSM principles entails building up a picture of the organization, depicting how it operates today, and through this reveal organizational issues by comparing the current state against the ideal VSM structure (Flood, 1995). The VSM provides information about shared communication spaces, interactions and organizational patterns, and by so doing is able to spotlight flaws and shortcomings. This enables a visualization of problems that constrain viability (Espejo, 2003; Espinosa & Walker, 2011; Hildbrand & Bodhanya, 2015).

One of the strengths of the VSM is its versatility. It has been applied in numerous organizations and systems[1], spanning from the 'ordinary' business, to bee colonies, to address systemic challenges in countries and governments (Espinosa & Walker, 2011). Furthermore, Schwaninger (2006) describes how more and more empirical research continues to support the applicability and utility of the VSM, without falsifying it. However, even though the VSM is highly versatile, applicable to any form of viable organization (Espejo, 2003), the most central area for application is "human activity organizations", meaning corporations, firms and governments (Herrera, Thomas, Belmokhtar, & Pannequin, 2011, p. 2). Herrera et al. (2011) further explain how this area of application has changed how we look at management, traditionally exercised through a hierarchical, top-down structure characterized by command and control.

The redistribution of decision-making power is an important principle in the VSM. The VSM is about addressing challenges faced in organizations by skirting hierarchical organizational charts and treating the functions themselves independently of who fulfils or executes them (Leonard, 2009). According to Flood (1999), Beer saw that hierarchical organizational charts

[1] There are many applications in industry that could not be documented publicly due to the sensitivity of the material in a commercial environment (R. L. Flood *in litt* 2018)

are used as a tool to apportion blame. Beer thus brings forward an important principle, supporting the redistribution of decision-making power, and giving sufficient autonomy in the units. In so doing this must support system cohesion otherwise, it breaks the principles of viability.

However, even though the VSM has proved to hold strong capabilities as a diagnostic tool, the model is also a shell for other models and tools that support for example task design and the "behavioral and social means to support them" (Leonard & Beer, 1994, p. 51). The VSM is a diverse tool that can be used along with other tools to address issues surfaced in a VSM diagnosis.

3.2 Principles and features

In this section, I will briefly present some important principles on which the VSM is built; Ashby's Law of Requisite Variety, complexity and autonomy. These are important to understand the features of the VSM that will be presented in section 3.3.

3.2.1 Ashby's Law of Requisite Variety

Ashby's Law of Requisite Variety explains how and why some organized systems maintain their stability over time (April & Shockley, 2007). Beer expresses the law as "only variety can absorb variety" (Ashby & Goldstein, 2011, p. 192), originally articulated as "only variety can *destroy* variety" (Ashby 1952 as cited in April & Shockley, 2007, p. 270). In short, this implies that a so-called 'controller' can control the outcomes of a situation with a desirable goal in mind, if the controller has the capacity to respond to external disturbances, that may otherwise prevent the achievement of this goal. If the controller succeeds, then the controller has *requisite variety* (Espejo, 2003).

Espejo (2003) gives the example of someone driving a car. The person's desired outcome is to keep the car on the road and the driver responds to the road's twists and turns by steering, altering the speed, braking etc. If the driver is able to keep the car on the road, the driver is said to have requisite variety. This law thus implies that to cope with variety, one has to match the variety of responses in the environment. Ashby was accordingly interested in the insight variety could give to "a system's capacity for regulation, i.e., its means for keeping itself intact in the face of disturbances" (Ashby & Goldstein 2011, p. 191). Espejo (2003) further argues that an organization's ability to deal with such a great amount of variety is due to its capacity of internal collaboration and to support coherent action in the organization's environment. The principles of the VSM are designed so that a system can have requisite variety.

3.2.2 Complexity

The challenge of dealing with complexity is a central topic within the VSM as it is for systemic thinking in general. Beer is concerned with complexity between organizations and their environments and between organizations and their 'managers'. Complexity is tightly linked

with viability because all organizations exist in environments that have greater complexity than the individual organization. According to Ashby's law of requisite variety, the key to controlling viability lies in the ability to respond to it (Achterbergh & Vriens, 2010).

3.2.3 Autonomy

Autonomy is a central principle in the VSM. Espejo and Gill (1997) show that the VSM can help to ensure "both functional decentralization and cohesion of the whole" (p. 5), which in other words means local autonomy. In any viable system, there is a trade-off between *cohesion* and *autonomy* where the challenge is to find an effective balance (Espejo, 2003). Living systems comprise sub-systems that are autonomous and have the ability of auto-organization and auto-regulation, which makes possible continued and independent existence (Herrera et al., 2011). This is tightly tied to the principle of recursion (which will be presented in section 3.3.4). Emery (1969) in fact states that a system can only reach viability (he calls it 'steady state') if it "allows to its human members a measure of autonomy and selective interdependence" (p. 11). He also proposes that individuals most effectively function like open-systems and that they need freedom to exercise choice.

3.3 The model

The model visualizes the main operations in any organization and further specifies the relationship between them and the management functions serving them (Flood, 1995). A viable system must have five management functions in place to have high operational effectiveness within its environment and maintain its identity (Beer, 1984; Espejo & Gill, 1997; Flood, 1995). The VSM connects these five management functions and the environment and organizes them according to a series of information flows (Flood, 1995). The five management functions are: Operations (System 1), Co-ordination (System 2), Control (S3), Audit and Resource Bargaining (System 3*), Intelligence (System 4), and Policy (System 5). Note that the management functions need not be a person(s) or a role, but are *functions* enabling communication and information flow (Leonard, 2009). Figure 3.1 represents the VSM. This depiction of the VSM utilizes Beer's terminology (e.g. S for system, S1 to S5) and Flood's (1995) use of management terms for S1 to S5

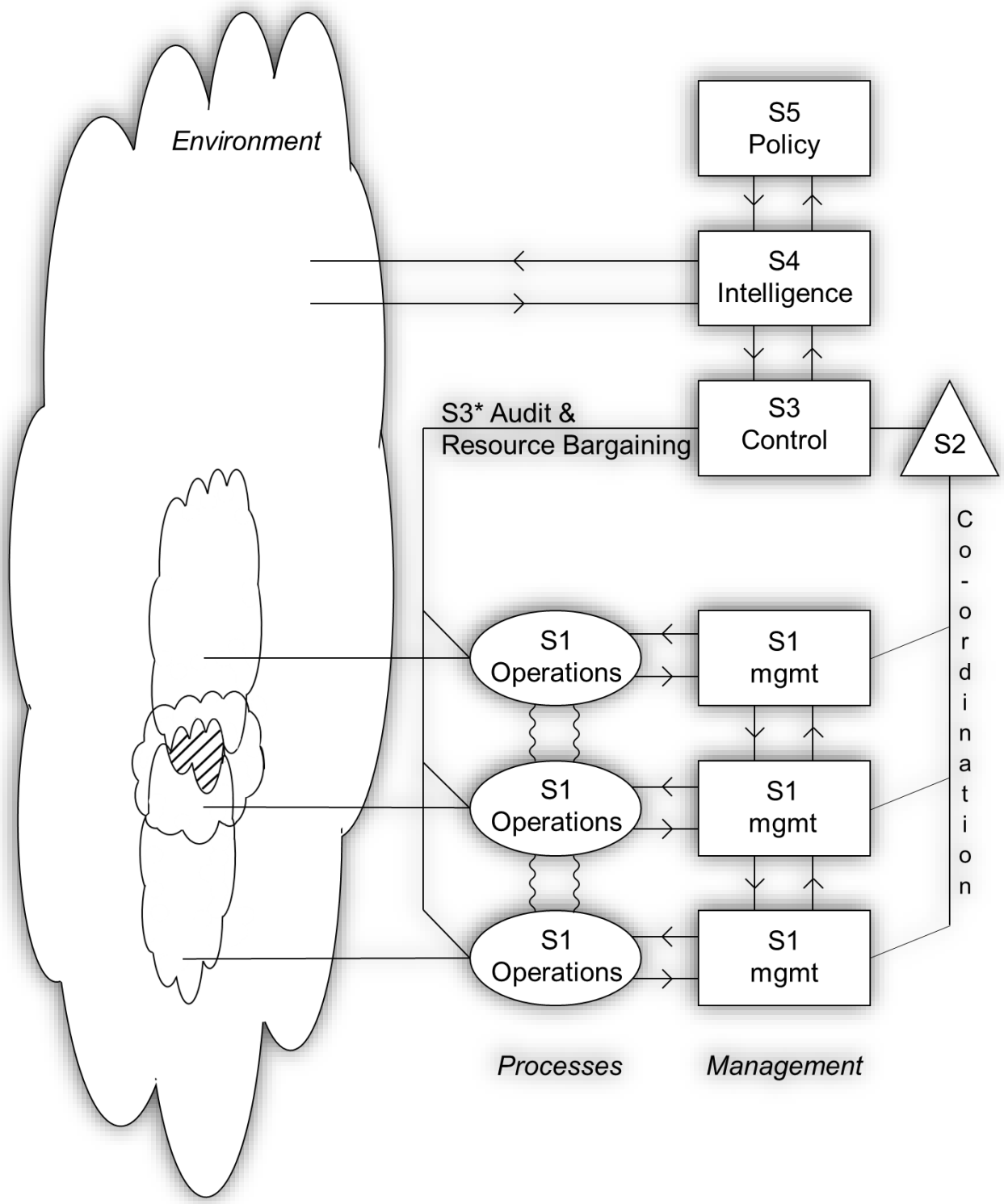

Figure 3.1: A depiction of the generic VSM

3.3.1 The five management functions

System 1: Operations

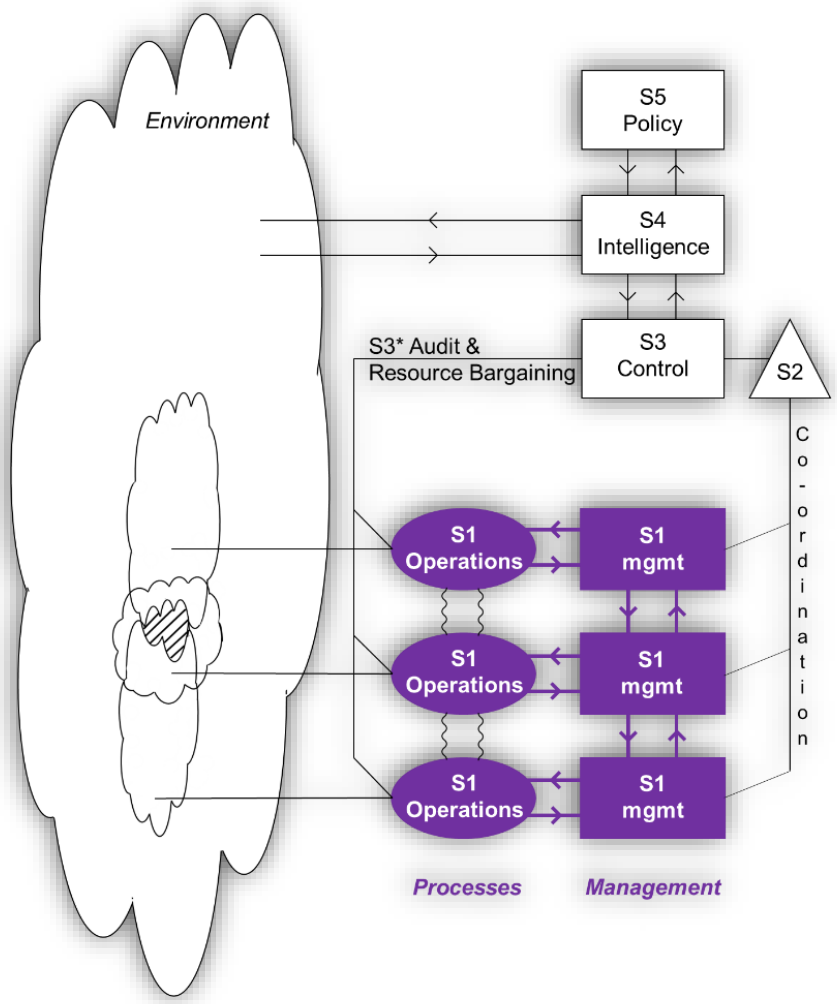

Figure 3.2: The VSM highlighting S1 or the operations

In chapter 2.1 I cited Beer (1979) who says that the "purpose of a System is (...) WHAT THE SYSTEM DOES" (p. 9). Beer (1985) further states, "what the system *does* is done by System One" (p. 128). Thus, System 1 (S1) is fulfilling the system's purpose (Espinosa & Walker, 2011). Flood (1995) thus notes that a viable system diagnosis "begins by asking 'What is the primary activity of the organization?" (p. 143), thus establishing what is S1. The circles in Figure 3.2 represent the processes, e.g. in a hospital, this could be the different clinics; the cancer clinic, the children's clinic, the clinic of cardiology etc. The boxes indicate that each of these S1 processes requires management with expertise about the division's capacities and market requirements (Leonard & Beer, 1994); in the case of the example, managing the various clinics.

In other words, S1 represents the organization's core activities (not management or support activities, but value-creating activities), and S1 is what the organization exists to do (Flood, 1995). S1 operations have local autonomy only in as far as it does not compromise overall

coherence, and S1 operations each interact with their local environment (Hildbrand & Bodhanya, 2015). Thus, operations provide some kind of service to the external environment, e.g. customers (Leonard & Beer, 1994). Leonard and Beer also draw attention to S1 units needing to be able to operate as viable systems, hence the units should have enough autonomy to carry out day-to-day activities and make decisions about them in order to adapt quickly to the environment (Espinosa & Walker, 2011). This also refers to the principle of recursion (see Chapter 3.3.4).

When conducting a diagnosis it is necessary to identify the most effective way of representing S1 operations and this can be done in many ways. Representation criteria include geography, activity type, resources required, and clients served. It is important not to mix them within a recursion level, but criteria can differ between recursion levels (Flood, 1995; Leonard & Beer, 1994). The example given for S1 processes in a hospital, the different clinics, is an example of mapping S1 processes onto various *customer-groups*.

System 2: Co-ordination

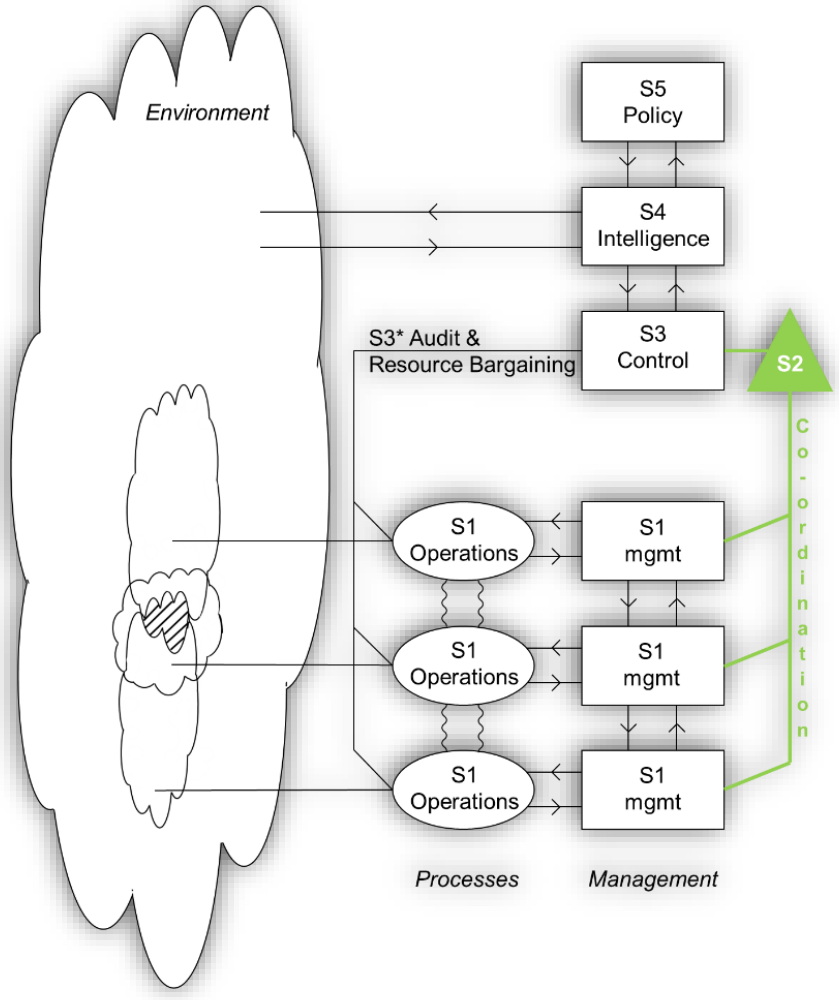

Figure 3.3: The VSM highlighting S2 or co-ordination

‘Autonomous’ S1 operations require co-ordination. System 2 (S2) is the co-ordination function and manages the short-term distribution of resources and conflict by giving procedures for the efficient utilization of available common resources (Flood, 1995). Therefore, S2 has the responsibility for co-ordination and harmonization between the different S1 units in the short term (Leonard & Beer, 1994). S2 receives information about the short-term challenges in S1 and applies given procedures to deal with them. A scheduling system or weekly status meeting discussing ward capacity in a hospital could be an example (Hildbrand & Bodhanya, 2015).

Espejo and Gill (1997) understand *co-ordination* as “co-ordination by mutual adjustment between support functions and between autonomous units” (p. 4) in order not to confuse the term with top-down direction and control. The stronger the co-ordination is between the S1 units, the greater chance there is for synergy and autonomy and the less need there is for management to intervene directly. Espejo and Gill also describe an IT system as a good example of an attractive means for co-ordination to avoid direct human meddling. This may not be feasible for all issues of co-ordination, however. S2 functions are not viable systems but a part of a viable system (Leonard, 2009).

System 3: Control

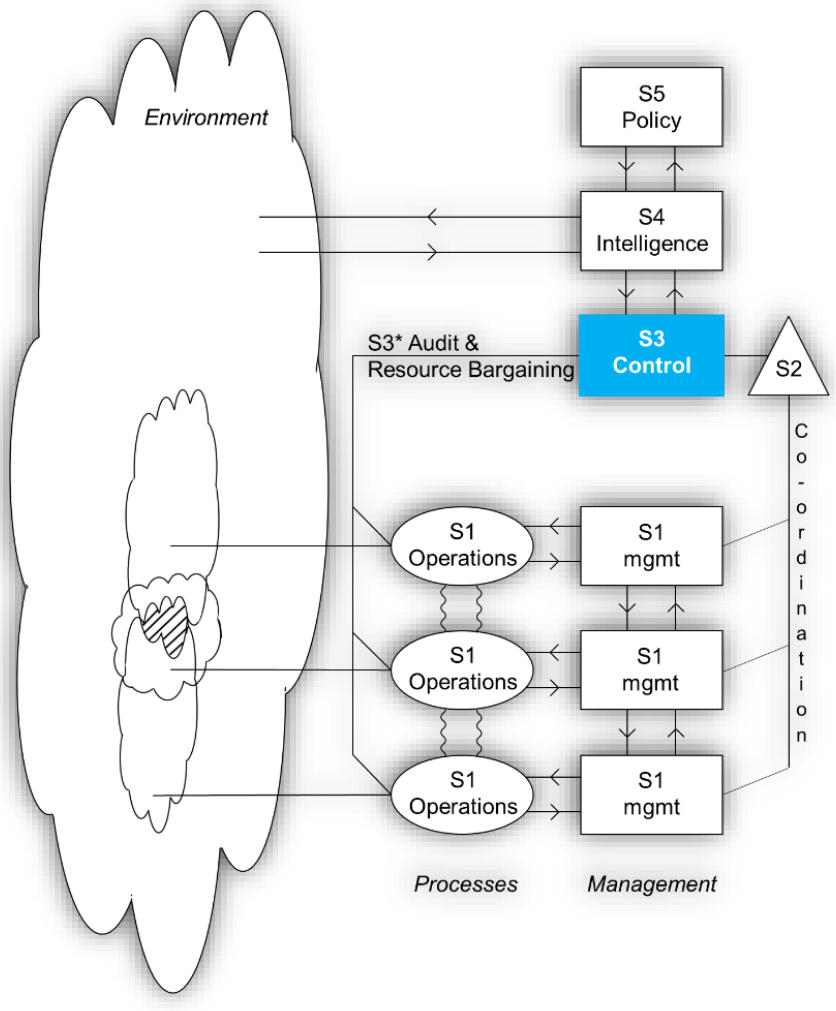

Figure 3.4: The VSM highlighting S3 or control

System 3 (S3), the Control function, focuses on longer-term issues than S2. Through System 3* (S3*), it handles resource bargaining and performs audits of the S1 divisions, as and when officially needed or arbitrarily required (Flood, 1995). Leonard (2009) argues that resource bargaining or S3* is needed to facilitate running of the organization in the best interest of the whole, and not solely according to the individual needs of S1 units.

Leonard exemplifies this in terms of resource allocation in the human body. When certain body parts need it, more blood will flow towards them. In the human body this generally happens seamlessly, however, this is not the case in most organizations. Different parts want the same resources and this proves the need for S3. An example could be bi-annual gatherings to evaluate and disperse ward capacity to different units in a hospital clinic. The idea is to plan and optimize activities across all S1 units so that the system benefits from synergies that arise when the units work as part of the whole (Espinosa & Walker, 2011).

System 3*: Audit and Resource Bargaining

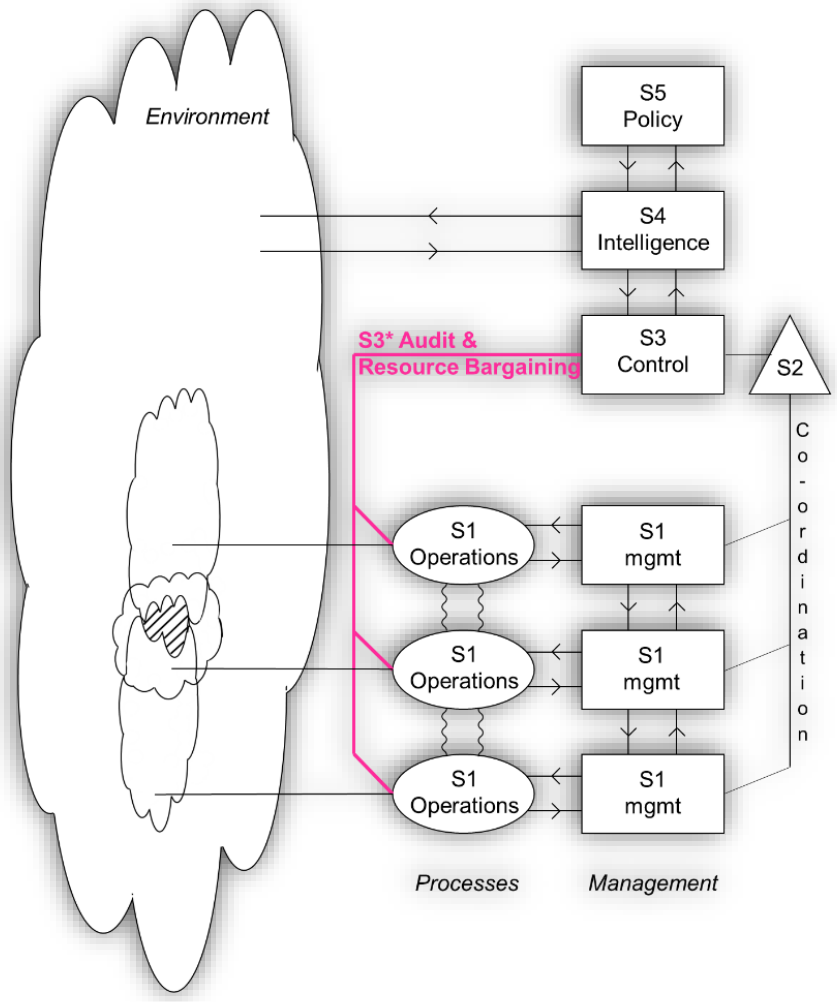

Figure 3.5: The VSM highlighting S3 or audit and resource bargaining*

System 3* (S3*) is the audit and resource bargaining function and exists as a support for S3 by accomplishing various audits and by monitoring crucial variables (Hildbrand & Bodhanya, 2015). The reason for S3*'s existence is S3's occasional need to look deeper into S1. S3* does this without directly intervening (Leonard, 2009). S3* provides information of what is actually going on in S1 because the information provided by S1 is general and could be inaccurate (Achterbergh & Vriens, 2010). With help from S3*, S3 can intervene "to reorient behaviors that may threaten organizational viability or sustainability" (Espinosa, 2015, p. 957). These audits can be budget reviews, IT audits, or indeed any form of audit relevant to the viability of the organization. When problems cannot be dealt with by S2, procedures related to S3* are activated (Flood, 1995). Monitoring the number of infections related to surgery can be an audit function providing S3 with important information about the activity in S1. This function can be performed by both internal and outside/external resources (Leonard & Beer, 1994).

System 4: Intelligence

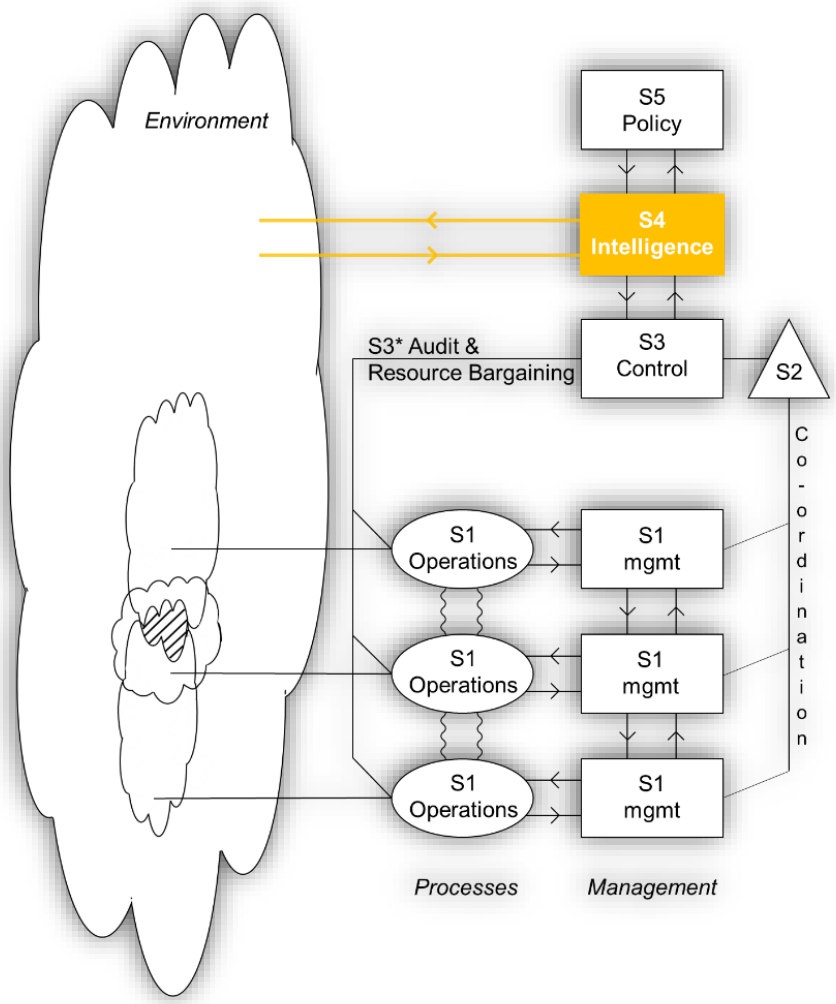

Figure 3.6: The VSM highlighting S4 or intelligence

System 4 (S4) is the Intelligence function and has the responsibility to look externally to figure out how the future might look, i.e. what threats and opportunities one might be facing. This could be a role of an R&D-department (Hildbrand & Bodhanya, 2015). S4 looks at the internal environment as well as the external environment, hence incorporating the system's own strengths and weaknesses and how these might relate to the future (Flood, 1995). S4 enables the organization to prepare for what is coming by seeking harmony between future needs and internal capacity. This requires interaction with S3 to get a realistic view of the current state of the operations. Information gained at this level must also be distributed throughout the organization. The capabilities of S4 provide the basis for decision in for instance recruitment and staff development (Leonard, 2009).

System 5: Policy

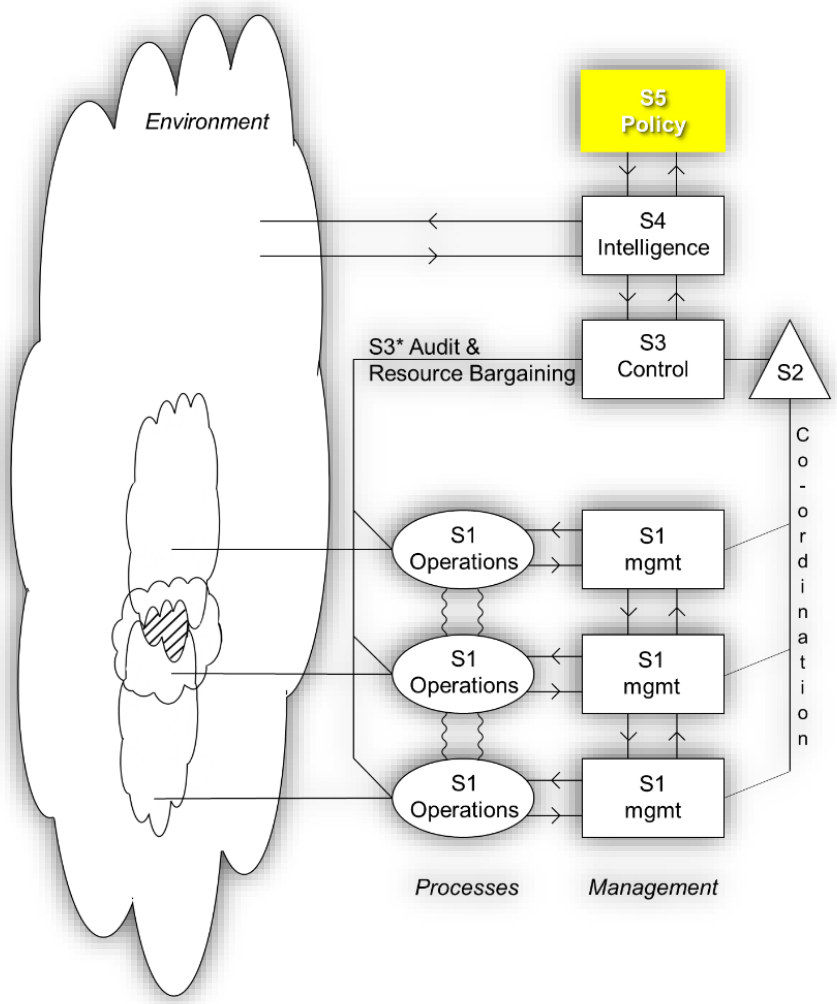

Figure 3.7: The VSM highlighting S5 or policy

System 5 (S5) is the policy function. It completes a view of the viable system model. This function is responsible for mission, goals, objectives, values and culture. Although higher-level management often performs parts of this function, all functions in the VSM contribute to S5 and hence it should not be viewed as a top-down activity. Nor is the VSM an organization

chart, for example, its meaning does not change when turned upside down. In fact, upside down helps to visualize S5 as the very foundation and enabler for the system (Flood, 1995; Hildbrand & Bodhanya, 2015). There should thus exist a strong connection between S5 and S1 so that the “ethos” established by S5 guides the autonomous units in S1. S5 also deals with the strategic decisions and modifies policies based on the relevant information reaching it - monitoring and adjusting the S1–S4 (Leonard, 2009). According to Beer (1985), “what the viable system *does* is *done* by System One. System Five, then, is ‘only’ thinking about it” (p. 128).

3.3.2 Information flows

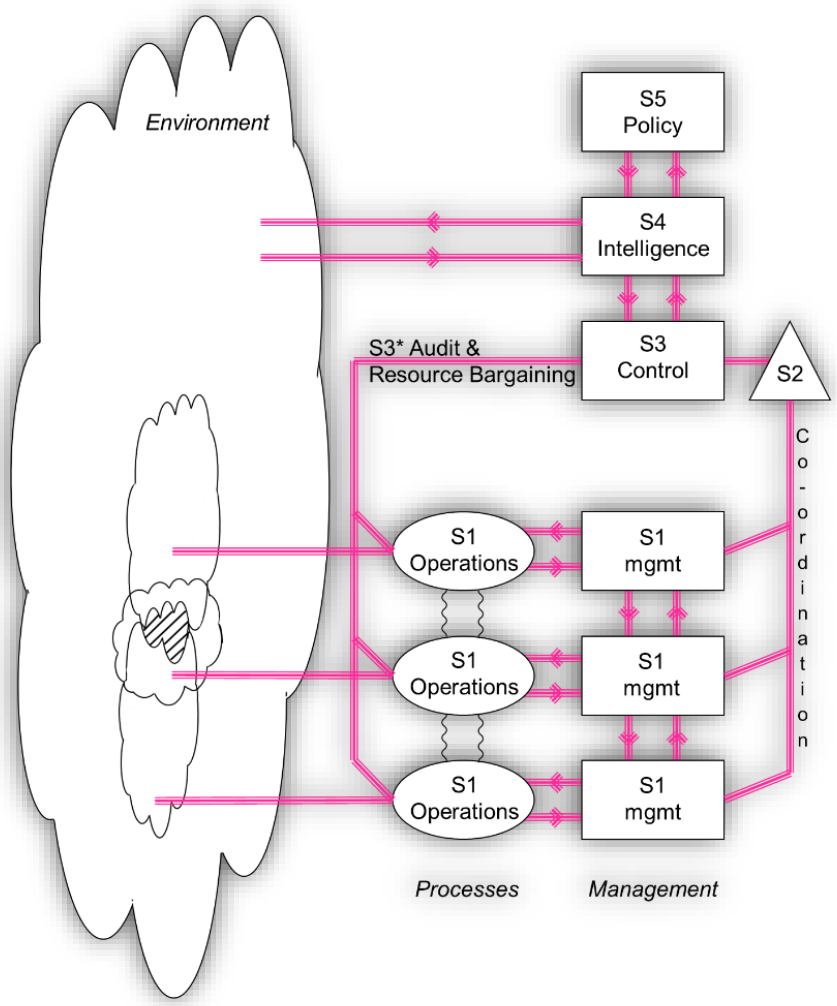

Figure 3.8: The VSM highlighting the information flows

In addition to the five management functions, the VSM also presents both vertical and horizontal communication channels or information flows. Among them are; lines of command and control, audit channels, vital information about problems in operations, and vital information about opportunities and threats (Flood, 1995; Leonard & Beer, 1994). The highlighted lines in Figure 3.8 represent these flows/channels. These information flows say a lot about the organization’s effectiveness. This is because diagnosing the organization and

summing it up in a VSM can create a powerful picture showing either that the information flows support viability, are weak, or missing completely; or worked out in manners that oppose the principles of viability (Flood, 1995). A VSM diagnosis often shows that management activity in S3 or S4 directly interferes with the daily operations of S1 and undermines viability. This is represented by a direct flow of information from S3 or S4 to some of or all of the S1 operations.

Creating well-functioning, organized and managed communication channels and information flows, and aligning the organization's development with its external environment, is crucial for an organization to be competitive (Mele et al., 2010).

The co-ordination channel, audit, and resource bargaining channel both pick up challenges and deviations in S1 and are the first ports of call to dampen oscillation/conflict and to connect S1s to other functions (Leonard & Beer, 1994). These channels ensure both vertical and horizontal interaction and enable local autonomy according to predetermined goals, while maintaining system cohesion by identifying problems that threaten system viability. These channels also ensure that future needs are communicated to the S1 operations and acquire important information from the environments.

Espejo and Gill (1997) emphasize the fact that the information flows/communication channels are two-way and should be constructed in a way that enables them to function as a filter for complexity.

In Figure 3.1 and 3.8 I intentionally left out the lines/information flows that some authors show between S3 and S1 (Espejo, 2003; Leonard & Beer, 1994; Preece, Shaw, & Hayashi, 2015). This is a conscious choice/preference that aims to avoid the mistake that direct interference between S3 and S1 may exist on a day-to-day basis. The necessary information and communication flows are taken care of through S2 and S3*, in that sequence.

3.3.3 The environment

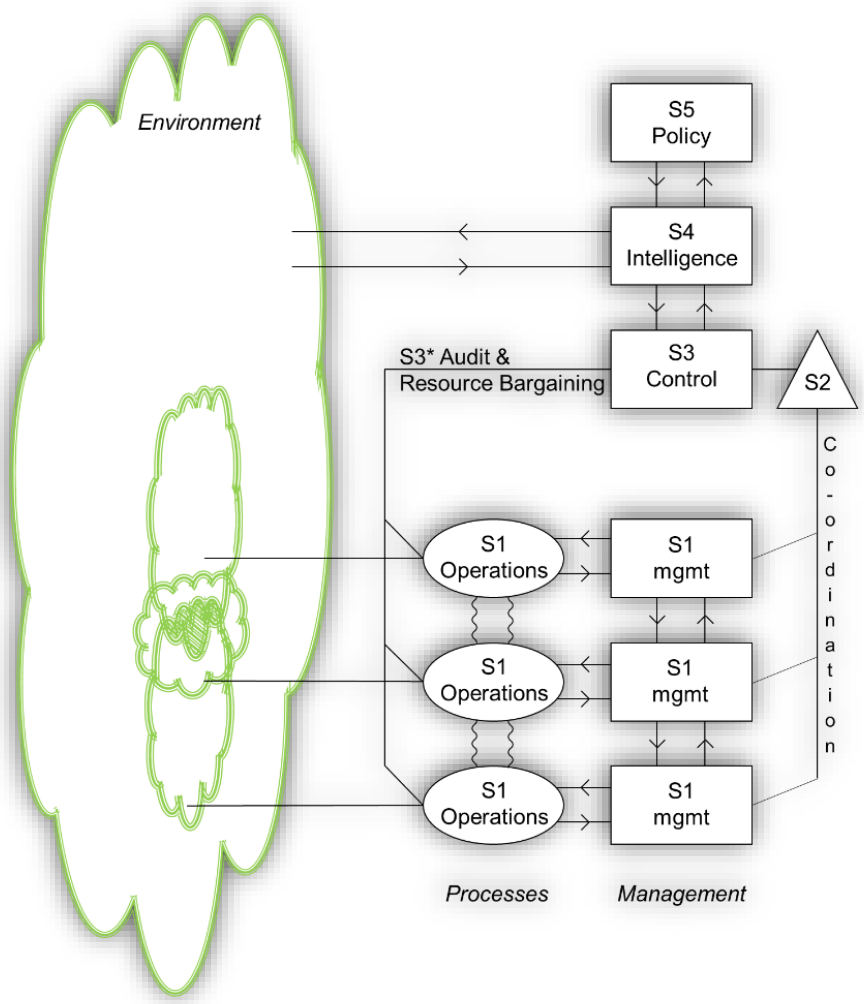

Figure 3.9: The VSM highlighting the environment

In Figure 3.9, the “amoeba” shapes to the left depict environment(s). This indicates that each S1 operation directly connects with a local environment, which could include a special supplier or customer. Local environments are encapsulated by the larger organizational environment, which also includes the future environment (Flood, 1995; Leonard & Beer, 1994). Espinosa and Walker (2011) explain the relationship between a viable system and its environment:

> “A viable system co-evolves with its environment: it adapts to it as this environment changes. It needs to be autonomous in order to be able to adapt quickly to changes in the local environment, but must also be able to keep a healthy relationship with the rest of the systems it contains and is contained within.” (p. 28)

Consequently, an organization must be able to respond to the variety in its environment. Beer (1995) (as cited in Ashby & Goldstein, 2011), compares this to a company’s ability to meet a customer’s needs and questions (variety) to avoid the customer leaving without doing

business. An example could be that after Norway introduced the patient's right to freely choose a hospital for treatment, every hospital must now, to a greater extent than before, meet patients' needs and questions to gain business (e.g. provide top cardiologic experts, accommodation for next of kin etc.). That is, a system/organization must respond to its environment to maintain viability. Thus understanding the environment is an important part of the diagnostic process employing the VSM.

3.3.4 Organizations as recursive systems

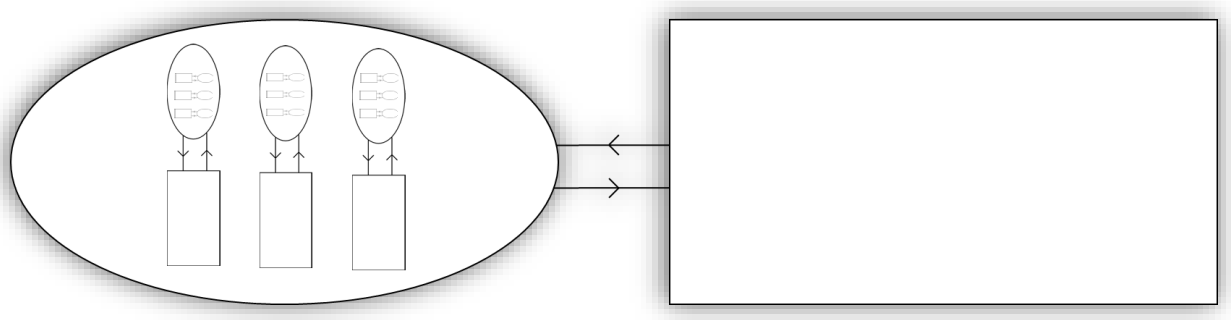

Figure 3.10: An S1 unit containing several S1 units

Figure 3.10 shows a little "cell" or a unit of a S1 unit: A process and a management function. The cell again contains many more of these. This is an attempt to depict the principle of recursion, which is central in the VSM. Beer (1979) describes the so-called 'Recursive System Theorem' the following way:

> "In a recursive organizational structure, any viable system contains, and is contained in, a viable system" (p. 118).

According to Espejo and Gill (1997) we have traditionally viewed organizations as hierarchical institutions with a top-down command structure, structured as pyramids. Espejo and Gill are of the opinion that this approach lacks speed and flexibility when facing the increasing complexity and rate of change we see in today's organizations. Beer (1984) also claims that merely hierarchical management models only are useful for appointing blame. According to Espejo (2003), the VSM however, is built on another principle, namely *recursion*. This implies that systems structured the same way will be recognizable within each other (like a Russian doll).

Said differently; it "produces viable systems within viable systems, at increasing levels of complexity" (Espejo & Reyes, 2011, p. 93). The different functions have local autonomy to work towards its environment, while still enabling a greater autonomous viable system (Espejo, 2003, p.11). As long as coherence is achieved of the overall system, this can provide complexity to be absorbed by the self-regulated recursive system and enable more flexible decision making at a local level (Espejo 2003; Hildbrand & Bodhanya 2015).

In the VSM, the principle of recursion is recognized through the repetition of all management functions and information flows in every viable system within the greater viable system, as shown in 3.10. Espejo (2003) claims that a recursive structure is a requirement in order to maintain viability in a complex organization due to people's limited capacity to and handle control variety. Leonard and Beer (1994) adds that VSM is a great tool to describe functions at different levels of recursion in an organization and thus compare them.

Hence, a VSM diagnosis can be done for several levels of recursion in an organization, but most viable systems will hold additional sub-systems to help cope with the complexity of what lies in their environments (Espejo & Gill, 1997). In theory, we could thus work with S1 units containing just a small team working on a single task. Leonard and Beer (1994) says that the principle of recursion lets us describe functions at different levels of recursion in an organization and thus compare them. Thus, different levels of recursion should not be described in the same VSM.

3.4 Critique of the VSM

Even though the VSM has empirically proven to be successful, the model is not free from criticism. Some of the main points of criticism are reviewed in this section.

First, Espejo and Gill (1997) recognize the "anything but soft" (p. 4) appearance of the VSM and Leonard and Beer (1994) recognize that the VSM "has been criticized for being too "hard" by some researchers (p. 52). It seems that the VSM gives the impression that its utility is in depicting absolute truth in a positivistic manner. It might give the illusion that a VSM depiction easily complies with everyone's understanding of the system of interest. That is why Flood (1995) argues that the VSM should not be considered as a "blue-print for organisation" (p. 140) and structure, but as a tool for thinking about the organization and surfacing issues for debate that demand attention.

Second, related to the previous criticism, the VSM is accused of failing to consider human factors and is not concerned about the individuals that make up an organization. Flood and Jackson (1991b) expressed concern with the transferability of the principles from biology to the world of social organization. This leads to a weak focus on individuals and social processes. In its own right the VSM misses important aspects of power, politics and culture (Flood & Jackson, 1991b). As previously noted, the VSM does not conflict with tools that do have these capabilities and the VSM is therefore often seen as better employed in combination with other approaches (Hildbrand & Bodhanya, 2014; Leonard & Beer, 1994).

Third, even though the diagnostic capabilities of the VSM have repeatedly been proven, it is often argued that the model does not hold the capacities to implement recommendations that arise through diagnosis. This can be mitigated by similar means to the previous criticism.

Hildbrand and Bodhanya (2014) argue that it is possible to use the VSM both for "good and evil" and that the model itself does not require or encourage involving stakeholders when diagnosing a system or an organization. Involving stakeholders in various ways when utilizing the VSM helps to ensure that the VSM is used according to Stafford Beer's original

intention (e.g. see *Designing Freedom,* Beer (1995)). Users who apply the VSM without this principle in mind risk producing a VSM depiction that reflects only the narrow perception of reality from the person/group undertaking re/design/diagnosis and this fails to achieve the systemic potential of the VSM. Conversely, Leonard and Beer (1994) are concerned that the VSM is viewed by some as too soft, exactly because of the constructivist's way of generating a diagnosis, and are concerned that the constructer have too much freedom when putting the functions and flows together, freedom to break the fundamental principles of the VSM.

Additionally, the measure of "variety" has been criticized as a poor perhaps rather vague measure, but Flood and Jackson in defense argue that it might be the only measure that makes sense when dealing with the viability of an organization.

All that said, it seems appropriate to give the final say to Stafford Beer (1985) via his parsimonious response to all criticisms of the VSM; "A model is neither true nor false: it is more or less useful" (p. 2).

Part II
Research methodology

4 Research methodology

In this chapter, I will describe the methodology used in this thesis. I will describe how systemic thinking and the VSM have aided the design of the study and what has been important to utilize the VSM as a diagnostic tool. In this Chapter I will explain why a qualitative research strategy and a single case study is chosen and I will also account for how I have ensured the quality of this study.

4.1 Research strategy

Through this chapter I will give the reader a deeper understanding of my choices in regards to research strategy for this thesis. According to (Bryman, 2016, p. 34), the research strategy reflects your choices between a qualitative or quantitative approach to research, it says something about the role of theory in your research in addition to epistemological and ontological considerations. How this thesis is put together with this in mind and how it is designed using the VSM is presented in this chapter.

One of the most obvious benefits of the VSM is that it makes the existing information flows, communication channels, procedures and functional structures visible for all to see. Espejo (2003) suggests that the VSM is a useful tool for observing systems and organizations. According to Flood (2010) *systemic* approaches enable the researcher to "construct meaning that resonates strongly with people's experiences within the systemic world" (p. 282) and a qualitative study permits exploration of the participants' perspectives and understanding of the world through their eyes (Bryman, 2016; Ezzy, 2002). Bryman (2016) claims that humans can "attribute meaning to events and to their environment" (p. 392-393), a condition best accounted for in a qualitative study. Furthermore, there was a need for an exploratory study that enabled me to delve fairly quickly into a field that was not overly theoretical. Additionally, Hildbrand and Bodhanya (2014), who have enjoyed hands-on experience applying the VSM as a diagnostic tool, claim that when conducting a VSM diagnosis, "qualitative research tools should always be consulted" (p. 2060): By their experience qualitative research methods were a prerequisite for using the VSM to develop an extensive picture of their case system.

4.1.1 Theory of Science

Inductive or deductive reasoning?

Even though I sought to generate new insights within a field with little previous research, I also sought to test the VSM in a rather *new* setting. This required a mix of inductive and deductive reasoning (Bryman, 2016). Inductive, because my research aimed to provide insight on hindrances to viability in a Norwegian hospital and this required data as a starting point; deductive, because the theory about systems and the VSM helped form both the design of the study and the analysis of the collected data. Hildbrand and Bodhanya (2015) argue for the need to use qualitative methods in an iterative way when working with the VSM; both to get the needed data to create a VSM depiction, but also using the VSM to let you know how to ask the right questions.

Ontological and epistemological considerations

According to Bryman (2016) ontology deals with whether social entities should be considered as real and absolute, existing independently of the actors/researchers, or if social entities are a result of how actors act and perceive phenomena. The former is known as the objectivism position and the latter the constructionism position. Epistemology, on the other hand, is concerned with what can be taken as "acceptable knowledge" (Bryman 2016, p. 24).

According to Vrasidas (2000), the main assumptions of an objectivist epistemology is that there is a world that exists "independently of the human brain and it is external to the knower" (p. 3) and there is only one understanding of any phenomenon that is correct. The VSM in this manner might be interpreted like a depiction of reality that is true, that the VSM merely recreates the real world.

However, as stated in the introduction to this thesis, the Norwegian hospital comprises numerous professions with different tasks and functions. This suggests just as many possible VSM visualizations. A constructionist approach is needed to develop these visualizations. This means that inputs from several stakeholders about their perception of reality is paramount.

According to Vrasidas (2000), constructionism treats knowledge as something co-constructed by people and is not independent of the learner. He claims that "reality is local and there are multiple realities" (p. 7), which supports this point: Complexity is expressed in several perceived realities and the VSM cannot be applied simply as an objectivistic tool. Vrasidas also puts forward that "meaning is a result of an interpretive process and it depends on the knower's experiences and understanding" (p. 7), thus treating social entities as something determined by the people within.

4.2 Case study

In light of the ontological discussion above, and in order to give a reasonable answer to the problem statement for this thesis, it seems that the most suitable approach is to bring forward *all* versions of reality held by stakeholders, validating it through stakeholders, using dialogue and qualitative studies to bring forward a 'truly' systemic VSM diagnosis. In this regard, Flood and Ulrich (1990) argue that the systemic view is misunderstood to "embrace all in its outlook" (p. 185), but that it is really about the ability to be critical and inquiring, opposed to just accepting one truth. The goal is hence to develop a picture that is as well informed as is possible (multiple perspectives). I explain how I designed my study in order to create an *as informed picture as possible*.

The choice for my research design is a case study and the choice was based on what has been presented so far on the methodology of this thesis. Leonard and Beer (1994) argue that if it is possible to reach an agreement about what the VSM should model, i.e. what is the system in focus and its boundaries, then the VSM is likely to be useful. This supports the idea of a bounded case such as a hospital. Stake (2005) argues that a "case study is not a methodological choice but a choice of what is to be studied" (p. 443), but that it is commonly used within qualitative research strategies. Stake further describes the different types of case

studies; *intrinsic case study* when the case itself is of interest, an *instrumental case study* for generalization purposes or for obtaining insight into a special topic, and *multiple case* where an instrumental case study is used on several cases. In this thesis, I seek to employ a case study to gain insights into existing hindrances in an organization. One can, therefore, view this case study as instrumental because the case itself is of secondary interest. The case in this thesis is a rather large department of one of Norway's largest hospitals and the hospital has gone through several reorganizations and change initiatives. This is typical for a Norwegian hospital and this makes it relevant in terms of the problem statement.

The process of creating the VSM diagnosis, thus conducting a case study utilizing the VSM, should involve the stakeholders (Hildbrand & Bodhanya, 2014). Stakeholders include all involved and affected persons (Ulrich, 1994). Consequently, an approach consisting of qualitative semi-structured interviews, observations of meetings and member-checks have been used in the search for hindrances to viability, which will be further described in Chapter 4.3 and 4.5. My goal was to validate the systemic portrayal of the VSM by bringing together *different realities* of the stakeholders. Guldbrandsen (2010) argues that the explanation behind these different perceptions is that people, with different goals and intentions, tend to emphasize different things, maybe without knowing it. Therefore, one can claim that organizations hold different realities. The only way to get to these was to design a study that enabled me to solicit views of people that look at things from different perspectives (nurses, doctors etc.). Vrasidas (2000) supports this approach when arguing that the person facilitating the VSM diagnosis as far as possible must consider all different interpretations and bring them together in a systemic manner.

My research is based on the design of Flood and Jackson (1991a, pp. 93-95) 'Viable System Diagnosis' (VSD); a description of how to use the VSM as a diagnostic tool. It is a method for "using the model to diagnose the faults of a proposed system design or an actual organization" (p. 93). Figure 4.1 summarizes the VSD and is the basis for designing my case study. The VSD is split into two steps; *system identification* and *system diagnosis*. In the figure, I have indicated what parts of my study were involved in the two phases. First, the system identification was addressed with initial interactions and meetings, and the system diagnosis was conducted through data collection (interviews and observations) and data analysis.

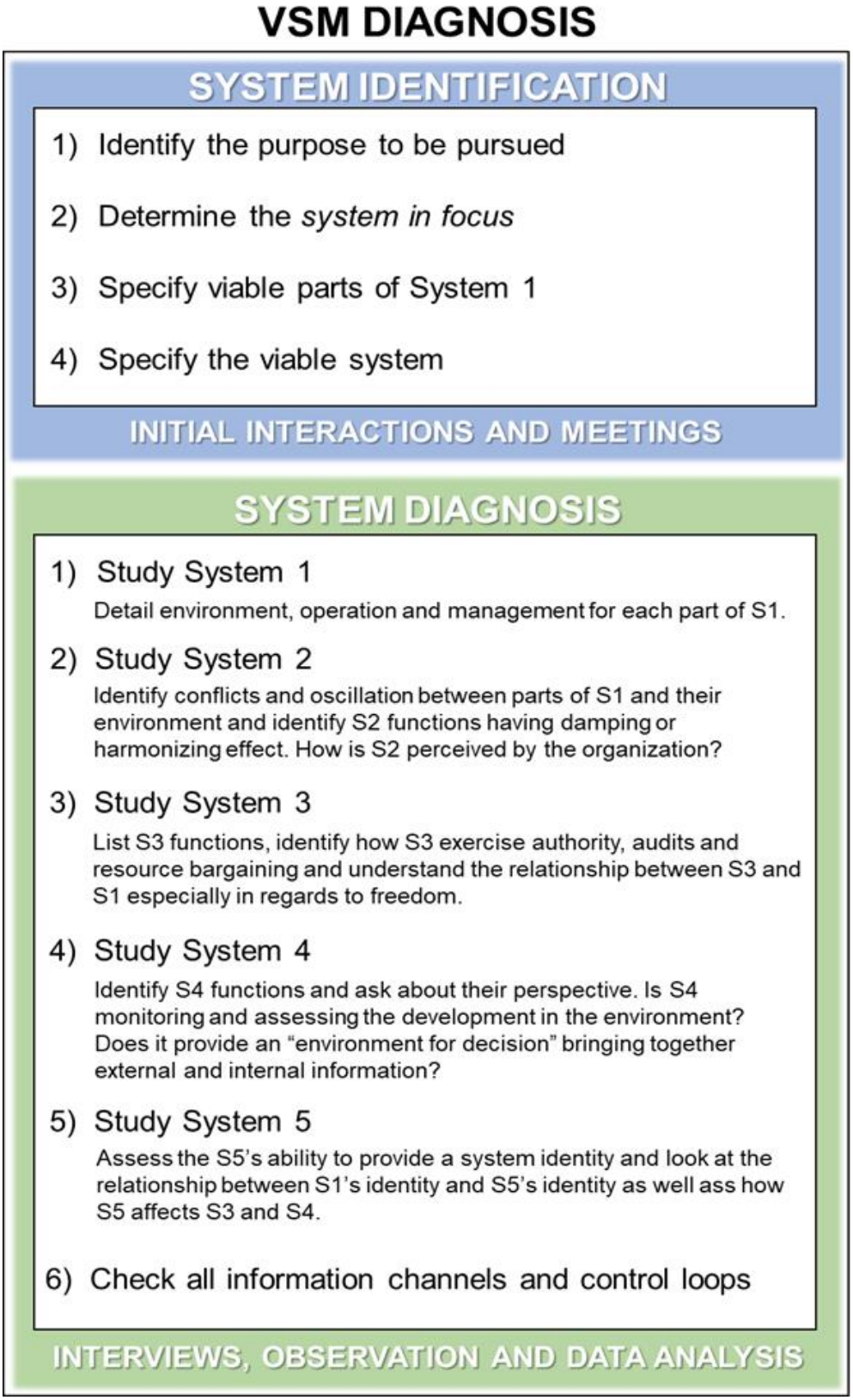

Figure 4.1: An overview of the VSD with the associated steps in my methodology[2]

[2] Based on Flood and Jackson (1991, p. 93-95)

4.3 Collection of data material

The data was collected between September 2017 and the spring of 2018, mainly during March and April. Data collection conducted during the fall of 2017 mainly consisted of meetings with different employees in the department as well as observation in meetings. In this section, I explain how, and with what methods, I have conducted my data collection for this study.

4.3.1 Observation

As the hospital as an organization was relatively unknown to me, I had to get to know the context and conditions specific to the hospital rather rapidly. This was especially important since I was conducting qualitative research (Tjora, 2009). The organization is characterized by 'foreign' words, technical terms, and knowledge that the organizational members take for granted, but were new to me. Learning about these things was important so that I could ask reasonable questions, but also so that I was able to understand the answers. I was helped by the department, that this thesis studies, who let me attend their meetings from the earliest opportunity.

Further, they allowed me to shadow an employee for almost two days prior to conducting interviews. Czarniawska (2007) defines this kind of nonparticipant observation "shadowing"; following someone conducting his or her job enabling me as a researcher to observe without simultaneously having to take action. She further supports this as a technique that provides a unique way to gain first-hand knowledge. Participant observation would be nearly impossible for me because it requires a specific skillset and formal training. However, the purpose of shadowing was above all to get familiar with the organization to improve my understanding and ability to ask meaningful questions. Tjora (2009) advocates that observation enables the researcher to observe the social entities in its natural habitat in addition to listening to what people say they do during interviews. He further claims that even short periods of observation can provide useful insight when combined with other methods.

I was also given an ID-card from the hospital as NTNU and St. Olav's Hospital have a well-established collaboration. This enabled me to walk freely inside the premises and I received useful feedback that personnel felt that they were helping an "insider" rather than some stranger conducting external research.

In table 4.1, I summarize meetings and situations to which I was given access (not including the interviews).

Field notes

As indicated in table 4.1, the situations and meetings I observed provided various opportunities to take notes. Most notes, however, were made at the time and were written out the same afternoon. I used breaks to take notes in situations where it was hard to make notes in real-time. My field notes are used as part of the data material which the analysis is based on.

Table 4.1: Overview of observed meetings and situations

Situation	Location	Duration	Participants	When	My role	Ability to take notes
Activity planning. Meeting to determine the distribution of and operations on the different wards for the consequent 6 months	External location	1 day	Representatives from the entire system in addition to external participants	Oct. 2017	Observer, I presented my project/ intention	The participants were aware of me taking notes, but I was located at a distance from the meeting table and I only interacted with the members during lunch
Meeting with the RSHU (Regional Centre for health service development)	St. Olav's hospital	2 hours	Members of the RSHU (doctors, staff, etc.)	Oct. 2017	Observer, I presented project	Regular meeting setting where taking down notes was natural for every participant
Meetings with key personnel	St. Olav's hospital	5 x 1 hour				The meetings were arrange to acquire knowledge about certain topics and taking notes was therefore expected
Meetings at the department: • Fast track meeting • Pre-doctor's round • Infection meeting • Daily planning meeting at ward • Meeting led by clinic leader	St. Olav's hospital	ca. 1 hour/ each		March 2018	Observer	
Lunch with nurses	St. Olav's hospital	Ca. 30 minutes	Nurses in wards	March 2018	Ate lunch and participated in the dialogue, told about my project and received feedback	Did not take notes, because I did not want to affect the dialogue and their time off
Two days with a nurse with leadership responsibility	St. Olav's hospital	Ca. two days	Object being shadowing and personnel we encountered during this period	March 2018	Shadower, ask questions about things I did not understand	Varying ability to take notes because we were often on the move

4.3.2 Interviews

Interviews conducted with different members of the system are the main source for data in this thesis and I will now describe the process of creating the interview guide and obtaining informants.

Dialogue is a determining factor when generating the VSM and therefore is a way of actually building and using the VSM. Leonard and Beer (1994) claims that some criticize the lack of "subjective interactions" (p. 52) when using the VSM for constructing a picture of a system. As previously stated, Hildbrand and Bodhanya (2014) argue that it is possible to use the VSM both for "good and evil" and that the model itself does not require or encourage involving stakeholders when diagnosing a system or an organization. Involving stakeholders is thus a way to make sure that the VSM is used according to its original intention and not reflecting the perception of reality of the 'modeler'. I took it as paramount that the VSM diagnosis was informed as far as possible by the stakeholders (involved and affected).

Structure

I needed to be able to compare how people with different roles and positions viewed the same system. This indicated the need for qualitative interviews to let me explore the world through the informants. However, the need to compare topics from the VSM still required some structure to ensure that I had a basis for comparison. Additionally, building the case study on the VSM, I needed to make sure that I covered the topics dealt with by the model. I, therefore, created a semi-structured interview guide that let me delve into topics that the informants found important, while at the same time ensuring that there was a basis for comparison.

Since the framework for my study was going to be the VSM, I used the model to create my interview guide, in order to have a clear focus in my data gathering process (Schwaninger, 2006). Thus, I created the interview guide in a purposeful manner. I started immersing myself in the theory of the VSM (summarized earlier in this thesis) and gaining an understanding of the different topics which Hildbrand & Bodhanya (2015) say are decisive in order to conduct a VSM diagnosis. The research question was aligned with the purpose of the VSM, namely to identify hindrances to viability in the hospital department and the topics came from the VSM; the five management functions (described in Chapter 3.3.1) in addition to recursion and the basic assumptions of the VSM.

In order to exploit other researchers' experience, I asked a VSM researcher, Robert L. Flood, to give his expert opinion of my interview guide. In this way, an expert provided me with thoughts and feedback on what would actually enable me to obtain information crucial for the VSM.

I structured the interview guide according to the topics in the VSM. This classification was mainly to help myself during the interviews and not something I showed to the informants. When coding, it became apparent that some questions generated data on other management functions, or not at all, but this was not quite unexpected. Figure 4.2 show how my interview guide was divided into different topics. This is illustrated by the use of color-

codes. A full (and more readable) version of the interview guide, can be viewed in Appendix I. Color coding is described in section 4.4.2, Figure 4.4.

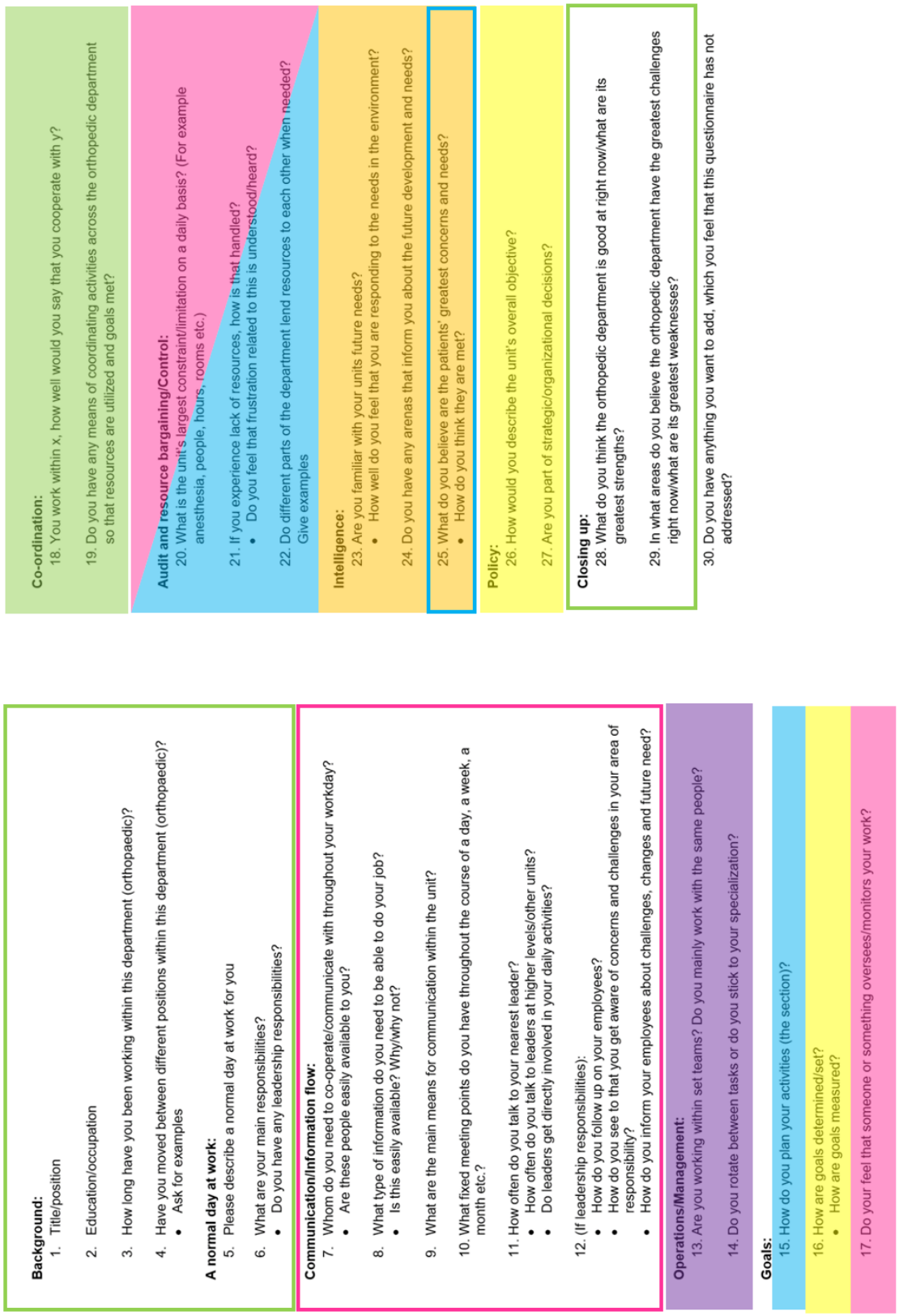

Figure 4.2: The interview's structure according to the VSM with the color-codes

As an inexperienced researcher, I found it especially important to pilot my interview guide, which also is strongly advised by Bryman (2016). Based on advice given to me by Robert L. Flood, an experienced VSM practitioner, I piloted the interview in three categories. First, a representative from academia who would provide insight from someone used to the situation, second, a leader from business life (due to the universal nature of VSM this would give me insight from a typical field where the VSM is usually applied), third, an employee from a different hospital from the one participating in my case study. Thus, I tested the questions in a comparable environment to my own case study. The main issue proved to be that some of the questions provided the same answers, some questions were unintentionally perceived as yes-no-questions and some of the questions needed to be accompanied by examples so that they were not too open-ended for the informant.

Piloting the interview guide did not only provide insight on how the questions worked in practice, but also provided me with valuable practice. Bryman (2016) notes that inexperienced researchers might not be aware of the personal issues involved in qualitative interviewing. One of the things the piloting taught me was that some of the questions could be interpreted as accusations. For example, one of my original questions asked whether the informant got involved in strategic decisions or not. One of the informants from my piloting felt that this implied that she was not doing enough in her current role. Based on this I altered the question to ask whether the informant had the opportunity to contribute to strategic decisions and this then inquired about the informant's experience and the management's ability to include their employees. This did not only help me alter my interview guide, but it had me reflect on my level of influence, as a researcher, on the case being studied. Just by being present, asking questions, I have an effect on the organization because it makes people reflect upon topics that my questions might provoke. This became an important lesson for me, which I kept in mind throughout the interviews and observations.

I further revised the rest of my interview guide based on these findings and finalized it according to the feedback. An important principle when applying the VSM is that discussion and interaction should not only happen based on a finished VSM, but also during the process of generating the VSM. As a consequence, some of the questions were altered after the data collection had started due to new insights. Keeping track on what the conducted interviews contributed to the VSM diagnosis enabled me to know in what areas I needed more knowledge, and so I added questions to the interview guide as I went along, which is aligned with the recommendations of Hildbrand and Bodhanya (2015).

Informants

When using a case study based on the VSM in a hospital, I had to find informants that would most likely have different perceptions of the system in focus. This involved both doctors and nurses that broadly represented the department. I also needed to include both people holding leadership responsibilities and people who did not.

I could not choose freely whom to interview due to the nature of the organization's daily activity. Most employees are limited as to how long they can be absent from their tasks as most of the informants are directly involved in patient care in one way or another. I asked my contact person within the department to give me a list of available people spread across the

units varying in leadership responsibilities or otherwise. This became a starting point in the search for informants. As the process progressed, I used the *snowball-effect* to gain access to employees that worked closer to the daily operation. I was interested in input from several levels of the organization and I, therefore, needed access to both leaders and employees with limited responsibilities. Additionally, some of the informants were also specifically asked because they had specialist knowledge on topics that emerged during interviews, which I needed more knowledge about. Specialist knowledge could be about projects, procedures or routines that I thought could be central to my findings.

Fourteen interviews were completed during Spring 2018. Table 4.2 gives an overview of the informants. To ensure anonymity of the informants, they are labelled by whether they hold leadership responsibilities and by unit (according to the organizational chart, not the VSM).

Table 4.2: Overview of informants for interviews

	Unit	Leadership responsibility?	Duration interview
A	Department of Orthopaedic Surgery Nursing	Yes	37:04
B	Department of Orthopaedic Surgery Nursing	No*	31:35
C	Department of Orthopaedic Surgery Nursing	No	30:35
D	Department of Orthopaedic Surgery Nursing	No	25:21
E	Department of Orthopaedic Surgery Surgeons	Yes	30:00
F	Department of Orthopaedic Surgery Nursing	Yes	30:26
G	Department of Orthopaedic Surgery Nursing	No	17:40
H	Department of Orthopaedic Surgery Surgeons	Yes	40:54
I	Department of Orthopaedic Surgery Driftsansvarlig overleger*	Yes*	24:49
J	Department of Orthopaedic Surgery Surgery	Yes	29:25
K	Department of Orthopaedic Surgery Operasjon	No	20:07
L	Department of Orthopaedic Surgery Surgery	No	26:24
M	Clinic staff	No	37:37
N	Department of Orthopaedic Surgery Patient administration and outpatient services	Yes	36:35
Total number of interviews: 14			

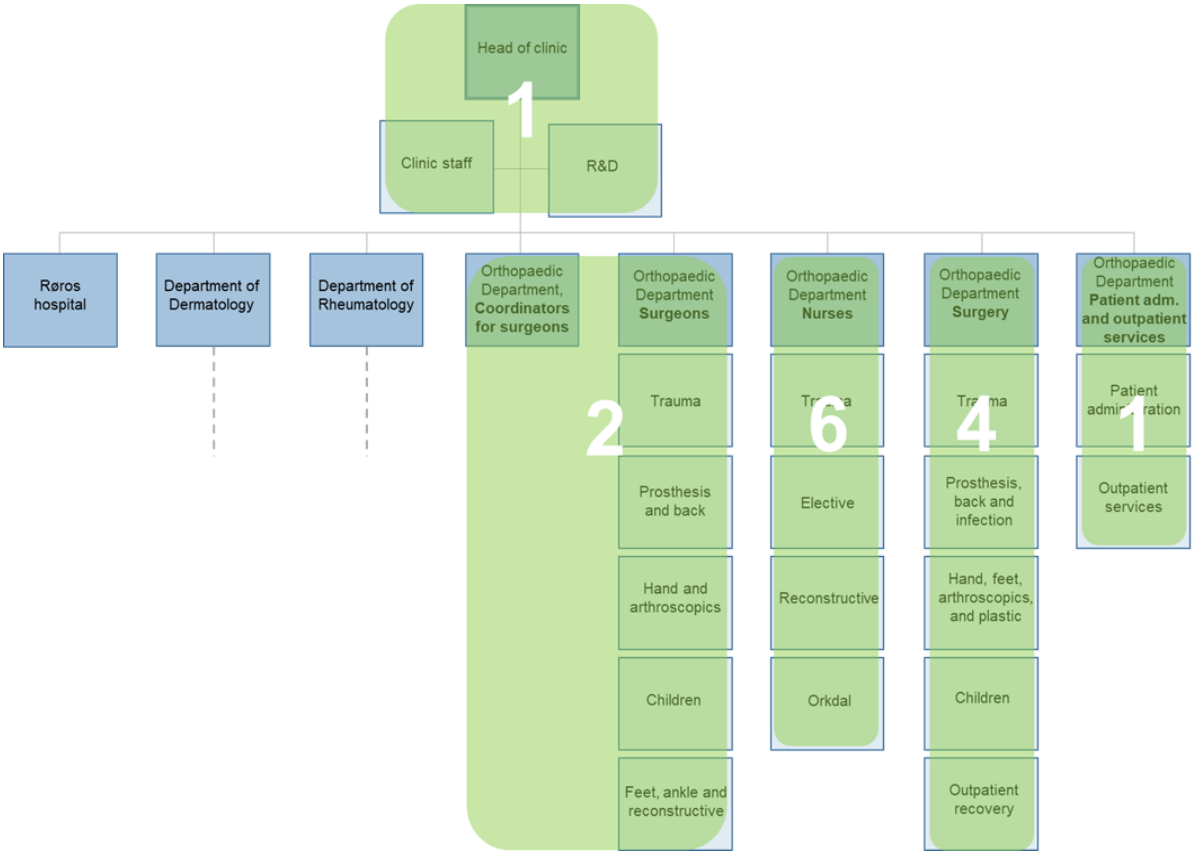

Figure 4.3: Visualization of the selection of informants

4.3.3 Ethics and anonymity

According to Tjora (2009), qualitative research requires the researcher to be especially aware of the ethical and contextual considerations. To address this I implemented some measures:

- The informants were informed that raw data was handled and stored according to the agreement with the Norwegian Centre for Research Data (NSD). The report and approval can be found in the Appendix II and III.

- I asked for permission to audio record the interviews.

- I informed the informants about the anonymity of statements, handling of raw data, and handling of the data after the end of the project.

- I informed the informants about my project and intent.

- I signed a non-disclosure agreement with St. Olav's Hospital.

During both my interviews and my observations within the organization, I was a 'foreigner' to the members. I found it necessary to provide a sufficient amount of information about myself

and my thesis so that they understood and were comfortable with my presence. This aligns with Tjora (2009) who argues that information about the researcher and his or her project is important to create legitimacy for the project and access to information. He also argues that it might not be necessary to go into too much detail, but to create an understanding of the fields of interests. Apart from introducing myself and my study program to informants and other people that I observed, I gave a short introduction to my thesis. Leonard and Beer (1994) argue that the "VSM was designed to deal with organizational structure and communication" and so I stated that I was studying organizational structure and communication based on systemic thinking, i.e. everything is interconnected. This was something they were able to relate to because they are central aspects of their everyday work life. I did not go into the details of the VSM as my diagnostic tool. I experienced that in certain settings this reduced some of the skepticism toward my efforts, because it assured them that I was there to study the 'system' and how they as a group conducted their daily activity; it was not about their individual professional capabilities as doctors or nurses.

Additionally, the interviews were conducted on the premises belonging to the department, close to the informant's workplace, which saved their time and permitted a 'natural' environment for the informants. All interviews were held in closed rooms to allow the informants to speak freely, undisturbed, and in confidence.

During the observations, especially during the meetings at the ward, I was exposed to sensitive information about patients. This was not something I took notes about, but to ensure that the observed employees were able to conduct their meetings freely and naturally, I signed a non-disclosure agreement at St. Olav's Hospital treating this concern.

4.4 Data analysis

In this section, I will provide an overview of how I have processed and analyzed the gathered data. Not only was the VSM the basis for designing my study, but it also acted as the framework for analyzing the data gathered.

4.4.1 Processing data

All of the interviews were carefully transcribed and every word was included to avoid losing important nuances in the interviews. Although this process was time-consuming, it made me very familiar with the data material and after transcribing the interviews, I compared notes taken during and right after the interviews. The transcribed interviews were then gathered and read through several times before the analysis began. The interviews were conducted in Norwegian and the quotes exhibited later in the thesis are my translation.

4.4.2 Running data through the VSM

Using the VSM as a framework for analyzing the data ensured that I had predefined themes for coding the data. The interview guide was designed in a way that I would get information about the different predefined themes within the VSM. Nevertheless, due to the semi-

structured nature of the interview, I had to go through a coding process to sort data based on the VSM framework.

I used a color-coding system for the coding process. These are the same color-codes that I used in Chapter 3 when describing my theoretical fundamentals. After having color-coded all my interviews, I created new sub-themes for each topic and went through the data several times until I had a manageable number of sub-categories that I could analyze. This aligns with the process for coding suggested by Tjora (2009). Some of the data gathered was also of a kind that was not dealt with through a VSM analysis. This implied that I had to code this separately into themes that I could keep outside of the VSM but still look into as interesting discoveries. Furthermore, I categorized the sub-topics back into the VSM, having a starting point for the empirical analysis, in my case being the VSM diagnosis. The color-coding system for the initial coding is depicted in Figure 4.4.

SYSTEM	MANAGEMENT TERMS	COLOR
1	Operations	
2	Co-ordination	
3	Control	
3*	Audit and resource bargaining	
4	Intelligence	
5	Policy	
	Information flows	
	Environment	
	Other	

Figure 4.4: Color-codes for coding data according to the VSM

Even though the VSM was used to design my interview guide and was the basis for my observation, I came across interesting findings not related to the VSM. This included aspects related to socio-political dynamics of an organization or even to the physical limitations due to poor design of buildings. This would have been interesting to investigate further, but since the scope for this thesis was primarily a VSM diagnosis, and time was limited, I found it necessary to focus on the findings relating to the VSM and systemic thinking.

4.5 The trustworthiness of the study

> ”Still, I have yet to meet case researchers unconcerned about clarity of their own perception and validity of their own communication.” (Stake, 2005)

In order to ensure the quality of my research, I employed the principles for ensuring *trustworthiness* by Lincoln and Guba (1985). According to them, there exist four means to ensure trustworthiness in a qualitative study; *credibility*, *transferability*, *dependability* and *confirmability*. I will now briefly present these concepts and account for how I strove to meet them in this thesis.

Credibility

According to Lincoln and Guba (1985), *credibility*, the “truth” of the findings, might be ensured through several different techniques. First, they suggest “prolonged engagement” (p. 301). They claim that this can both provide knowledge about culture, the ability to test misinformation, and the opportunity to build trust. Even though most of my data collection was collected during the spring of 2018, my first meeting point with the organization occurred early in the fall of 2017. Although it takes more time than this to fully learn about an organization, the prolonged time provided me with a network and familiarity with the terminology and long-term challenges and projects. The network provided me with the opportunity to check my findings with others. Peer debriefing is also a concept that Lincoln and Guba support for enhancing credibility. My regular sessions with both of my supervisors provided me with a context for peer debriefing.

Lincoln and Guba (1985) further suggest the use of “member checks” (p. 314) as a method of testing findings on the people the data was gathered from. This is further supported by Beer (1979), claiming that one might expect more peculiar findings not being obvious to the employees and management. However, findings that are familiar or expected by the system’s members are “part of the validation of the mapping of the model” (p. 534). To apply the VSM according to its original intentions, the researcher needs to include stakeholders as part of the process of conducting the VSM diagnosis and the validation of the findings (Espejo & Gill, 1997; Hildbrand & Bodhanya, 2014; 2015). In order to address this, I conducted a member-check towards the end of my project. I had a meeting with the head of the clinic discussing preliminary findings and got valuable input to my final analysis and discussion. Additionally, I discussed my findings with informants to check my preliminary findings.

Furthermore, all of the interviews were audio recorded and transcribed in their entirety.

Transferability

Transferability, the applicability beyond this very situation that the research is conducted in, is according to Lincoln and Guba (1985) handled by the researcher's ability to provide enough description so that the reader can judge whether the findings are transferable. In my study, I have included a large number of verbatum quotes through the empirical analysis so

that the reasoning for my analysis is as transparent as possible. I have also provided a case description (chapter 5) explaining the area of application and can help suggest transferability to other potential cases.

Additionally, the VSM itself can help support transferability in two ways. First, the tool is a highly visual tool that shows how the analysis is connected and this can help decide the level of transferability in the findings. Secondly, the VSM is a general tool that can be applied to any viable system (Espejo, 2003). It is therefore likely to assume that other systems, similar to the one in focus for this thesis, can see the resemblance with the findings from this study.

Dependability

Dependability is whether any findings are repeatable and consistent. Lincoln and Guba (1985) underline that whether a study is replicable or not, becomes a less useful measure if the case studied, changes. In this instance and in the light of VSM, any viable system needs to adapt to its environment in order to remain viable. The VSM can work as a tool for redesign, and replicability therefore is less decisive to this thesis.

However, to ensure consistency, measures were initiated. I created an interview guide in addition to keeping track of steps and material. Recording these steps in form of this written thesis is also a step to ensure consistency. Furthermore, being the only one working with this thesis meant that I was involved and in charge of every step of both the data collection and the analysis of it. I was present at all of the interviews and the observations are my own. The process should therefore be consistent and not affected by several “lenses”.

Confirmability

Confirmability concerns whether the findings are actually based on the informants’ rather than the researcher's interests or bias. All the transcribed interviews are stored. It is therefore possible to go through the data to confirm or otherwise what I have based my analysis and conclusions on. Although data is not included in its entirety in this thesis, an extensive amount of direct citations and statements both from the interviews and field notes are included. This enables the reader to follow the arguments as they build from the empirical data.

4.6 Limitations of my methodology

Some limitations to my methodology are now briefly addressed. First, as far as possible, I contacted the informants myself so they realized my interviews were not an ‘instruction’ from their manager. Otherwise, they might be afraid to give a true account of their everyday work life; both good and bad. However, this was not always possible. Contact information for personnel at the hospital is not publically available, thus I relied on colleagues or superiors for this information, or having people put me in contact with other informants.

Second, my intention was to interview patients to get opinions on how the system is perceived from the “outside”. Through my data collection, I realized that the condition of many of the patients within the department would require a lot of me as a researcher to ensure that ethical considerations were properly ensured. As a first-time social researcher, in discussion with my supervisor, I viewed my skills as not sufficient for this task. This is an obvious limitation of my study. Related to this, the relatively small portion of surgeons I had the chance to interview, is a weakness, but was to a degree addressed by observing many situations were surgeons were represented.

Third, in order to conduct the VSM diagnosis, I had to make a choice about my system in focus. Although a system in focus is merely a certain level of recursion in a web approaching an infinite number, I still had to make some choices to limit my scope, to limit my system in focus. In his description of ideal systemic thinking Capra (1996) says that; “Ultimately ... there are no parts at all. What we call a part is merely a pattern in an inseparable web of relationships.” (p. 37) In order to look at a manageable sized ‘web’, I had to take a pragmatic view on systemic thinking, idealizing the relationships and the core idea of systemic thinking, hence also the VSM, studying only a small part of the infinite web (system in focus) that my case object really is a part of.

One of the first and maybe most prominent obstacles for conducting data gathering in the hospital was my limited knowledge of hospital jargon and medical terms. Although I have some knowledge about the terminology, the field was largely unknown to me. For that reason, it was important for me to get to know the organization early on, before I even thought about interviews or observations, and before I knew what I was looking for. Meetings, studies and encounters during the fall of 2017 made me more familiar with these obstacles. However, observation and interviews brought me closer to the operation and daily activity and during the first interviews, I still felt that some terminology was holding me back. I was open about the fact that I came from a non-health discipline and most informants took that into consideration when explaining certain aspects of the operation. That might have had two effects: 1) I was allowed to ask and delve into concepts that were not familiar, 2) participants might be holding back because they thought that I would not understand. My impression was that when I showed them that I had a certain level of knowledge about their organization and about their field, by using terms learnt, participants were more willing to tell me about their understanding of different situations because they did not feel that they had to go through all of the basics. These are simply my impressions and not something that was confirmed from the informants.

Part III
Case description

5 Description of the case object

In this chapter, I will briefly present the structure of the Norwegian hospital sector. This provides a basis for a better understanding of the context in which the research was undertaken and further emphasizes the complexity of the system. First, I briefly explain how Norway has chosen to organize its hospital sector, second I describe St. Olav's Hospital before going into further details about the Clinic of Orthopaedy, Rheumatology, and Dermatology and the Department of Orthopaedic Surgery, which was my case object for this thesis. This chapter serves as the system identification on which the VSM diagnosis was based.

5.1 The system in focus

The system in focus for this thesis is Department of Orthopaedic Surgery. Figure 5.1 depicts how this system connects to one higher and one lower level of recursion.

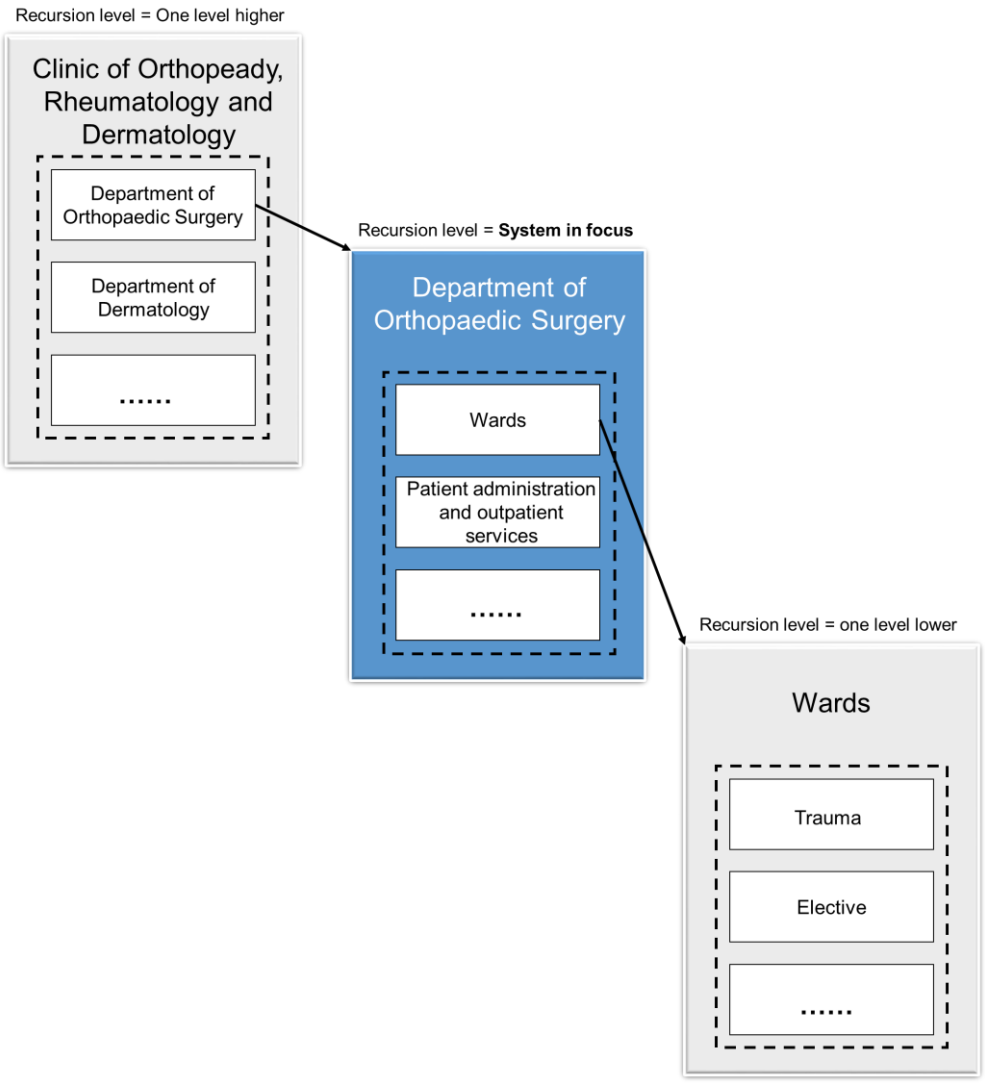

Figure 5.1: A depiction of the system in focus 'Department of Orthopaedic Surgery'

Delimitations

I have bounded my system in focus in several specific ways. First, I have only included the public hospital, therefore excluding organizations related to hospital pharmacies, IT-organizations that also are included in the health authorities and private organizations that are included in Norway's hospital services. Second, I include merely patient-related activity, hence not touching upon research and education. Third, I include only nurses, theatre nurses and doctors/surgeons (in addition to administrative personnel) in the interviews. Other actors were part of the observed activity, but are not in focus for the diagnosis. Finally, only the activities that takes place in Trondheim will be included in the case study.

5.2 The Norwegian hospital sector

The Norwegian hospital sector is owned and governed by The Ministry of Health and Care Services (HOD). The ownership is exercised through legislation, budgets and supporting institutions (The Norwegian Government, 2007). The HOD manages their ownership through Norway's four separate health regions. Each of them has a health authority, owned by the Government, responsible for providing specialized health services to the population in the region (The Norwegian Government, 2014). The four health regions are shown in Figure 5.2.

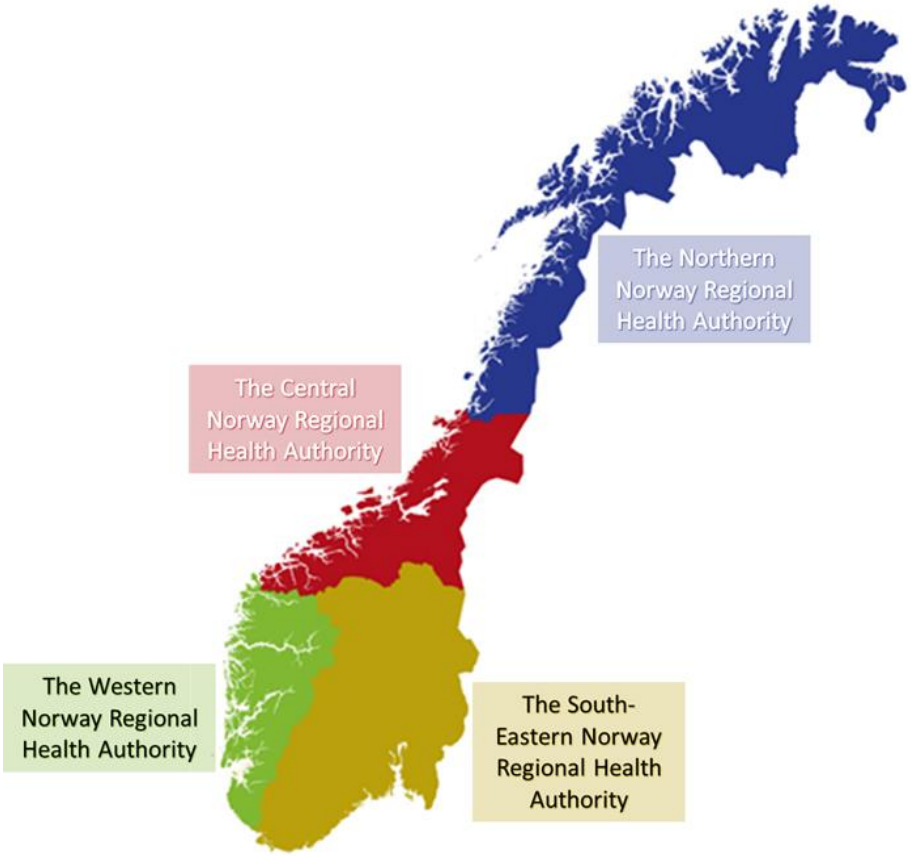

Figure 5.2: The four Health Authorities in Norway[3]

[3] Adapted from South-Eastern Norway Regional Health Authority (2011)

Each of these health regions/hospital trusts are further split up into several subordinate hospitals/hospital trusts (Lian, 2003). The Central Norway Regional Health Authority owns three hospital trusts: St. Olav's Hospital, Health Møre og Romsdal, and Helse Nord-Trøndelag, which in turn govern local hospitals. St. Olav's hospital is, for instance, further localized in Trondheim, Orkdal and Røros (Central Norway Regional Health Authority, 2017a). St. Olav's Hospital's operations in Trondheim is the focus of this thesis.

HOD provides monetary resources to the health regions through the state budget together with a description of the demands for activity and quality of the services. Even though the Boards of the various health regions are in control, the HOD monitors activity through reporting channels and supervisory meetings in addition to informal contact between the Chairmen of the Boards and the Minister of the HOD. At the end of the year, the Boards send reports, providing information about goal achievement and financial statements (Central Norway Regional Health Authority, 2017b).

5.3 St. Olav's hospital

St. Olav's Hospital is, as presented in chapter 5.2, owned by the Central Norway Regional Health Authority. St. Olav's Hospital is a university hospital and therefore holds a multivarious set of responsibilities: Patient treatment, research, educating medical personnel and so on. Its history dates back to 1804 and it has undergone several 'redesigns'. Maybe the largest, making St. Olav's like it is today, was conducted during 2002–2015 (St. Olav's Hospital, 2018). The hospital is divided into clinics and those are listed in Table 5.1, note that parts of these activities are conducted at Orkdal and Røros.

Table 5.1: An overview of the clinics at St. Olav's Hospital

CLINICS AT ST. OLAV'S HOSPITAL	
Cancer Clinic	Clinic of Orthopaedy, Rheumatology and Dermatology
Clinic of Anaesthesia and Intensive care	Clinic of Physical Medicine and Rehabilitation
Children's Clinic	Clinic of Substance Use and Addiction Medicine
Clinic of Cardiology	Clinic of Surgery
Clinic of Cardiothoracic Surgery	Clinic of Thoracic and Occupational Medicine
Clinic of Clinical Services	Department of Radiology and Nuclear Medicine
Clinic of Ear-Nose-Throat, Eye and Maxillofacial Surgery	Division of Mental Healthcare
Clinic of Emergency Medicine and Prehospital Care	Division of Services
Clinic of Laboratory Medicine	Neuroclinic
Clinic of Medicine	Women's Clinic

5.3.1 Clinic of Orthopaedy, Rheumatology and Dermatology

My case object, the Department of Orthopaedic Surgery, is part of the clinic of Orthopaedy, Rheumatology and Dermatology. The clinic consists of four departments listed in Table 5.2. The clinic has its main activity at St. Olav's Hospital in Trondheim, but also conducts operation in Røros, Orkdal and at other locations at St. Olav's main location in Trondheim.

Table 5.2: The sub-departments of the Clinic[4]

DEPARTMENTS AT CLINIC OF ORTHOPAEDY, RHEUMATOLOGY AND DERMATOLOGY
Department of Orthopaedic Surgery
Department of Rheumatology
National Service for Pregnancy and Rheumatic Diseases
Department of Dermatology

5.4 Department of Orthopaedic Surgery

The main case object for this thesis is the Department of Orthopaedic Surgery (hereby referred to as "the department") and will be the system in focus for the data collection, analysis and discussion. In this section I present relevant information about the department that will be of use to make sense of the empirical data on which I base my thesis.

The department treats all the patients at St. Olav's hospital that is in an orthopaedic patient group. Figure 5.3 is an organizational chart showing the Clinic, but with the department highlighted in yellow. The further structure in the other departments is left out to better highlight the system in focus. The department's nurses and surgeons are organized in different units, and the nurses are further sectioned according to specialization: the nurses in the wards and the theatre nurses in surgery. Further, both the nurses and surgeons in surgery related activity, are sub-specialized into almost corresponding units.

The surgeons are sub-specialized according to the following units: Trauma, Prosthesis and back, Hand and arthroscopies, Children, and Feet, ankle and reconstructive. The theatre nurses are organized by the following sub-specialization: Trauma, Prosthesis, back and infection, Hand, feet, arthroscopies and plastics, Children, and Outpatient recovery. The activity is mainly divided into emergency patients and elective patients. The former are those coming through the emergency room at the hospital and are not part of the planned activity. The latter, the elective patients, are those having planned surgical interventions and might be planned a month in advance for the largest and most complex interventions.

[4] (St. Olav's Hospital, 2018)

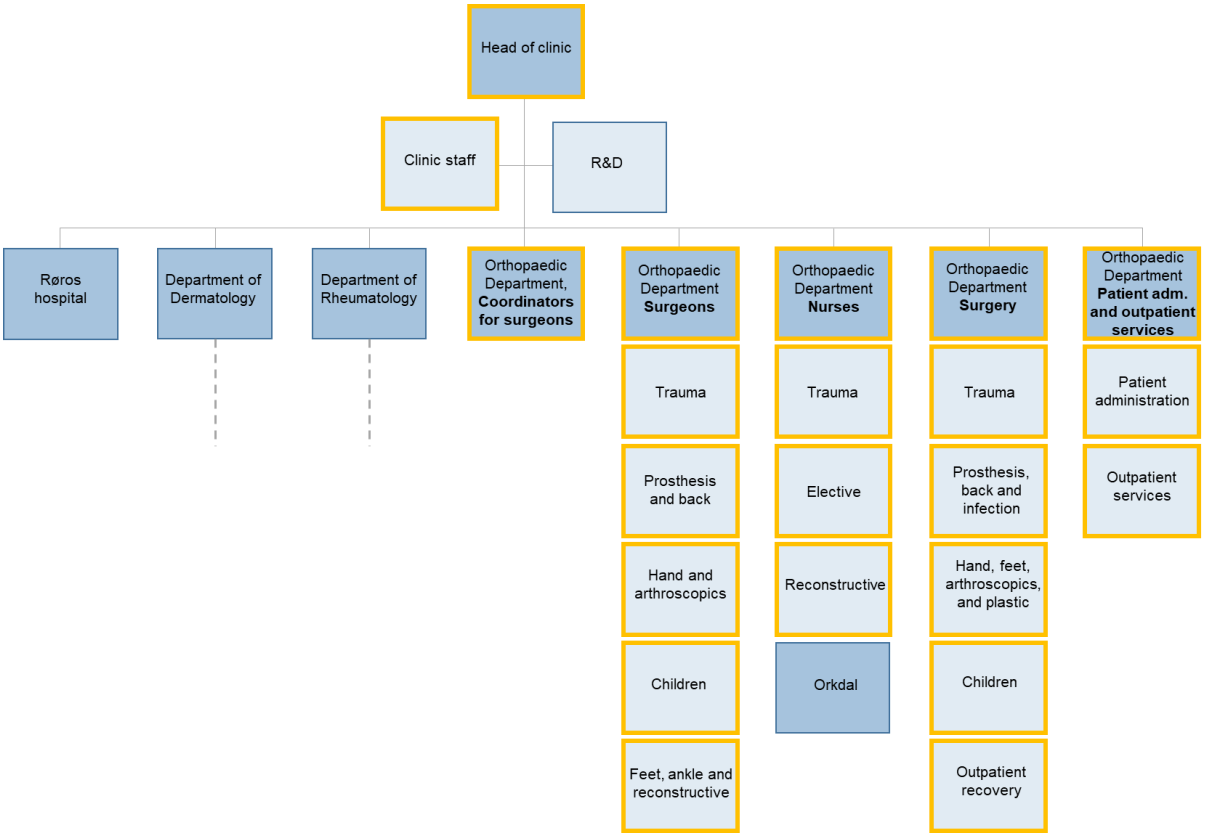

Figure 5.3: Department highlighted in the organizational chart

The Fast Track pathways

Throughout the diagnosis, the Fast Track pathways becomes central. Thus, I will shortly explain the basic principle before ending this chapter. The department has established two clinical pathways that stand out from the rest. The head of the clinic describes them as *standardized* pathways to ensure optimal treatment to a fragile group of patients. The pathways are highly standardized with procedures in place for everything from summoning the patient to what information the patient takes home, in addition to the time schedule for the procedure and how early the patient should be mobilized. There is one Fast Track pathway for hip fractures and one for knee prostheses. The patient attends a so-called 'patient school' 1-2 weeks ahead of the surgical intervention where the patient learn about the procedures, gets information about what to except and what needs to be taken care of in advance, e.g. transportation, blood samples etc. There are dedicated nurse personnel in the department's wards, caring for these patients.

Part IV
Empirical analysis

6 Empirical analysis

In this section, I will present the empirical data through the VSM, in other words, the system diagnosis utilizing the VSM. The main findings from the VSM diagnosis are presented in terms of the five management functions, information flows, and the environment. Here compliance with and deviations from central VSM principles are indicated and at the end of the section they are presented through a depiction of the VSM diagnosis of the department. To be able to explain how the different management functions operate and interact, I describe how they do so today and look at challenges that exist today that should be dealt with by the different functions.

The nature of the VSM implies that the different functions, together with information flows and environments, will directly influence each other. Some of the topics brought up will, therefore, be discussed on several occasions from different perspectives. In this analysis I aim to identify where the weak links in terms of the VSM might exist today, and it is based on data gathered both through interviews and through observations. The former constituting the largest portion of the data. In Chapter 7, I further discuss some of these findings.

6.1 System 1: Operations

Defining S1 entails looking at how the department is built up around value-creating activities. Since the focus for this thesis is patient-related activity (not research or education), only the processes directly related to this were deemed of interest when diagnosing the S1.

Looking at the organizational chart in Figure 5.3, it is apparent that the border between surgeons/doctors and nurses is prominent in everyday operations, as will also be seen throughout the rest of this analysis. Nevertheless, from a VSM perspective, both of these occupational groups aim to solve the same set of activities, and the S1 processes are therefore set up accordingly. Further, there exists a need for more interdisciplinary ways of working, exactly because the activities are aimed at patient treatment as opposed to the skill sets of the different occupations.

Setting up the S1 processes in a way that encapsulates the activities that a patient goes through enabled me to include all the nurses and doctors/surgeons involved in patient-related activities. I can include the aspects of personnel moving across sections and units. Even though one might argue that it is only the surgery that generates monetary value for the department, the different steps found in the department are all of great value to the individual patient. I will therefore look at support activities in a traditional form of staff and administration, along with those services directly related to the patient as part of the S1 processes. I consider that S1 “performs the primary activities of the organization, that is, it works to achieve what the organization is set up to do” (Flood 1999, p. 40). In this department’s case, this means dealing with orthopaedic patients from either the emergency room or a physician referral, to release them either to home or to another institution. In order to cope with a large number of interviews with nurses, I choose to focus on their sub-specializations, even though they do not overlap completely with the sub-specializations of the surgeons. The setup of S1 processes is: Trauma, Prosthesis, Back and infection, Hand,

feet, Arthroscopies and plastic, Children, Outpatient recovery, Wards, Patient administration, and Outpatient services (depicted in Figure 6.1).

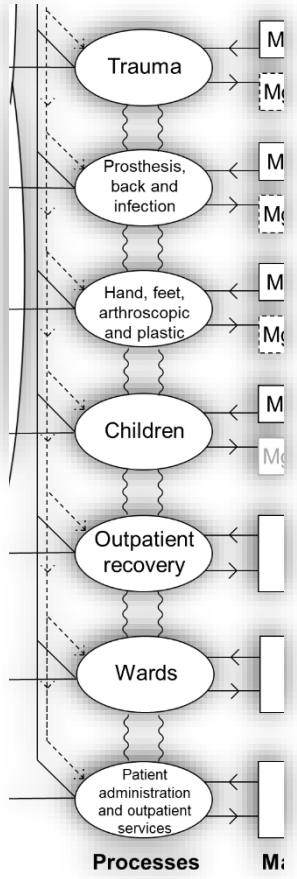

Figure 6.1: Overview of the S1 processes of the department

This also locates the level of recursion that I have chosen. In some cases, there is a need to zoom into some of the activities to look at details affecting these S1 process. In other cases, I need to say something about the connection to a higher level of recursion.

6.1.1 Processes

The responsibilities in each S1 process differ between the occupational groups and specialization. The three main occupational groups treated in this thesis are nurse, theatre nurse and surgeon/doctor. They often work together, but hold different responsibilities. In the first phase, the surgeons and nurses work together to assess patients and plan activities through outpatient services. Patients are then dealt with by nurses and also surgeons in the wards both before and after surgery, while surgeons perform surgery and theatre nurses assist during surgery. This can be both emergency patients and elective surgery.

> *The duties consist of receiving patients, prepare them for surgery, do blood samples, take them to surgery, give them medicines and observe the patient in its entirety.* (Nurse)

Most of the informants described their workday as hectic and eventful and the activities are centered around patient activities. High pace characterizes the activities, but even though it is hard to anticipate the activity level in the department, research found that the tasks are somewhat predictable.

> *We have a hectic day from start to end. In the morning, there are often patients that need to be prepared for surgery. Then there is the breakfast, medicines, looking after the patients, and the doctor's round. Then you may have departures that need to be planned. There are many tasks related to the patients, a lot of documentation. It is a quite hectic workplace. Even though it is unpredictable, you know what you need to get through in the course of a day. You never know what will happen, but still, there is a sense of system to it.* (Nurse, ward)

The nature of the work is also characterized by whether the member of staff holds a daytime position or works shifts. The theatre nurses also move between participating in surgery and serving the personnel that do participate in surgery.

> *Usually, it is quite easy to describe my normal day, because I hold a daytime position. My days are a bit more homogeneous than they were when I worked shifted and worked with emergency patients. We partly do practical work like preparing sterile material. Then we distribute tasks.* (Theatre nurse)

While the nurses stay within their S1 process and do the same type of work every day, the surgeons move between activities during their week and may run in to time management conflicts or at least challenges in terms of planning and co-ordination.

> *I have two, three days where I do surgery. Then I have one day for doctor's round, usually do doing the doctor's round before noon and taking care of paperwork after lunch. During a surgery day, I usually have two or three surgical interventions and I might do a doctor's round before that and some paperwork in between and after. Then I usually also have a day at the outpatient clinics.* (Surgeon with leadership responsibilities)

6.1.2 Management

In this department, according to how the S1 is set up, several processes have more than one leader. This is due to the distinct separation between occupational groups. Surgeons lead surgeons, while nurses lead nurses. A common feature for leaders in the hospital, according to an informant is:

> *As leaders in the hospital, we are imposed three main areas of responsibility, which are profession, personnel and economy.* (Theatre nurse with leadership responsibilities)

The different occupational groups also choose to exercise their role differently, which for some staff causes frustration. How this affects information flow will be described in more detailed in Section 6.7. The managers for the nurses are freed from operational responsibilities to be able to have time for management tasks. The leaders for the doctors, on the other hand, have responsibilities both in the S1 processes and on the management side. Since there exists a great need for co-operation between the two occupational groups, the limited availability of the surgeon managers frustrates the full-time managers among the nurses. The interviews indicated that doctors treasure the opportunity to stay current and to

be a part of their field, while the nurses who become leaders choose to shift their position over to management tasks. An informant described this choice:

> *You have to choose something when you become a leader compared with your colleagues. You cannot stay one of them anymore.* (Nurse with leadership responsibilities)

This nurse underlines this point interpreting the situation:

> *I believe it could be structured in a better way. That is my claim, but I believe that a nurse manager has a different understanding of what leadership is than what the doctor leaders have. It is more technical being a doctor, the surgery is more important for a leader among the doctors. When I chose to become a leader for the nurses, I had to put aside a lot of my profession because it is not possible to be a good leader and be engaged in that at the same time. But I think if you are going to lead doctors, you need to excel in your profession in order to earn respect.* (Nurse with leadership responsibilities)

The managers in nursing are released from day to day operations and can fully concentrate on leadership responsibilities, so they are able to fulfil management functions, which is discussed later on.

> *I am not part of the operation at all. No one depends on me showing up. I believe that full-time leaders are needed to support a good working operation.* (Nurse with leadership responsibilities)

One surgeon informant had office days every Thursday, while another one claimed to divide administrative and operational activities fifty-fifty. One of the surgeons described his week, and this highlights the many tasks that a surgeon leader has to juggle with, in addition to having leadership responsibilities:

> *It differs how my days are after the morning meeting. Sometimes I will rather quickly move into surgery, which I then do all day. You typically have one day a week at the outpatient clinic, and for us that hold combined positions, this entails a lot of teaching. This involves some teaching or practical lessons with patients for the students. Beyond that, we go to the wards to do a short pre-patient-round, together with the nurses, dealing with the current patients. Some of us are given the responsibility to do the rounds with the patients while the rest go do other stuff, like outpatient clinic or surgery. In my job, I also have many meetings and administrative tasks, and I try to divide my time roughly fifty-fifty. (Surgeon with leadership responsibilities)*

It looks like there exists a need for daily communication between the two professions, due to the nature of the department. Things are continuously happening and decisions have to be made on a frequent basis. Awaiting the leaders on the same level thus creates frustration. An informant described how this affects the workday:

> *I need to communicate and co-operate with the surgeons and it can be problematic to get in touch with them. It is most often the leaders, they are overall available, but they are busy in the operations. They are available by email and they most often get back to you, but it is difficult to make appointments with the doctors' leaders and the doctors because they are busy in the operations. You have to make appointments early and it is not easy. The department is alive and things happen all the time, so often you will need to clarify stuff.*

> *Things pile up and you maybe want to have a meeting to expedite the process. Things often are delayed and you are not able to initiate new things because you constantly have to await answers. That is the doctors. My own leaders and employees are easily accessible. (Nurse with leadership responsibilities)*

Another informant supports this:

> *I think that the doctor leaders spend too little time being leaders. I have always said that it delays our work and make things harder. Things move more slowly. They are doing surgery, outpatient clinic, they attend courses and seminars and in addition they are supposed to be leaders. And even though they do not have responsibility for many employees, what they do concerns and affects us nurses to a high degree. So, even though they are available by telephone, you constantly need to be aware that they are busy. I think that is hard. (Nurse with leadership responsibilities)*

Even though the nursing managers are mainly full-time leaders, many of the informants describe that being a part of the operation is what enables them to complete their leadership responsibilities. This indicates that staying current is important for both of the professions, but is acted out in different ways. Nurses need to be part of operations and support their employees, but also to experience first-hand what are the challenges and what needs to be done. One informant described working in operations like this:

> *I try to be there, I try to see to the patient and talk to surgeons, anesthesia, I try to speed thing up. (Nurse with leadership responsibilities)*

Another informant described choices enabling a higher degree of presence in operations:

> *I am a part of the operations by dressing according to dress code and being physically present in the department and having my office here. I have the opportunity to have my office somewhere else where I could sit in my personal clothes, but I have chosen an alternative solution because I believe it benefits the departments. I also do some shifts when we need people because I want to and it gives me a unique opportunity to see how things work. We work across clinics, so that I am able to feel the atmosphere is very important. Doing that, I do not express opinions in areas I know little about, I actually have the facts (Theatre nurse with leadership responsibilities)*

Managers, both doctors and nurses, hold numerous responsibilities and are pressed on time. Doctors are split between the operation and management tasks, while the nurses are responsible for both the everyday challenges and planning long term. The nurse leaders use a lot of their time on the daily personnel situation and ensure that there are enough people to cover operations during all hours a day. Additionally, the leaders at the wards use a substantial amount of time co-ordinating resources like bed capacity for patients. These tasks are solved within each S1. Some meeting points and functions are in place to support this co-ordination and will be discussed in section 6.2. Still, much of the co-ordination responsibilities lies within S1 and hinders leaders to spend time on other management tasks.

> *Potentially you would have to remove some of the responsibilities. There is a lot to keep track of as a leader at my level. Something could have been delegated to someone else. For example, hiring temporary employees for vacant shifts. That takes a lot of my time. (Nurse with leadership responsibilities)*

The wards are pressed on capacity and to be able to deal with patients and make sure that the patients that are already in the system are placed and handled correctly, the leaders in S1 spend a lot of their time co-ordinating the total amount of available resources, and sometimes the leaders can use full days on such tasks, reducing time for other leadership responsibilities. This indicates that an S2 co-ordination function is carried out by S1 management. Nurses with leadership responsibilities were asked about the department's greatest limitation:

> *That is the number of beds. It is a problem. We use too much time finding beds for the patients. I do not know how many people in this house in total spend their time on that, but all the leaders at my level are working with that and it requires a lot of time. If you measure that in money... (Nurse with leadership responsibilities)*

In order to absorb complexity in a system, the VSM states that a reasonable number of recursive levels are required. Thus, every manager should not have an unmanageable amount of people in their area of responsibility, to ensure autonomy, but also system cohesion. The VSM diagnosis shows that in this department, guidelines for the number of employees a leader should have is lacking. In some cases, managers have been able to insert a level of leadership below themselves, while in other cases leaders struggle to reach all their employees. One nurse holding leadership responsibilities feels that there are too many employees to handle:

> *I need to do all the appraisal interviews myself, that is leadership. No one else can conduct them. But I think that my group of employees is too big. It is 50 hours with appraisal interviews in addition to preparations and the finishing process. You cannot just conduct the performance review and then you are done. (Nurse with leadership responsibilities)*

However, another nurse with leadership responsibilities had the opportunity to have an extra level of leadership placed below her to help cope with the direct leadership responsibilities:

> *I have large groups of employees that I am responsible for. I have delegated the main responsibility to a management level below me that we made because the span became too large. The distance between me and the employees became too large and proximity to leader disappeared. I believe that having that extra management level has been beneficial for the employees, and also for the profession. (Theatre nurse with leadership responsibilities)*

The management functions in the different S1 processes and professions are rather different and for some, the lack of conformity is frustrating and causes tough challenges in the workday.

6.1.3 Flow of resources

No matter how I set up the VSM depiction of my case organization, I found that resources flow across the S1 units. Surgeons transit between the outpatient clinic, the surgery, the wards, and in many cases it is necessary to share nurses as a resource across units due to the need for flexibility and scarce resources. Exchanges in S1 are extensive and involve very different activities. Physical restrictions also lead to units being somewhat scattered. This flow of resources demands a well-functioning S2.

It is a demanding and challenging task to ensure that the processes within S1 are well co-ordinated, because they are physically spread and have internal distance due to differences in the tasks and in workdays. This indicates that it is an advantage to have stable teams, to provide continuity, and keep a part of the workforce flexible to deal with sick absence and other variations. A nurse working in different units appreciated the importance of having a certain degree of stability within the different units:

> *Since I have two floors, I have one permanent team on one floor that just operates there. Then I have a permanent team on the other floor who runs that. In addition, I have some people moving between them, a third team working on both floors. To make things work. It works well because those that work on a floor on a permanent basis keep track of the patients and get things done. I believe it is a good idea not to have everyone on the move.* (Nurse with leadership responsibilities)

> *The department is very disjunct. It is not a unit with loads of nurses. There are secretaries, nurses, with many people working on different things.* (Nurse with leadership responsibilities)

In many cases, resources flow across units due to the need for flexibility in periods when resources are short, e.g. vacations, a full hospital, sick absence or other special circumstances. Even though nurses move between wards, floors and units, they seldom go outside of their field. The theatre nurses might move between sub-specializations, but only in very special cases. There is a need for a degree of specialization to increase efficiency in for example surgery. Theatre nurse therefore seldom go outside of their sub-specialization, but due to access to resources, theatre nurses must flow across units of S1.

> *There are no watertight compartments. Therefore, if there is sick absence we do cross the lines because plastic can help arthroscopy and the other way around.* (Theatre nurse)

The flow of resources is also a topic for the surgeons. The number of surgeons able to conduct the different types of surgery is limited and therefore are highly affected by sick leave or other situations that lack the available number of personnel. The interviews indicate that for the surgeons, it is harder to cover for each other due to the required skill set for the different types of surgery:

> *If there is a section that is very low on staff in one period, we lend doctors across sections to do doctors rounds and to do surgery. But on what scale? We do that relatively seldom. Everyone can do doctor's round so during holidays and other periods where sections are low on staff, the department's chief surgeon organizes the exchange of resources and do doctor's rounds for each other. When it comes to surgery, fewer and fewer of the surgical interventions are reckoned to be general orthopaedy and more and more are reckoned to be special orthopaedy that only a few can do. Therefore, it is not that easy to help each other. And the willingness to help out on the general orthopaedy varies*. (Surgeon with leadership responsibilities)

However, the general flow of resources also has its limitation. For a start, staff stay inside their profession when moving from their regular unit. Second, some parts of the operation are shielded to a large extent from this flow of resources. A part of the operation is designed like a Fast Track clinical pathway, and this is somewhat shielded from the rest of the operation due to the need for accurate planning and efficiency.

> *Some things within our unit are more protected than other things. For example, we have a process called Fast Track for hip prosthesis and knees. Those resources are shielded. I guess it has something to do with earnings and money. So, if there is sickness, absence or something else causing the need to cut down on the operation, I believe that they are shielded in some way.* (Theatre nurse)

This leads us to the next topic of this empirical analysis, that is, the need to shield clinical pathways inside S1.

6.1.4 The need for shielding clinical pathways

Somewhat unique in this sector is the direct influence that different activities have on each other. Clinical priority can in many cases lead to changes in the planned activity somewhere in the system. Elective activity can be affected by peaks in the number of emergency patients and the orthopaedic patients can be downgraded due to other patients in the hospital requiring treatment more urgently. This relates both to planned activities and resource distribution. One of the nurses with leadership responsibilities identified this as one of the great challenges:

> *I think the biggest concern for the orthopaedic patients is that, unfortunately, the medical criterion leads to them loose in all contexts where you deal with resource matters. Meaning, our patients are in a group that can wait. There will always exist patients with more urgent needs than our patients. This results in it being harder to accomplish optimal patient treatment because their treatment is consistently in peril of being cut out or postponed due to other activity deemed more urgent.* (Theatre nurse with leadership responsibilities)

This was also emphasized by a nurse claiming that low prioritization affects everyday activities in the department:

> *If the hospital is filling up, our planned surgery might be cancelled or postponed and we might get emergency patients or patients from another department. It creates noise and mess in our system. But we understand that it has to be like that when it is structured like it is.* (Nurse)

This might indicate the need for a clearer border between the processes in S1 and the need to shield some or all clinical pathways from other activity. The informants explain how a large volume of orthopaedic patients could justify this way of thinking. The two units that have so-called Fast Track pathways are mentioned repeatedly in interviews. Informants think that this is the solution to many challenges, but also it is something that the department is proud of. The Fast Track pathways are highly standardized, with substantial information to every patient and carefully planned steps. Resources connected to these pathways are shielded to a high degree and these kinds of surgical interventions are seldomly cancelled or postponed; less affected by other activities. A theatre nurse with leadership responsibilities stressed the importance of the department's ability to handle shielded pathways:

> *I think it is very important to create good standardized clinical pathways that are somewhat shielded from other activities in the hospital, and especially for orthopaedic patients. Other hospitals have chosen this model deliberately, exactly because the quantity of orthopaedy is so substantial that we can uphold our activity without depending on someone else. We are able to staff and treat enough patients during the course of a day to cope with our own*

activity. Other clinics do not have the volume and they cannot defend running a ward alone throughout the year. They need someone to share the burden with. Making our hospital understand that the quality of our patient treatment is linked up to this has been hard. (Theatre nurse with leadership responsibilities)

A theatre nurse with leadership responsibilities supported the fact that Fast Track is something that should be applied more widely in the department:

The Fast Track mentality is great, because it is a standardized clinical pathway. It is planned and organized from referral from a general practitioner until they are treated here. We consider implementing the same for other suitable diagnoses. For example, we are looking at creating a standardized clinical pathway for all outpatients. Both emergency and elective patients. (Theatre nurse with leadership responsibilities)

The surgeons, in particular, have several different responsibilities related to the patients, which create stress for some of the S1 processes. The outpatient clinic is an important step in mapping upcoming activity and balance resources. Still, this activity is not a top priority, which in many instances causes a bottleneck at the very start of the patient treatment. The knowledge generated in this activity thus directly affects other activities' ability to plan and adjust. A nurse with leadership responsibilities emphasized how this limits the department's ability to plan:

One of the department's current limitations is the outpatient clinic capacity; it is an activity very early on in the clinical pathway. We receive referrals from the general practitioners; our doctors assess them and summon them. The lack of capacity and priority here directly affects the other units. If we could get rid of the initial queue and clarify whom we are taking in, then we would have a much better overview of what we are going to do to go forward. It is not like this today, we have a queue to the outpatient clinics so we can never predict our future needs. I think that is the greatest challenge. (Nurse with leadership responsibilities)

The informants also emphasize the need to change and alter S1 according to the development both in treatments, patients and elsewhere in the environment.

There will be many more patients. But I believe that the development in treatments is happening rather fast and I think there are many patients in the hospital who, strictly speaking, do not need to be in-patients. My experience is that we have come a long way in the Clinic of Orthopaedy. We have a hotel-day ward, which is open five days a week, and we have a high number of outpatients. We also have Fast Track prosthesis, which has activity five days a week. So even though there is potential to do more, I believe that we have done a lot. (Nurse with leadership responsibilities)

Shielding clinical pathways, according to informants, is important in order to increase efficiency. I will later discuss the ongoing changes in the environment, but this theme arose during the interviews; due to the need for increased activity with fewer resources, it is important to adjust S1 accordingly.

There will be a need for increasing the efficiency because we need to produce more health services per head, because the demand will increase. We cannot increase the number of employees in the same measures as the demand is rising. The only solution is that we become more efficient. You cannot necessarily do that by running faster or to lengthen the

> *workday, but by organizing smarter. And the key is really standardization. Standardize everything. Every clinical pathway, patient flow, everything from blood samples to surgery. It is all about standardizing so you can automate things that are time-consuming today.* (Surgeon with leadership responsibilities)

The need for shielded clinical pathways is also supported by the fact that emergency patients have a direct influence on the remaining activity. Medical prioritization will take resources from other activity.

> *Last year we went through a period where we cancelled patients in January, February, March because we had many emergency patients and we also had a lot of patients who were done with their treatment but who were in too bad a condition to leave.* (Nurse with leadership responsibilities)

6.2 System 2: Co-ordination

The department has a great need for co-ordinating activities, as we have seen, both to utilize resources in an optimal manner to get the patients through in an efficient way, and to make sure that critical information about plans and patients are distributed. The need for co-ordination is reinforced by the constant flow of both resources, occupational groups and patients between the different processes. Thus, in this section, I explain the need for co-ordination and the activities and measures that exist today to ensure achievement of the principles of this management function.

6.2.1 Regular meetings

The department has numerous regular meetings at different levels and between different people. The majority of these deal with co-ordination of current and upcoming activity. Several of these were mentioned during interviews and I had the chance to sit in on some of the meetings. I will outline key meetings and their intention. Note that the list is not exhaustive.

The daily meeting between the section managers within nursing (not theatre nursing)

Every morning nurse leaders at the wards and outpatient recovery come together at 08:00 to co-ordinate patient flow, available beds and resources. This also happens on late- and night shifts and during the weekends. A designated person is given responsibility to meet up with corresponding persons in the other wards. This is the only means that they have to ensure day-to-day resource co-ordination and to make sure that they get through daily operations in regards to having enough beds and personnel. This is a highly manual process that relies on the staff's ability to problem solve and communications between the leaders throughout the day. This meeting functions as a means for co-ordination of the current situation and very short-term. Below two nurses explain how this S2 function is carried out:

> *I attend a meeting at 8'o'clock together with the other unit leaders and we run through all of the wards, who will check in and out, patients who are finished with treatment, etc. We see if*

we can meet the scheduled program for the day and also if we have room for emergency patients, which we know will come every day. (Nurse with leadership responsibilities)

Next, the person with the telephone communicating with the emergency ward needs to co-ordinate things depending on what we signal. (Nurse)

The weekly meeting between the section managers

The nurse section managers in every section have a weekly meeting. Nurses at the wards and the theatre nurses have separate meetings. The concern of the meeting is longer-term, week-to-week plans and topics. The meeting is regular, but is sometimes cancelled due to other pressing needs. Below two nurses explain how meetings are implemented and how consistently they are held:

The leaders in each section meet once a week for a meeting to discuss different things that relate to us. Meetings make plans and co-ordinate what we do. (Nurse with leadership responsibilities)

It is not every time that we are able to meet. If not, we talk on the phone since we are not that many. (Theatre nurse with leadership responsibilities)

Even though leaders meet every morning, every week, and on several other occasions, interviews indicate that the time they have to actually evaluate their actions and how they lead, it is scarce:

I notice that the section leaders actually have too little meeting time to reflect and discuss our own experiences as leaders. We have talked a lot about trying to make a plan for that. There are a lot of the things that we do that do not have a correct answer and it would be beneficial to share those experiences and support and guide each other. (Nurse with leadership responsibilities)

The operational meeting

The operational meeting is a meeting that is supposed to be weekly, which brings together an interdisciplinary sample of people involved in operations; emergency, elective and staff representatives. This includes those outside of the department who are vital to running the department, for example, anesthesia. The meeting is meant for the members of the department to review the week, and also to adjust upcoming activities and distribution of resources. However, this meeting is one of few interdisciplinary meeting points for weekly co-ordination, and is often cancelled due to absences or other events. Thus, it is indicated that the co-ordination function between occupational groups as a whole is threatened. A nurse with leadership responsibilities explained how meetings are set up and that they are often cancelled:

We have operation meetings once a week, with surgery, doctors, doctor leaders, outpatient clinic, outpatient recovery, the entire bunch. It is supposed to be once a week, but it was cancelled this week and last week. There has been a lot of seminars for the doctors, I believe that is why. (Nurse with leadership responsibilities)

A member of the staff describes how cancellation limits the chances for interdisciplinary meetings in an organized manner:

> *We did have the operation meetings weekly. Now they are every now and then, not regular anymore. We are summoned when necessary. It is a bit sad because it was an arena where both surgery, anesthesia, outpatient surgery, the wards, everyone had a chance to meet.* (Staff)

Meeting at 13'o'clock

At 13'o'clock, the nurses at the ward come together to have a daily co-ordination meeting to make sure that they get through the day and to check the status of things. This meeting is somewhat dependent on the leader being present and it is the intention that it should be conducted daily. The meeting is here described by two nurses, both holding leadership responsibilities:

> *At 13'o'clock we usually have a meeting with the employees to find out if there are changes that mean we need to re-plan. It is nice to have a little pep talk. Today I will not be present, so they will have to go through with it themselves.* (Nurse with leadership responsibilities)

> *We go through planned departures, when patients leave and when we can bring patients in from reception.* (Nurse with leadership responsibilities)

Morning meetings and internal report

Both doctors, nurses at the ward, and theatre nurses have a daily morning meeting. The content differs between the occupational groups, but these meetings are mentioned as one of the most important functions for daily co-ordination and information flow by several of the informants. These meetings are not interdisciplinary, but for those occupational groups with night shifts, it serves as a link between the shifts and to ensure that the information flow is satisfactory. The next part of the morning meeting is co-ordinating the present resources according to the known activity level for the day. Here the morning meeting for surgeons is explained by a surgeon with leadership responsibilities:

> *"We meet a quarter to eight every morning for a joint meeting, where all the doctors meet. Most days it starts with lessons, a half hour, and it rotates who is in charge of the lessons."* (Surgeon with leadership responsibility)

Doctor's round and the Infection meeting

The doctor's round is the only formal meeting point between nurses and doctors in the ward throughout the day. This meeting point is extremely important for patient treatment because it is where doctors get information about the patient's condition and the doctors give instructions and plan the activity for the nurses. This is one of the most important meetings from the nurses' perspective, but it often is not conducted smoothly and regularly. First, doctors conduct a pre-round, discussing the cases briefly in a meeting setting with several other doctors and selected nurses, before they actually visit the patients. During the pre-round, it is just selected nurses, often those with leadership responsibilities, who participate.

After that, one or more doctors are supposed to stay behind to do the actual rounds and answer questions that the nurses might have, but according to several informants, this does not run smoothly. Doctors often conduct surgery or have other responsibilities to see to during the remaining part of the day, so this meeting between the two professions is essential. The nurses highly depend on instructions and information from the doctors. A nurse with leadership responsibilities explained that the surgeons are not easily available and that there are no fixed meeting points between them apart from the doctor's round:

> *We meet the doctors during the daily rounds. But after that, they are not easily available. We use the tools that we have. We use the operation plan to see when they are done with surgery and call them right away; we line up.* (Nurse with leadership responsibilities)

Even though the doctor's round is a fixed meeting point between the nurses in the wards and the surgeons, this is not upheld and the nurses are often left without the chance to discuss important issues with the doctors:

> *They usually do the pre-rounds around nine, but after that we need someone would to stay to talk to us nurses who actually take care of the patients, to let us discuss what we have seen. And sometimes no one stays to do the rounds. Everyone is in surgery or doing other things. Then you are left not able to do your job because we do not have the authorization to make decisions. There are a lot of decisions that have to be made by doctors that are left waiting. This might lead to delayed departures for patients because we lack papers and information from doctors.* (Nurse)

A nurse emphasized how important the doctors are in order for them to do their job, which indicates that the lack of co-ordination between the two occupational groups can have great consequences for the system:

> *The doctors are our most important collaborator in order for me to be able to do my job*. (Nurse)

Even though nurses are frustrated, the doctors do value the information obtained during the rounds and agree that this is an important meeting point. To make an informed decision, it is important to have as much information about the events during the day and reaction to treatment. A surgeon holding leadership responsibilities underlines the fact that the nurses indeed observe the patients the majority of the day and therefore are privy to important information:

> *I need information from the nurses in the wards about the patients. They observe the patients 24-hours a day and the rounds are the single moment during the day where they report on developments.* (Surgeon with leadership responsibilities)

However, who is supposed to conduct these rounds is not decided until the same day and the chance to co-ordinate the doctors is therefore limited because their schedule is already in place:

> *We plan it to a certain degree. We solve that during the morning meeting according to who can attend. We are relatively few people in my specialization, so we roughly know the schedule. So every morning we see who can do the rounds. We do not plan that in advance*

> *apart from knowing who is available. We only find out who has time in the morning.* (Surgeon with leadership responsibilities)

I observed pre-round meetings twice. This excerpt from my field notes indicates that the meeting lacks structure, potentially harming this as an S2 function:

> *There is no distinct leader of the meeting and no visual meeting agenda. They start by going through the current patients, but only after a few minutes there exist three different conversations. Initially there are five surgeons present and two nurses, but eventually, I lost track of the total number of attendees due to people coming and going. Two attendees had a parallel conversation not related to the current patients. Information about one patient was repeated twice because one was not paying attention. No one is assigned the task of recording the minutes of the meeting and the meeting is dissolved without summarizing what was decided in regards to patient treatment or who is doing what.*

The lack of an agenda leads to information reaching only some of the members of the meeting who were attentive to the conversation. A situation described in my field notes supports this:

> *One of the patients up for discussion is undergoing a treatment, but due to a condition not related to orthopaedy. No one could figure out why the patient was on this treatment and consequently, they did not know whether they should cease the treatment or not.*

The lack of structure is in part to do with the lack of a clear leader and lack of a meeting agenda. This is undermining the S2 function.

An important extension to this pre-round meeting is the establishment of an Infection meeting. This meeting offers a means by which to increase interdisciplinary cooperation by drawing together interdisciplinary expertise in decisions about patient-related activity. Patients in all clinics are exposed to the risk of infections, and to better cope with this, the department has established a weekly meeting to discuss proper treatment of infected patients or patients at risk with infection. This is an important S2 function; however, the meeting lacks structure and efficiency. I base this on an excerpt from my field notes taken at one of these infection meetings:

> *14 people are present; microbiologist, orthopaedists and doctors specialized in infection medicine. People are having parallel conversations and one of the attendees has to ask the rest of the attendees for their attention and to move to the next case, on several occasions.*

However, one of the participating surgeons highly valued this meeting:

> *We have managed to find a time where many people are able to attend and it is a strength having so many representatives from each discipline, which is not common in hospitals. It is very useful to be able to discuss the different cases and through the 4–5 years we have had these meetings, I genuinely feel that they have raised quality and cooperation.* (Surgeon with leadership responsibilities)

Fast Track meeting

Even though the department overall has few interdisciplinary meetings, there is one important exception. The resources dedicated to the Fast Track activities have weekly meetings where everyone involved meet in a highly interdisciplinary meeting. Some of the meetings are extended, which I will deal with in more detail when considering S3. This is a meeting where the previous week is reviewed and the coming schedule is gone through. Participants both assess and plan in the same meeting. This meeting is seen as an integral part of what is necessary to uphold a clinical pathway like Fast Track and this is prioritized by the participants.

> *With Fast Track we have an interdisciplinary meeting once a week. We review this week's and next week's patients and plan if anything needs to change. We look at who is coming and in the same way the ones that have come through in the course of the week, so we can learn from our activity. This is regular and there are doctors, anaesthesia, surgery, physical therapists, everyone really that is involved in the patient. That is unique to Fast Track.* (Nurse)

Even though this meeting is directly relevant for prosthesis, back and infection, it is an S2 function at this level of recursion because it involves other S1 units like patient administration, outpatient services, outpatient recovery, and the wards among others.

Lacking interdisciplinary meeting point

As previously mentioned, one of the few meeting points between occupational groups, which are not particular to any small unit, is the operational meeting. This is no longer held regularly, and co-ordination between nurses and doctors outside of patient surgery and treatment thus is rather weak. A theatre nurse explains the absence of a common meeting point:

> *"We do not have any shared meeting where we discuss cases and things like that, no. It is possible that the doctors have something like that, but it is not something that is established within the group."* (Theatre nurse with leadership responsibilities)

Further supported by a surgeon:

> "*We do not have any official joint meeting arena together with the nurses, apart from what you have in your units. There is no such thing beneath clinic leader level."* (Surgeon with leadership responsibilities)

This can be viewed as a weakness in S2 because of the already fragmented management function in the various S1 units.

6.2.2 Need for Co-ordination due to different opening hours

Not all the wards operate throughout the week. Extra co-ordination is required between the wards closing on weekends and the ones that do not because patients do not heal according to the opening hours of the ward they are treated in. This is mainly co-ordinated through the daily meetings between the section managers, but is a continuous effort, especially on Friday when, for example, Fast Track patients that have not departed before the weekend must be

moved elsewhere. This process repeats every week and requires a much effort from the individual leader.

> *Fridays are stressing days here in the orthopaedic department and elective. The others do not need to clear out that much. People staying at the hotelward are in such a condition that they leave. Trauma also closes one ward and only operates two during the weekend, so they experience it too. Sometimes we have 6 or 8 patients at worst that are arriving from Fast Track. Some weeks it is extremely stressful, I need to call it stressful because you tear your hair out to get it done. You have to put them in other wards sometimes to make it work. It is unbelievable what you can accomplish, we move some patients to other hospitals and in fact utilize every possibility. We need to be on constant alert.* (Nurse with leadership responsibilities)

The system lacks an S2 function to help S1 with this really important need for co-ordination.

6.2.3 Cooperation

Cooperation is key to ensuring employees are able to do their job; very few tasks are solved by individuals alone.

> *I believe that a close collaboration is very important. Everyone depends on each other. There is no use in having two people that are in control and have everything ready if someone else is not paying attention. We cannot conduct surgery on the patients unless everyone is on board.* (Theatre nurse with leadership responsibilities)

The need to co-operate is also great between the different S1 processes and in the department, different units and sections.

> *We have a great need to co-operate across the sections because many things are interdisciplinary, meaning we need help from other subspecialists and they need help from us. It is a discussion about where the patient should stay and also interdisciplinary treatment. That is not functioning optimally, but not poorly either.* (Surgeon with leadership responsibilities)

Since a patient is not always a straightforward case with only one diagnosis, there is a need for the nurses and doctors to co-operate to get the whole picture of the patient. Different specialties need to co-operate and make sure that the patients get appropriate treatment. However, even though the employees understand the need to cooperate, some informants do not feel that this always happens.

> *As a patient, I would worry about if they were able to actually keep track of the whole picture. What I think is challenging with a health service that is highly divided into special fields is that everyone is very good at what they do, but no one is seeing the whole picture. If a patient arrives here with non-orthopaedic pain or trouble, it is a hazzle to get that looked at. So, if I were a patient, I would be very worried about who is keeping track of the whole picture. I think the nurses are great at seeing the whole picture, but it requires a lot from us to get doctors to look at something that is not within their field. We have to work hard or else they are sent back to their primary physician. They have brought in infection medics on Friday, to ensure the correct treatment for infection. But I do not feel that we have a well-functioning system for patients with problems in addition to the initial problem. If a patient that has had surgery*

> *suddenly gets a heart problem or a lung problem or other things, we almost have to force doctors to refer them to other clinics.* (Nurse)

As described in section 6.1.4, there are quite distinct differences between leaders among nurses and leaders among doctors. This has a direct influence on S2's ability to conduct efficient and effective co-ordination. There are indications that cooperation between the two occupational groups, nurses and doctors, might influence their ability to co-ordinate different activities that directly affect patient treatment and flow.

> *I feel that it is a challenge to co-operate with other occupational groups. That may be what I feel most often, that I feel alone contra the doctors. I wish there was more interdisciplinary co-operation with them. As a leader and nurse in a department like this, you feel a great pressure from the emergency room to get the patients to the right place at the right time. I feel that I am working against something. The doctor resource is pressured as well; they have conflicting interests, and I include surgeons here. I feel that we are not feeling the same pressure about getting patients out in order to be able to take in new ones. That is a challenge.* (Nurse with leadership responsibilities)

6.2.4 Co-ordinating personnel - a conflict of simultaneousness

From section 6.2.1 and 6.2.2, it is indicated that nurse leaders in S1 allocate a lot of time to patient logistics. A lot of the remaining time is spent on co-ordinating personnel. Like the patient logistics, few functions exist to ensure that the issues related to personnel run smoothly. It is an effort that depends on the individual leader and takes up a lot of time that could potentially be used for other management tasks.

> *There are a lot of questions about solving vacant shifts due to sickness and following up with employees on sick leave takes a large portion of my day. Things related to personnel take up a lot of my day.* (Theatre nurse with leadership responsibilities)

If everyone is present, i.e. when everyone that should be working is present, that is just enough. Thus, vacant shifts need to be filled because the responsibilities need to be carried through. The department relies on a co-ordinating function to deal with personnel on a day-to-day basis. Today, this is mainly a leadership responsibility.

However, one function to help cope with this and to make a more flexible workforce is a staffing center. The staffing center is a co-ordination function where the intention is to provide different units with nurse resources when needed. Different units provide resources to this pool that is distributed according to registered needs. Still, the interviews indicate that this is not satisfactory because the staffing center seldomly has available resources when needed, especially short-term when the need often is most pressing. According to the informants, the staffing center is of varying benefit to the department. The department used to have 10 positions in the staffing center pool, but this has reduced to only three because they were made better use of full time in the department.

> *We have a staffing center that assists us. But when the need arises on short notice and it may be close up to the weekend, I know that it will ultimately become my responsibility to fix things in the likelihood that they cannot help me. They can say sorry, we cannot help you. Thus, I would rather fix it myself from the beginning because I know that the resources from the*

staffing center are likely already booked. But of course, it takes time. (Nurse with leadership responsibilities)

Furthermore, it is not only absent personnel that causes co-ordination needs. The present personnel also need to be co-ordinated, especially across occupational groups. The personnel are highly dependent on each other, and from the nurses' point of view, it is often difficult to get hold of the doctors on duty.

> *I feel that there are too few doctors, but they cannot do anything about it. I wish there were more doctor resources. I wish they were more easily available because I spend a lot of time finding a doctor. In Fast Track, they are so lucky that they only need to visit the patient that they conducted surgery on, then I believe that they should be able to do that.* (Nurse)

The nurses directly feel that the doctors are absent and that there are few measures both to help them figure out where they are and make a plan for when they should be at different places. This directly affects the nurses' work. However, the doctors feel that they are torn between tasks and places and that they are not able to fulfil everyone's needs.

> *I often experience time conflicts and that I should have done several tasks and been in several places at once. But I believe that it is a part of working in a hospital, I think you have to get used to it. I guess that it is we that struggles the most in regards to availability. My workday involves so many different places and activities. So I guess that they feel that we are less available than we feel that they are. We do not see it as a lack of co-operation, but that may feel different from the other side. We have time conflicts and we do not have the time to do everything that everyone wishes we should do.* (Surgeon with leadership responsibilities)

A result of a weak S2 function might be that there is no one to ensure that the resources in S1 are utilized to the better good of the system. No function exists to communicate these decisive prioritizations to the S1 units. An example of this consequence is given by a surgeon with leadership responsibilities:

> *Often, it is put forward like an accusation against the management that the management does not understand, lacks insight, does not understand that more is needed. The one raising the claim clearly lacks the understanding that we do not have inexhaustible resources to draw from. Some believe that we do not want to increase the amount of resources, but we have limited amounts of resources to draw from. So if you want to have more, you also need to say something about who is getting less. Such an understanding lacks to some degree in the organization.* (Surgeon with leadership responsibilities)

6.2.5 IT systems

IT systems can be an important part of any S2 and this also applies to the department in focus. The informants mainly mention three IT systems that they depend on for daily co-ordination: Resource steering system (RS), Operation Plan (Op.plan) and Outlook. RS is a leadership tool that is used for staffing, the Op.plan is a valuable tool for everyone as it is an overview of daily activity and staffing, Outlook is mainly used for planning meetings.

RS is something that leaders spend a lot of time in and rely on to co-ordinate present and absent personnel.

> *I spend time in the RS-system, we have our staffing there.* (Nurse with leadership responsibilities)

However, RS is a leadership tool and the regular employees do not have access. They rely on the information that is reflected in Op.plan (which is imported from RS) and this is often printed onto a sheet of paper. The challenge is that if this changes throughout a day, this information would be outdated and the nurses at the wards, for example, will not have access to it because computers are not key available tools. This can reinforce the frustration regarding not knowing where the doctors are and when they will show up.

Several informants mention the calendar function in Outlook is an important tool to keep track of their day. This is mainly relevant for employees with some kind of leadership responsibilities or employees who for other reasons need to attend meetings on a regular basis. However, it is mentioned that this is not used to the same degree across occupational groups and this can cause confusion and frustration for people who rely on this feature to plan their day.

> *I use Outlook and I see that is typical for other nurses. That is a challenge with the doctors, because they have not incorporated routines for using Outlook or for notice of the meetings. I have missed some meetings because I have not understood that they decided on a meeting through an email conversation. Outlook provides important information.* (Nurse with leadership responsibilities)

6.3 System 3: Control

S3 deals with long-term challenges outside of the remit of S2. As this department is constantly affected by the ever-increasing demand for their services, this management function is an important link between everyday operation and future development of the department. I discuss this management functions using data that deals with both S3 type issues and how the department deals with such issues today.

6.3.1 Planning

Planning is an integral part of any organization and every daily activity depends on. In a hospital department such as the one under investigation, however, one can only count on planning to a certain point. The influx of patients, which determines the activity level, can only to some degree be predicted and employees must always be prepared to alter plans and react to what is coming.

> *I run a section with only emergency patients. That is challenging, you cannot make long-term plans. Of course, we adapt our activity to holidays and the like, but apart from that, it is demanding to be a leader because you never know when activity will peak. I would love to plan six months ahead, but it does not work like that. But it is what triggers me to work her really. I like it when things happen and when things are a bit unpredictable.* (Nurse with leadership responsibilities)

6.3.2 Regular control meetings

There exist several regular meeting points that contribute to the control function in the department. This is by no means an exhaustive list as there are several local meetings.

Manager meeting in the wards

Once a year, the nurse leaders in the wards travel together to a cabin to lay long-term plans and to discuss long-term challenges. This is an important control measure, given that the leaders find too little time to talk together about longer-term challenges.

> *We have this arrangement in the department that once a year our boss takes us to a cabin. We stay there for three days, the leaders, and then the special nurses[5] arrive day two. We work a lot and create plans for the next period. We try to plan changes in the wards, reduction of personnel, everything we are instructed to do.* (Nurse with leadership responsibilities)

Fast Track

The Fast Track meeting has also evolved into a control function where long-term challenges are discussed and decisions are made. Some of these meetings are extended and topics can be submitted and will be discussed at this meeting. This indicates that they have merged an important coordination activity with a control activity.

> *We decided that more substantial discussions and decisions should be held at these meetings. You submit subjects and we address them during these extended meetings. In this way, we avoid people making isolated decisions just for themselves, but create some common guidelines. For example, if we decide to change the treatment.* (Nurse)

I had the chance to sit in on one of these extended Fast Track meetings. Based on my observations, this was an orderly and planned meeting with high attendance from all of the participating groups. The control part is not overly conflated with the co-ordinating part of the meeting because of the structure of the meeting agenda. First, the weekly schedule is reviewed; both the previous week and the coming and necessary plans are made. Then the extended part begins and people without direct interest in the long-term discussion are able to leave. This is further underpinned by an excerpt from my field notes:

> *There are representatives present from all the occupational groups and units that are supposed to be there. There are people from anaesthesia, physical therapy to patient administration, nurses, surgeons etc. Everyone involved in the patient treatment from start to release seem to be present. The meeting starts on time and the meeting leader stands in front of the other attendees using a power point to go through the meeting's agenda. The leader underlines that it is important to uphold these meetings even though there are no big cases to discuss. First, they evaluate the patients from last week before they move on to discussing the coming patients. Special cases are planned. They discuss issues regarding information flow, i.e. that some parties have not received important information and other decisions are made here to avoid inequalities in treatment.*

[5] NO: Fagsykepleier

Activity planner

One of the larger meetings for long-term planning is the *activity planner*, which takes place every six months. This is a meeting mainly to plan and distribute surgery resources between the sub-sections. The members have the opportunity to conduct bargaining of resources and go through the need for increased or decreased amount of resources for the coming period, based on the previous one. The meeting also has time for discussing longer-term issues that affect the daily operation, for example, the access to anesthesia or the hospital's plans, and representatives from other recursion levels can be invited to give feedback and answers.

> *We hold a meeting every six months where we plan the next year's operation. That is particular to our surgery activity.* (Surgeon with leadership responsibilities)

This activity plan created during this meeting then serves as a plan/goal for the coming activity and is visible to people in S1. The activity planner also acts like an information channel for the S4 function in the way that parts of the meeting are devoted to the head of the clinic giving a "status" on how the department is performing compared to demands and the challenges they are facing.

Meeting with Head of the clinic

An irregular meeting is held by the head of the clinic, where the leaders in the department get to meet and discuss longer-term topics. This is also an interdisciplinary meeting point, which perhaps should be a more regular meeting point, as it is an arena in which to discuss challenges that cross-occupational groups and sections.

> *We have a clinic leader meeting that is not regular, but that I wish it would become more regular.* (Nurse with leadership responsibilities)

6.3.3 Other long-term issues

Some resources are harder to co-ordinate because they are not owned and thus controlled by the department itself. Parts of S1 deals directly with other parts of S1 in a higher level of recursion. Even though in reality they are part of the same, on another recursion level, other departments and clinics are by this department understood as part of the environment. This part of the environment can in many cases impose limitations on the daily operations. Some of them also have different economic incentives than the department that causes problems. There is no formal control function to deal with these resorces that do not belong to the department, but that the department relies on every day. In terms of the larger system and a higher level of recursion, this deals with local autonomy and system cohesion. It causes limitations because other clinics have different goals/incentives that do not align.

> *The limitation is that we do not own all the resources. We highly depend on co-operating with other clinics with different goals than us. There are also different economic incentives because the clinics are not built in the same way. It most likely a weakness because for example anaesthesia operates with framework financing so increased activity would mean a*

minus for them budget-wise, but we are DRG[6]-financed so that increased activity would be a plus for us budget wise. This means that we have different incentives and different goals for the activity. So even though we are co-ordinated and we have a mutual understanding of what is needed to get through the day, it can cause challenges when it comes to overtime and going the extra mile. We do not have the same grounds for decision-making. (Theatre nurse with leadership responsibilities)

6.4 System 3*: Audit and Resource Bargaining

In an organization with activity in one way or another 24 hours a day, 7 days a week, all year long, and where decisions have to be made on the go, it is important that S3 has the opportunity to audit and monitor the activity without directly intervening in the daily activity. The organization deals with real people and life and death situations, so keeping track of the activity is crucial. In an organization where resources are scarce, a strong S3 function to support resource bargaining is extremely important. In this section, I will look at the data dealing with how the daily activity is monitored and what central measures exist to help resource bargaining.

6.4.1 Audits and reviews

The department conducts both direct and indirect audits looking after the daily activities. I will now go through some of the audit functions that came up during the interviews.

Risk audit/review

Sporadically risk audits are conducted. While I was gathering data, a risk audit looked at the preparation of medicine. In an organization that depends on minimizing the chance of errors made during patient treatment, it is important to keep track of high-risk activity.

We are doing a review, a risk audit, of preparation of medicine. The focus is on antibiotics and epidural treatment. (Nurse with leadership responsibilities)

Goals Fast Track

Those within Fast Track are also special in the way that they are measured more frequently, on several parameters that are constantly monitored. Outcomes are kept track of and reviewed during the Fast Track meetings. This enables employees included in the Fast Track to constantly adjust what they are doing. A nurse with leadership responsibilities exemplifies what measures exist in the Fast Track pathway:

They are measured on everything down there (Fast Track). They measure patient satisfaction during the stay, how much they are mobilized, how much pain-relievers are delivered, everything is measured and we have statistics on everything. (Nurse with leadership responsibilities)

[6] Diagnosis-related group

Fast Track personnel are also measured on the quality of treatment and a nurse's statement indicates that the personnel in Fast Track have access to the information generated from the quality monitoring:

> *We have a quality register; you do not have that everywhere. We measure pain, pain-relievers, we measure if they receive standard medicine, we measure for example nausea and at departure if there have been any complications. And the patient delivers a satisfaction survey, so we are actually able to measure patient satisfaction in the different areas the patients go through. That is pretty exciting, I received one of those feedbacks a while back, and the patient felt less taken care of, but comments were a bit vague. But then I called the person in charge for the quality register, who scans them and had her look at patient satisfaction and it was 97. So all in all the patients are happy, right. It is good sometimes to be able to measure thing.* (Nurse)

Quality

Quality is a measurement that some nurses outside of the Fast Track wish were more central in everyday work life. In Fast Track, this is a measurement that everyone is updated on. Personnel is left feeling that they are measured on cost, time usage, and other measures that relate more to efficiency and economy than what they actually feel is important; quality of patient care. A theatre nurse explains how they are measured on time, but not the quality of the work:

> *I feel that we are trusted and that we do our job. What we are monitored by is the time matrix. It says that you are supposed to use 45 minutes on preparations, and the surgical intervention should take two hours and then there should be 20 minutes to finish up, waking up the patient and get him or her out. And 20 minutes for cleaning. And it will show as a Gantt chart and they will ask why did that take so long? And then and there we feel that we have to explain ourselves. First of all, we needed a catheter, we were not informed, and then we needed an extra anesthesia. You have to be responsible for the time you use. Not the quality of what I do. That puzzles me, that it is the time matrix that reflects the activity. What is important is how many patients we can process, because if we spend too much time, the next might be cancelled.* (Theatre nurse)

The theatre nurses have a feeling of how the quality of their work is depending on what they observe themselves during the activity. However, there is a lack of more formal feedback on how they are doing, for example, related to infections that arise as a consequence of the surgical intervention. One informant stressed the fact that this affects their ability to adjust their daily activity:

> *I feel that we have done a good job when the patient wakes up when he or she is supposed to and everything is ok. The intervention went as planned, we know we did our jobs, but only we know that. I miss that feedback because I am sure that there are infections and there may be cases related to other stuff that we do not know of. And as long as we do not hear anything, you can be tempted to believe that everything is fine, but I know that that is not true.* (Theatre nurse)

The doctors are to a large degree measured on quality because it is a central topic in their own discussions. Interviews reveal that this is an important part of their profession; to evaluate their own and other's work to develop their professional skills. However, they also

admit that it is hard to have specific measurements on quality. The statement from the following informant might indicate that the surgeons have more easily available information about quality measures than the theatre nurses do:

> *We are to some degree measured on quality in what we do regarding how many infections we have how many re-surgeries we have. We are measured on how long the waiting time is from when a hip fracture arrives until surgery. And we are measured on general waiting time for the emergency patients ensuring that we get them through surgery within a reasonable time. And we are measured on how efficiently we run the surgery activity.* (Surgeon with leadership responsibilities)

This informant emphasizes the fact that surgeons evaluate each other by qualitative means:

> *It is hard to measure quality specifically because we have not systemized it. But we sit together and look at X-ray pictures of the surgeries we have done and evaluate each other and ourselves. It's an analog scale, not 1 to 10. And we do not write it down. But it is a kind of an internal control, we look into each other's work so that no one is able to repeatedly do something wrong.* (Surgeon with leadership responsibilities)

This part of the empirical analysis indicates that there lack consistent and formal structures for feedback from S3/S3* down to S1 to help them adjust daily operations.

6.4.2 Monitoring and goal achievement

Monitoring and being measured against goals are something most of the department's employees are used to. However, no one felt monitored in a way that they did not feel trusted to do their jobs.

> *"I feel that our hands are pretty free. We are being measured mostly on economy and bed utilization. You cannot have empty beds, but we have a bed utilization of well over 100%. Apart from that, I do not feel monitored, no. But the economy is the weakest point, and when the sickness absentia explodes, it's hard."* (Nurse with leadership responsibilities)

On the doctors' side, it is more common for leaders to follow up on what is in their field of expertise:

> *I mostly follow up what they do within my field of expertise. But I am attentive to what they do elsewhere as well. But it is hard to be completely up to date, but I see what is happening and show interest and can get involved where necessary and offer questions and comments.* (Surgeon with leadership responsibilities)

Data and statistics are central in the workday at the department and most are aware that what they do is tracked and monitored. However, the employees with leadership responsibilities have easier access to this data then the rest. This will be discussed further in section 6.7. One of the informants stressed the fact that this is a huge part of their activity, but that there are advantages:

> *Yes, I feel that there is something monitoring what I do. I think you just need to get used to it. We are being measured from all angles and there exist data and statistics on everything you*

> *do. And part of the job as a leader is to render this harmless and rather promote it as something positive as well. Because you can utilize it to argue for the need for increased staffing. It is reasonable to speak the language of for example economists or directors or other leaders. Then you are able to speak the same language and communicate on the same level.* (Theatre nurse with leadership responsibilities)

Part of the monitoring activities come from higher levels of management/S3*/S3, but S1 management also conducts audits and retrieves information about their own operations:

> *I feel that someone pays attention. We get numbers describing how good and bad we are in regards to deadlines, waiting time, passed internal deadlines. We get served a lot. And we retrieve a lot ourselves. We are monitored centrally on those things. In addition, we have a patient safety visit from the directors, but that is not every day. Last year we asked for an internal audit of patient administrative work. Our routines.* (Nurse with leadership responsibilities)

Time matrix

In surgery, every intervention is measured against a time matrix that describes every step in the surgery from preparation to finishing up the surgery. The time matrix contains information about how much time should be spent on each step of any given surgical intervention. The employees need to explain deviations from this time matrix, but it only says something about time as a cost driver, not the information behind, like quality or unforeseen events. However, the theatre nurses are determined to highlight the different reasons for deviating from the time matrix.

On the question whether it is hard to reach the requirements in the time matrix, a theatre nurse replied:

> *It is getting better. We struggled in the beginning. We have become more realistic and we have demanded to get into the details with preparation time and said that this is not possible to achieve in 30 minutes. It's Utopia. We have adjusted things over the years. So it is better, but you can never protect yourself completely from special circumstances with the patient having diseases that we don't know of. There can be so many things ruining the schedule and suddenly we have used two hours for preparation when you were supposed to use 45 minutes. Then you will be struggling at the other end. That is really simple arithmetic.* (Theatre nurse)

Patient safety/Risk board review

Audit is done daily at the wards through a risk assessment board meeting. Issues related to patient safety; danger of falling, bedsores and nutrition risk are closely monitored from day-to-day and utilized to control the situation. This is made visible to employees since the review is reported directly on a physical board in the operation area where the nurses are present:

> *We have a risk board meeting every morning to go through all the patients in regards to the patient safety campaign and those goals that are to be followed up. Falls, bedsores and nutrition risk. And it is important that management is firm because if you are not pressing, it becomes faulty.* (Nurse with leadership responsibilities)

6.4.3 When co-ordination fails: Resource bargaining

Resource bargaining is needed to handle one of the most fundamental control issues; resources. The co-ordination function can only do so much with existing resources. Long-term issues related to the total availability of resources need to be taken care of by S3 with the help of S3*. What happens when co-ordination is unable or fails to take care of the resource situation in the department?

There are often situations where fluctuations in demand and activity level cannot be handled by increasing the amount of resources, hence personnel are left having to work even harder. Long-term lack of resources in periods where co-ordination is unable to meet needs seriously affects the workforce and informants think that this leads to employees getting sick, leading the department into a vicious spiral of under-resourcing. It is a constant struggle to keep the workforce at a minimum to carry through the needed tasks and leave practically no time to strengthen personal knowledge about the profession. In practice, this control problem is something that S1 and S2 are left dealing with on a day-to-day basis. An informant explains how a lack of resources is handled on a day-to-day basis:

> *It varies how they handle the shortage of personnel from time to time. It depends on their ability to get people. You can tell them that you think that it is a shortage, but they deal with it from shift to shift. Thus, if the people on the previous shift have not successfully expressed the situation, you will start your shift with having to deal with what is available. I do not think that they have found a solution that is stable enough over time. But they try from shift to shift to hire people and my nearest leader is rather understanding. But we'll often hear that they have done what they can and there is no one available. Then you are left in a bad situation and you just have to roll up your sleeves for yet one more day. Of course, you can do that for a shift or two, but I am certain that in periods where this is a frequent situation, that it triggers people becoming sick. And you end up in a vicious spiral because the ones left need to work even more and take on an extra shift. Then they become tired. Increase the core staff, I believe that would decrease the amount of sick leave.* (Nurse)

The nurses point to their desire to help out the patient and will stretch themselves to complete the job with the resources available:

> *You have the fundamental desire to help your patients. That leaves you with no choice. You are left with the responsibility and need to make the best of it. Some shifts can be impossible and you co-operate as best as you can with the people present and you can ask a leader or assistant leader to help you if a crisis emerges. But at that point you have already reached a worrying stress level because you are already behind. You will always try to fix it yourself.* (Nurse)

This theatre nurse also underlined how sick absence affects the remaining staff:

> *We have had a high degree of sick absence, which leads to few people present at times. You cut down on your meal break, you run faster.* (Theatre nurse)

The long-term load on the nurses is high and it molds the workforce over time:

> *I feel that we very often work close to the limit of what is possible. You have to ask yourself why the average age in the wards is so low among the personnel. It is because over time the workload is heavy. Often, it is so busy that it affects your life outside of the job.* (Nurse)

The doctors are also struck by a constant need for more resources. The nurses feel that the doctors are unavailable and the doctors experience a conflict of having to be in several places simultaneously. This is represented by a surgeon feeling pressed on time:

> *In part, you can organize and plan things differently and we have done a lot of that. But our, the doctors, common understanding is that there are too few positions. We see understaffing and that is a lot of the reason for things being hard. Because you want time for in-depth study in your field and time for paperwork, doing it all within normal office hours, and also create a long-term plan for the transfer of experience to new personnel.* (Surgeon with leadership responsibilities)

However, some are under the impression that the department has not come far enough in planning the resources they already have and the nurses miss a clearer plan for the doctor resources; both a long-term plan as an S3 function, but also daily S2 plans. Based on this, a demand for more resources could more easily be put forward if it was clear that utilizing your resources to the fullest still is not enough:

> *They constantly talk about the need for more resources. Like that is the solution. My opinion is that we need a good plan for the people we have and the distribution of tasks, only then can you tell if you are short on resources. The planning has not been good enough. But it is getting better and with good leaders amongst the doctors, I believe in the future.* (Nurse with leadership responsibilities)

A surgeon, on the other hand, feels constant pressure to be at several places at the same time:

> *We feel that the problem from the doctors' side is that we do not have enough capacity to fulfil all the tasks that we need to and that others would want us to do. For example, we have enough time at the outpatient clinic, enough people to do the doctor's round, assess physician referrals and all those things.* (Surgeon with leadership responsibilities)

Some informants blamed the sick absence, but some informants stress the lack of resources. One informant underlined the fact that the existing resources are enough to get through patient-related activity, but not to evolve talented employees:

> *I actually have to say that we are a bit undermanned. If everyone that is supposed to be present is present, I think we manage ok. But that is just enough to carry through with patient treatment. Not to have time for in-depth study into literature, stay updated on the latest research, because work is knowledge-based and that requires time and effort. You never have the time, it just doesn't happen.* (Theatre nurse)

Some of the informants were afraid that as the department gets more and more pressured on available resources, it will be hard for the individual unit to focus on the bigger picture because their immediate needs feel so urgent. Resource bargaining from a more central function, therefore, is needed in order to ensure a resource allocation that is for the better for the total system. As seen in section 6.2, the individual leader spends a lot of time and

capacity on dealing with scarce resources in a situation that is almost unsolvable in the absence of a more central resource bargaining function. This relates both to employees inside and across occupational groups. An informant emphasized the fact that if this is not taken care of, this might set groups up against each other:

> *Co-operation between occupational groups. I think that if everyone becomes more and more pressured on time and we are supposed to produce even more, I think that the groups will be more and more set up against each other. I do not think it necessarily will become a problem here, but if you think about cuts in the hospital, it is stuff like that we worry about. What do they decide that we do not need to spend time on or what we should downgrade? We feel that we are doing an important job, but everyone else feels that too. One needs to highlight that so we do not need to fight over resources.* (Theatre nurse)

6.5 System 4: Intelligence

Knowledge of what the future might bear can be even more vital for the hospital than for a lot of other organizations. This because not being able to deliver according to demands is not only crucial for profits and cost control, but for the societal responsibility, the organization holds. Adjusting internal capacity to the environment is crucial for the department to be able to provide the health services that the environment/wider society depends on. In this section, I will present data on how intelligence is gathered and who does it, in addition to what challenges exist in the environment.

6.5.1 Looking ahead

For many of the employees in the department, the workday is about dealing with everyday challenges and making sure that the tasks and assignments are taken care of. For many, this leaves little time to think about what might happen in the longer term and mold their work to fit anticipated future needs. It is therefore a leadership responsibility to have the ability to look ahead, but many of the leaders who work close to the daily activity, feel too busy to delve into topics relating to the future. The higher-level leaders work a lot with the longer-term plans and changes and how to mold the department. One informant feel that the department's ability to look forward is good:

> *It is nice to have some knowledge about the future to avoid staying in your own bubble. It is easy to get there. But I feel that this department is a leader in that regards. It was fun to get in here, I worked somewhere else earlier. We have leaders that look ahead and seize opportunities before others even think of it.* (Nurse with leadership responsibilities)

Even though the ability to look forward is taken care of by 'higher level' leaders who are not directly dealing with everyday activity, the leaders at 'lower levels' also wish they could be involved in these kinds of intelligence functions. Having leaders more directly involved in this activity would provide a stronger link between S4 and S1. One informant is under the impression that the day-to-day activity gets in the way of S4 activities:

> *We are looking straight down at our papers and are focused on what we do, solving every-day problems and challenges. I do not feel that we have the time to look ahead; it is a bit from day*

> *to day. I miss having time to be able to look ahead and think more long term. But there is so much to do that I do not have the time or capacity.* (Nurse with leadership responsibilities)

The activity planner also acts like an S4 function in the way that parts of the meeting are devoted to the head of the clinic giving a "status" on how the department is performing compared to demands and the challenges they are facing.

6.5.2 Strengths and weaknesses

Most of the intelligence from S1's day-to-day operations is gathered through S3*, as described in section 6.4. Statistics are gathered in records and in many areas, it is possible to compare the department with other comparable organizations both inside and outside the hospital.

However, these data and statistics are to a large extent a part of the intelligence that the system gathers; much of this information is utilized when conducting larger projects and incentives rather than to make local decisions. The leaders, as described in section 6.1.4 value the ability to get involved in S1 processes to get signals on what are the strengths and weaknesses, what is working and what is not. Even though this is a method utilized by leaders, not all employees feel that the leaders through this get a realistic view of what is going on. An informant feels that leaders are not part of the operations and will not have the same experience of the situation:

> *The leader is present and sees what is happening. But sometimes, to get understanding of how we experience it is not the same. It is easy to hear about what is going on, but feeling it yourself is not possible when you sit in an office. You can listen to people when they say it is busy, but you do not feel it physically like when you experience it yourself. But the leader is present and listens when we talk. (*Nurse)

In addition to gathering intelligence on the everyday operation, the department values the possibility to compare their treatment to national and international standards. Many of the informants emphasized that they feel that the department gives treatment in accordance with the development in the field and is not lagging behind:

> *I believe that we have a good professional standard on the treatment that we provide. I believe that it is according to national and international established treatment principles and we stay updated. And I believe that what we do surgically is good as well. (*Surgeon with leadership responsibilities)

6.5.3 Opportunities and threats

Most employees are aware of the most pressing matters that will mold their services in the future. Gathering intelligence about the environment, knowing what they will be up against next, therefore is an integral part of operating the system and indicates a rather strong S4 function.

Two subjects that came up time and again during the interviews are the fact that patients are getting sicker and increasing in numbers and that the resources when it comes to nurses will be even scarcer in the future. The interviews indicated that this is something that worries the employees, and for many, the challenges are becoming insurmountable. The combination of an ever-increasing number of patients to treat, with more complex diagnosis and scarce resources, is something that is a constantly discussed topic. In addition, it is not only something that makes the future look hard to handle, the staff increasingly feel the consequences today. However, the data shows that employees at all levels reflect upon how the department should address the issues, showing that the S4 function is more than an individual's job. One nurse explains how the patients are changing:

> *More people. I think that our greatest challenge is that there are more and more people to treat and fewer and fewer resources. And people are not getting any lighter, so the physical work is getting harder. So you need people to do the job. So we need to find streamlined systems that make a plan, which smooths the transitions between the institutions, requires fewer resources. Because now we can have patients that are done with their treatment but stay here for three weeks because they are demanding and it is easier for the municipalities to leave them here.* (Nurse)

This nurse further supports the need for finding new methods:

> *I think it will be a challenge with increasing numbers of patients. It does not look good thinking about the lack of resources. Not enough nurses are being trained to ensure that we can achieve what we are doing now. But a lot has happened within the development of orthopaedy the last few years in regards to treatment paths and who are outpatients and not. We need to find new methods of treatment, which requires less time in the hospital. And I believe that we should not remove health workers from the hospital, because a lot that is done by nurses today are not tasks that require a nurse.* (Nurse with leadership responsibilities)

6.5.4 Who fulfils the S4 function?

Even though it might look like the intelligence function is left to the higher-level management, some employees feel involved in the way that they are included when their part of the operations is under review and decisions are to be made. One informant claims to be involved in processes when input and opinions are needed:

> *I feel involved in the clinic. I really feel that my viewpoints are heard and included. I also think that I have been included and been asked to offer my opinion on projects on higher levels as well.* (Theatre nurse with leadership responsibilities)

Others feel that their workdays are hectic enough and also feel that it is out of their scope of responsibility to participate in this function. On a question about whether the theatre nurse felt involved in strategic initiatives in the department, this was the answer:

> *Not very much. No. We are represented by our leader. We do not really have that much time for that. We have the daily operation and we are put into production. If it is something that relates directly to us, we are heard, or at least we are heard or that maybe our case is brought forward on our behalf.* (Theatre nurse)

6.6 System 5: Policy

As an organization owned by the government and operated with the intention to fulfil a society's need for health services, the policy function of the department is partly given from the outside of the system in focus. However, many goals driving the organization are related to the desire to conduct good patient treatment and pride in the occupation. Based on this, there exists a strong S5 function in the department.

6.6.1 Given goals

Some of the goals that are central to the department are given to them by higher levels of recursion, e.g. the hospital or national standards.

One informant explained how the department adapts to higher-level goals, which might indicate that there is a relatively strong policy function, but that the patient focus stands strong no matter what:

> *Our goals coincide with the hospital's goals and it is about outstanding treatment. But we want the patients to get the best possible outcome from what they come to get help for, to say it like that.* (Theatre nurse)

In the wards, they have recently started to introduce a so-called 'monthly focus', to put focus on important topics that either need improvement or are of great importance. This can be the work environment, infections etc. This helps the department to work more systematically with areas that they might otherwise struggle with, and can be topics gathered through the intelligence function through presence in S1. One informant explains briefly how this is done in practice:

> *The special nurses set up a yearly plan for the monthly focus. And there is a common yearly plan for the whole hospital and we have adopted some of that. The special nurses do the lessons and mold the focus. (Nurse with leadership responsibilities)*

However, the VSM diagnosis revealed that no matter how many goals are set either from the central management or from the nearest leader, the employees always have the patient in mind. Even though resources are scarce or things look dark, the motivational engine behind what they do is that they care deeply about the patient. One informant underlines that no matter what the task or the limitation, the patients and your colleagues are central:

> *Your personal goals are that you really want to go home and feel that the patient you have treated is happy. We always strive to do our best. And you really want to get done with everything during your shift, it is not a good feeling to leave a lot of responsibilities to the next shift.* (Nurse)

This is not only relevant for the nurses working directly with patients on a day-to-day basis, but also for the leaders in S5 functions:

> *In every meeting, we try to have the patient in focus. The best for the patient, how can carry out the best possible patient treatment. And we end up with patient safety. We work a lot with laws, rights and deadlines.* (Nurse with leadership responsibilities)

6.6.2 Creating system cohesion

The department is only a part of the hospital, and they rely on the same resources and work toward the same mission as the rest of the hospital. Thus, even though the department has a high degree of local autonomy to solve the tasks related to orthopaedic services, parts of the policy function revolve around creating system cohesion in the hospital.

Meetings and information that relate to the entire hospital are therefore important. According to an informant, the executive director used to hold meetings for everyone, but not anymore. This might have been a good opportunity to ensure a common policy for S1:

> *"The executive director used to have a meeting, but he doesn't hold meetings for all the employees anymore, only for leaders here and there."* (Nurse with leadership responsibilities)

Another policy function that exists to create system cohesion is "the Source" (NO: Kilden) containing information relevant to the entire hospital that everyone is expected to read.

6.7 Information flows

The information flow in the system has already been highlighted indirectly in this chapter. It is central to the VSM, as it is to the department. I will now describe the information flows in the system that have not already been discussed, as they are central to helping the department to carry through their daily activities.

6.7.1 Information flows towards S1

Getting information from the higher systems down to S1 is crucial to ensure a smooth operation and to be able to adjust the activity in S1. S1 is dependent on the information gathered by S4. People in management positions state that they rely on information on how to lead their section. One informant underlines that it is important to know how the higher-level management expects the leadership tasks to be conducted:

> *It is important for me to know the steering commands. What is my mission? What bounds do I have regarding the profession, economy and personnel? It is important to know what expectations my leader has for my role. (*Theatre nurse with leadership responsibilities)

Sharing information is an important topic in the department. The leaders worry about providing enough information to their employees and their employees are interested and eager to know what is going on. An informant stresses the fact that despite attempts to reach everyone, this is a constant challenge:

> *We have some general meetings, we have initiated that. It is about twice a year that the leader tries to inform us. But informing people to a sufficient degree is a problem. Some people do not turn up and some attended but did not listen. Communication can be hard, but we try. We have some competence-days for every employee, one during the spring and one during the fall. We have lessons and they get information when we start implementing large changes in the hospital, so we have a system. Afterwards, we have a staff meeting for everyone.* (Nurse with leadership responsibilities)

Leaders want to spread information, but in a department where people have different tasks, hours, and need different information, it is challenging to create an arena that is suitable for everyone. One informant was clear on the fact that there exists potential for improvement:

> *I think we can become even better at disseminating information. I am not sure we are where we are supposed to be. We are planning staff meetings with all the employees as we did before. But the section is so large and different that we could just as well have had two sections; the one is not that interested in the other and vice versa. But we are one section, so we try to do something like that, twice a year with information and status in the section.* (Nurse with leadership responsibilities)

The majority of the nurses I talked to stated that a so-called Departmental meeting and a Competence day are their primary source of information about what is going on, changes, the future and other important topics that they don't necessarily work with on a day to day basis.

> *We have competence days with subsequent departmental meetings and those are pure and unmitigated information. So they try to inform us sometimes using e-mail, but you have to pay attention yourself as well. So much is happening that it is hard to get to everything.* (Nurse)

However, you are not allowed to attend these meetings if you are on duty:

> *We have a staff meeting, but you do not get to go if you are on duty, so you have to be lucky that the meeting is on a day when you are off duty. Beyond that, there are meetings when something big is going on, which you can attend if you are off duty. But you get the minutes, though it is not satisfactory to read minutes when you have not heard the discussion.* (Nurse)

The interviews and observations indicates that various meetings at higher levels have more time and room for information than the meetings in S1, which are more focused on daily operations. One informant describes how the staff meetings are conducted in regards to dispersing information:

> *The staff meeting has room for everything. The leader reports from meetings with the top management and that gives us a direct line from the top. We get a lot of information through there, about our own clinic and from the hospital management.* (Staff)

The greatest weakness that I detected in regards to the information flow to S1 is the lack of feedback on the actual activity. Informants were missing feedback on how they do their job in order to be able to adjust their methods. The interviews revealed that the feedback from all the measurements that are done through S3*, does not reach back down to the employees in the daily operation and this valuable information might not come into use at all. One informant clearly describe the flaws concerning this information flow:

> *We miss feedback on for example the infection register, are our numbers high compared to the rest of the country? Those are the things that the hospital gets and the clinics get, higher up in the system than us, but which could be very valuable for us to see. But we have to ask for it. It could be helpful to have for example monthly or quarterly feedback on how many infections we have had, how are we compared to the rest of the country and do we have any other deviations. Have the patients been placed in the wrong way on the operating table, gotten nerve damage? We never get those things because they are handled administratively. I have never experienced that someone has gotten down to our level and said that we had a nerve damage that happened in September last year, we just receive a patient damage case on it. It is possible that they go through journals and reports that we write. But they could ask, are you doing anything out of the ordinary? I miss that. That could wake us up and ask ourselves if we do anything differently than we used to. Why is this happening when this usually doesn't happen? Maybe we have cases without knowing. It is that kind of uncertainty I would like to have more systematic feedback on in the department.* (Theatre nurse)

In total, this indicates that there are challenges in regards to the vertical information flow S3-S5 down to S1.

6.7.2 Feedback on S2 issues

Some of the challenges S2 has are in regards to co-ordinating resources because, sometimes, the available resources simply are not sufficient. These issues should be picked up by S3* and some kind of feedback should be given both back to S1 and upwards to S3-S5. As resources are a central topic, it is interesting to know how the employees feel these issues are handled. One informant feels understood, however seldom feels that the feedback comes in terms of extra resources:

> *I feel that they understand. I have never experienced something else. We have statistics and numbers on everything, so we know what we are doing. But they do not have resources either.* (Nurse with leadership responsibilities)

Another informant highlights the fact that there are no long-term plans to handle these issues and that the day-to-day activities are about fixing problems as they arise:

> *I am understood, no one is denying what I am saying. But I think some tough measures are needed to do anything about it on a permanent basis. We are fighting fires, we catch up and then the queue grows again.* (Nurse with leadership responsibilities)

One informant felt that despite signals in terms of statistics are sent to the higher level management, the resources simply are not sufficient:

> *I do not feel that we get much response. We feel that we are substantiating our points rather well. But we do not get a response in the form of more positions. If they do not have money, they do not have money; I guess it is that simple.* (Surgeon with leadership responsibilities)

6.7.3 Patients

Information about the patient is vital to be able to conduct a satisfactory patient treatment. There are several systems for this, as previously mentioned; op.plan and the doctor's rounds. I have also described that when this exchange of information is not working optimally, it causes frustration and hinders the daily activity. A nurse describes the crucial need for adequate information about the patient in order to conduct acceptable patient treatment:

> *It is often very complex and complicated and there are many secondary diagnoses or other diagnoses, which can affect the patient on a much larger scale than what they were admitted for. I need background information about that. And I need to know what has happened the last 24 hours, everything that has happened after the surgery. I need the results of blood samples and examinations.* (Nurse)

But in order for the activity to run smoothly, the patients also need to get the right information in advance to be able to make the correct preparations. The patients going through Fast Track have their own patient school, which the other elective patient groups do not have. Patients attend patient school one to two weeks ahead of their surgery and they get information about what to expect and how to prepare in order to have the process run smoothly:

> *They are informed about everything. They attend a patient school before their operation.* (Nurse)

From the nurses' perspective, it looks like this patient school is perceived as highly important in order to do what they do:

> *I think that the patient school is decisive. We could not have done the Fast Track without the patient school and the patient information, because we try to create a predictable pathway where the patient knows what we think and what will come. I do not think we could have gone through 18 patients with 16 beds during the course of a week if we had not have had the information. The patient school and the interdisciplinary meetings, they are together required.* (Nurse)

Getting patients in is one thing, getting the patients transferred out is another thing that requires information to flow smoothly. While most patients go home after surgery, a group of patients is transferred to other institutions. That requires a lot of communication with the municipalities. The department has their own departure coordinator to help remove the load from the nurses. One informant explains how the information handling with e.g. the municipalities is a too demanding task to go on top of the daily activity:

> *We have our own departure coordinator who just deals with that. It is very time consuming that we cannot do it alone. We still spend time on it. If I am going to send away a patient, I cannot just pack their stuff and be done. I need to document everything that has happened and what needs to be followed up on. It takes time.* (Nurse)

6.7.4 Means of communication

The department uses different means for communicating with each other and across sections. Every morning the nurses on duty log onto a phone and can be reached during the entirety of their shift. Even though the phone is mentioned as one of the most important means of communication, it is mentioned as something that also gets in the way. One of the informants underlined the fact that the phones take up a lot of time in the daily activities:

> *We have phones on us all the time, and we use them a lot, calling everyone. We can hear that during the pre-doctor's round phones are ringing constantly. Sometimes you are not able to think through a thought. The phone is very important.* (Nurse with leadership responsibilities)

During my observation, I noticed that the phone has a very special position in the everyday activity. There is an understandable need to be able to pick up the phone no matter what the situation because the call can be something urgent about a patient. This custom have created a culture where a phone call trumps a meeting or a conversation. During both an infection meeting and the pre-round meetings, I noticed that phones were looked at and picked up easily without there being an emergency. This often interrupted the meetings and created separate conversations so that people missed important information that was shared. Next follows two excerpts from my field notes supporting this:

> *During both the pre-round meeting and the infection meeting, several people left because their phone rang. One also asked to be excused to take a private call towards the end of the meeting. At one instance, one of the attendees at the meeting answered and completed a phone call while staying inside the meeting room.*

> *Meetings and conversations are often interrupted by phone calls. Several interviews were initiated with the informant clarifying the need to attending any phone calls.*

Another information channel which disrupts a smooth flow of information is all the information stored and transferred on paper. Several informants mentioned keeping information on paper as a hindrance to effective operations. During my observations, I noticed that some wrote down information on paper, while others did not. This might lead to information loss and a situation that harms patients. An informant described the use of paper as an information channel:

> *We have the patient overview on a white paper sheet; there you have bi-diagnoses and things like that.* (Nurse)

This was also supported by my observations from one of the pre-round meetings:

> *Some of the attendees have a piece of paper, which is a printed list of the current patients. Some write down the information that is given in the meeting, but some do not. People also write down different information and not consistently.*

In other words, some of the informants feel that the department needs to improve within ICT in order to ensure a smooth information flow. This was mentioned as one of the future challenges by an informant:

> *Within ICT and those solutions, we need to become better. We will have the health platform*[7] *eventually, but we still work cumbersomely with papers. And we are a bit worried about that, we try, but we see that it is complicated to phase out some papers as well. It involves so many people. (*Nurse with leadership responsibilities)

On a question about how the department will ensure that the nurses in the wards, without immediate access to computers, will obtain up to date information about doctor's whereabouts, patients and other activity related data, the informant answered:

> *What we did before was that we printed a report from the op.plan and hung it up. But that will only give you a momentary picture from when you press the print button. And it can quickly change, so the most correct picture is in op.plan. And we want to move away from all those papers in the pockets, which hold the wrong information. Because it is correct when someone writes it down and then someone makes changes that you miss."* (Staff)

Ensuring that information is recorded is important, to let others who need it access it, and also because the requirements for documentation are getting stricter:

> *A lot more than before needs to be documented in the medical records. Everything needs to be done and if it is not in the records, it is not done.* (Nurse with leadership responsibilities)

6.7.5 Being loyal to the order of the management functions

The VSM diagnosis revealed that most employees are very loyal to the leadership structure that exists in the hospital. The dialogue goes through the nearest leader if not summoned to larger meetings and special situations. This aligns with the principles of the VSM and avoids systems to intervene directly into S1. One informant's statement was typical of what other informants answered when asked about communication with higher-level leaders:

> *The dialogue mainly goes through our closest leader and she brings it forward. But the other leaders have some dialogue in staff meetings and things like that.* (Nurse)

6.7.6 Information upwards

An important information flow is getting information from S1, the operations, up to S3-S5. Presence and close relations with the employees represent an important way for managers to get to important information about what is going on in the sections. Earlier, I described how leaders get involved in the operations to understand the employees' workday. The formal vertical information flows are not utilized as much, to get information from operations to S3-S5. This reply from a surgeon is representative of how informants with leadership responsibilities replied when asked how they intercept information about challenges, needs or worries from S1:

[7] The health platform (NO: Helseplattformen) is a project to create one shared medical record for all health services in Central Norway to ease the information flow between the institutions

> *Mainly, people just show up, get in touch, call, send e-mails and set up a meeting and then we will talk. We have an internal message system where people can report deviations electronically. My occupational group is not very good at using it. And I get a lot from a monthly meeting with an employee representative and safety delegate. I also get things via weekly and monthly meetings with colleagues.* (Surgeon with leadership responsibilities)

This nurse also supports the fact that information is to a high degree obtained by everyday interaction with the personnel:

> *I have a close dialogue with people. I think I am quite good at seeing people and reading how they are doing. And I have a yearly performance review with everyone.* (Nurse with leadership responsibilities)

A nurse also underlined that knowledge about the employees' tasks is of great importance to stay in touch with S1:

> *I feel that I know very much in detail about what is going on. And I feel that it necessary. I cannot do their job, but I know very well what they are doing. I know whom to ask and I feel that I have a good overview of my employees.* (Nurse with leadership responsibilities)

6.8 Environments

One of the central aspects of the VSM is the interaction between the open system and the environment. The department's environment might be characterized as even more complex than the system itself. The environment consists of colleagues, patients, premise provider etc. and molds the everyday events of the department. The environment becomes a part of the system every day through the patient treatment that is at the core of the system's activity. Parts of the relationship with the environment have already been described, so the following section deals with the remaining parts.

6.8.1 Defining the environments

It is probably hard to argue that the department's environment is uncomplicated. But how is the environment defined? On S1's level, it is mainly the constant flow of patients, but also suppliers of equipment, food etc. Even though the supply of personnel is a central topic for S3-S5, the management in S1 is constantly affected by the available supply of personnel because they hire and make temporary engagements.

When questioned about where the department's patients are coming from, a nurse replied:

> *We have some patients coming from the hospital, but most come directly from their home. It is seldom they come from nursing homes or other places at the hospital.* (Nurse)

6.8.2 Feedback from the environment

In order to be able to adapt to the environment, basically all systems rely on feedback from their part of the environment. The department has various forms of enabling this, but again, the Fast Track pathway has the most formal way of doing so and the most stable feedback on the results. The patient satisfaction survey that they use in Fast Track gives the department a specific means by which to get direct feedback from the environment on how they are doing. This has become an integral part of the procedures the nurse help the patients through:

> *We have a patient satisfaction survey we are measured on; we usually score high on that. We tell the patients to be honest and tell us if we can get better.* (Nurse)

The rest of the operation that does not utilize a patient satisfaction survey on a regular basis has a patient satisfaction audit yearly where they hand out random samples to test. This provides some of the same feedback, while not as systematically as they do in Fast Track and therefore not something that the nurses are aware of on a daily basis.

6.8.3 Adapting to the environment

Knowing what staff know about the future resource situation and growing number of patients means that the staff know something about the likely developments in the environment. The environment is actually a provider both of resources in the form of monetary resources from the owner and personnel from educational establishments. One of the means that was mentioned to react to this change in the environment is transferring more and more patients to outpatient treatments. Another example of how the department has adapted to the environment is the continuous shift to becoming more specialized. That implies that the resources are less flexible, but that they gain a more expert skill set within each sub-specialization. When being questioned about whether the informant felt that this sub-specialization process is a strength or a weakness for the department, the informant replied:

> *It has been like that in other countries longer than it has been here and I do not think there is any other option. But, in smaller hospitals, you do not need the same specialties. If they cannot do it, they send it to us, we need to have everything.* (Surgeon with leadership responsibilities)

Although some of the processes are adapted according to the changes in the environment, related to how others within the same field are organized, the interviews point to challenges regarding internal prioritization. These prioritizations might enable the department to adapt to the environment because they would get a better knowledge of their part of the environment. One informant stressed the fact that the outpatient clinic is not a prioritized activity and therefore the department lacks decisive information about the environment:

> *It requires a reorganization of how we want to work. They want to do surgery, but they want limited time in the outpatient clinic. The outpatient clinic is not very popular. But imagine having no queue or people waiting to be evaluated. Then you would know exactly how many were waiting. You would have a great overview and know how to allocate your resources.* (Nurse with leadership responsibilities)

The department is highly dependent on resources in the form of personnel from the environment. The access in general thus affects them directly. A theatre nurse described this situation for their occupational group, and how they reacted:

> *The need in Norway and in Europe has been greater than the supply for a while now. As a response, the hospital and educational establishment co-operated about having large classes here at St. Olav. Part of the reason for us getting into this situation was the conditions to get scholarships/stipends. The theatre nurse education lost finance and therefore no one would go through the education. We had small classes, while at the same time roughly one third of the existing theatre nurses are seniors, i.e. 55 plus and the retirement in all the special nurse' fields is large. Both in the previous years but also the coming years.* (Theatre nurse with leadership responsibilities)

6.8.4 Expectations

An important part of being able to adjust according to the environment is to know something about what the environment expects from you. From the interviews it is indicated that employees with leadership responsibilities care about what expectations the patients have and try to incorporate their way of thinking. When asked about what were the patients' greatest worries and needs, one informant replied:

> *I think it is taking too long. It takes too long to be examined and for some, it takes a while to get surgery after it is decided. I think people outside feel that we are limited on capacity.* (Surgeon with leadership responsibilities)

However, the expectations come not only from the patients but also from legislators. Patients expect everything to run smoothly, the staff to be knowledgeable and the treatment to be successful. However, they seldom put words on how that is going to happen and care less about the work behind. However, authorities set strict guidelines on how this is to be achieved. An informant told me how you need to stay current in order to do your job:

> *The requirements to stay updated are strict if you are going to keep on doing your job. In regards to patient treatment, you need yearly courses.* (Theatre with leadership responsibilities)

Seeing this in relation to the lack of time to do in-depth studies that was put forward in section 6.4.3. indicates a conflict of interest.

6.9 The need for systemic thinking

Not all findings from this study are directly related to the department's deviations from the ideal VSM structure. Some findings relate directly to the department's ability and willingness to apply systemic principles and thinking. Still, it is interesting because it says something about the context in which the VSM is applied. It can therefore tell us something about why the diagnosis ends up as it does.

During the interviews, many individual projects were mentioned. The projects aimed at fixing very specific topics as isolated problems and most described that they did not feel that anything much came out of them. They also described initiatives they heard about, but that did not create any noticeable results. This might indicate a lack of systemic thinking, since problems are addressed one by one, like objects needing individual solutions, rather than looking at patterns and relationships.

It might also look like projects are initiated without full support or capacity from people involved. This causes problems and change initiatives might be left unfinished. One informant described a negative experience working on projects in the department:

> *It requires many people to do these projects, and they were not given time to work on these projects. It is frustrating to be the only one given time to work on a project and no one else who is a part of the project has the time or interest to contribute to change. If you are going to change a large organization like this, it demands more than one person wanting to make it happen. And in health, the medical personnel in charge is the doctor, and they are already pressed for time and need to be in '100 places' at the same time.* (Nurse)

Systemic thinking is a very important prerequisite for applying the principles of the VSM in any organization since the ability to think of the world as systemic is what the VSM is built upon.

Focus on individualism among some occupational groups can also be a sign of the need to increase the systemic thinking and focus on how everything links and affects each other. One informant described how some employees have been granted the opportunity to do more or less as they please, thus letting individuals affect large parts of the system;

> *There has been a negative culture amongst the orthopaedists where some have done as they pleased and controlled their own workday, taken leave without reporting it in the RS-system. But at the same time, the negative culture exists because no one has stepped in and said something about this.* (Staff)

As emphasized several times in this thesis, the relationship between a system and its environment is a central aspect both in systemic thinking in general, but above all in the VSM. Adapting to the changes in the environment, hence exercising requisite variety is a prerequisite for viability. The willingness to change thus needs to be an integral part of any organization and this informant explains how this can be viewed as a challenge:

> *People are used to things that have always been the same. We will do it like this because we have done it like this for 30 years. And you end up in old patterns.* (Staff)

While the doctors often work alone conducting surgical interventions, visiting patients etc., the nurses are in a constant need to work together and rely on each other, indicating a distinction between doctors' and nurses' workday. This also became a topic during the interviews. A doctor addressed this issue when asked about the greatest challenge within the department:

> *There is no team spirit or loyalty really. Most work for themselves, so I maybe feel that there is little loyalty to the department and common goals.* (Surgeon with leadership responsibilities)

However, the nurses had answers that to a larger degree addressed the need for a good workplace environment valuing the team spirit. One nurse explains how the workplace environment is what gets them through the more difficult times:

> *We have talked a lot about that during busy times that if it had not been for the work environment, people could not take it any longer. Workplace environment means a lot.* (Nurse)

6.10 A depiction of the VSM

This empirical analysis will now be summarized in a depiction of the VSM. This depiction is a diagnosis, hence it looks different from the ideal version of the VSM, showing how the department as a system deviates from the principles of the VSM. The figure will be briefly explained. Why these deviations might act as hindrances for the department are discussed in Chapter 7. Figure 6.2 is hence a visualization of the empirical analysis and is revisited in the next chapter. According to Hildbrand and Bodhanya (2015), such a comparison enables the exposure of "which subsystems and channels operate adequately and which require improvements" (p. 193).

By and large, the diagnosis showed that "inside and now" (S1, S2, S3) contains the most prominent deviations from the ideal VSM, while S4 and S5 to a larger degree are embodied and functioning well.

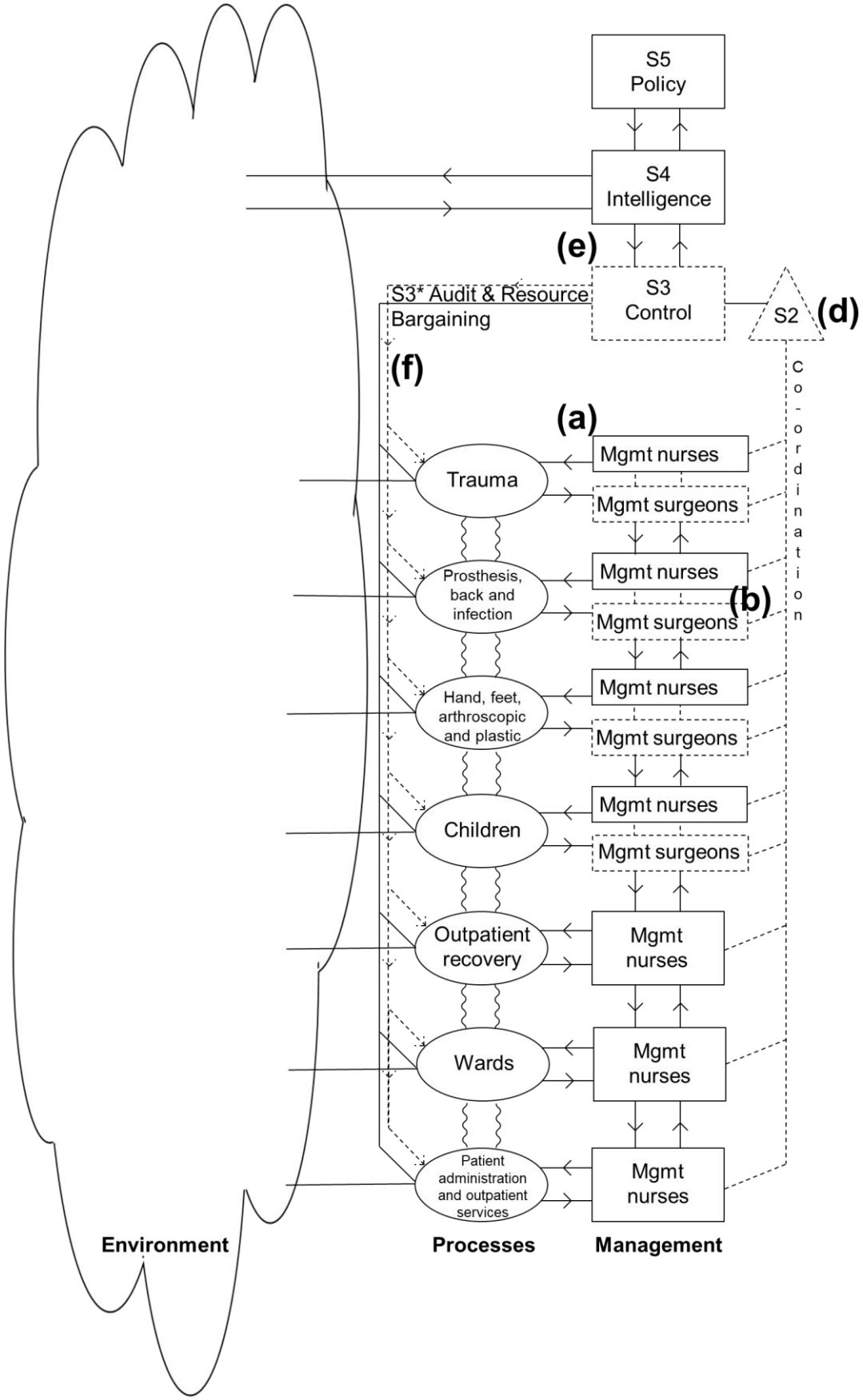

Figure 6.2: The VSM diagnosis with (a)-(e) indicating deviations from ideal

The letters (a)-(e) point to the location of the main deviations of departmental functioning from the ideal principles of the VSM. I will briefly explain the figure.

(a): The double management function in four of the S1 units, as described in section 6.1.3, is here depicted by each process having two distinct management functions.

(b): The dotted lines between the two management functions indicate lack of co-ordination between the two management functions, as described in section 6.1.3 as well as several places in section 6.2. The dotted line around the management functions for the surgeons in the four first processes indicates a weak management function because the distinction between process and management is unclear, as described in section 6.1.3.

(c): The dotted lines in the S2 area indicate a weak S2 function, which is described in section 6.2.

(d): The dotted line around the control box points to the weaknesses explained in section 6.3.

(e): The dotted line from S3* indicates the lack of feedback from audit and monitoring relating to this function.

Although there are dotted lines indicating weaknesses in the department, all functions are present and in that way support system viability.

Part V
Discussion and conclusion

7 Discussion

In the previous chapter, I presented and analyzed data collected from interviews and observations. This forms the basis for the following discussion. Let us recap that the purpose of this thesis is to answer the following problem statement:

What hindrances to systemic viability exist in a Norwegian hospital?

Based on the VSM principles and diagnosis presented in previous chapters, the department appears to be a viable system in terms of VSM principles; no system is completely missing or totally malfunctioning. However, as the VSM diagnosis indicated, there exist aspects of departmental running that might act as hindrances to viability and the main ones are considered in this chapter.

Based on the empirical analysis in Chapter 6 and the depiction of the VSM in section 6.10, I discuss the following issues: defining management, systems for dealing with the department's environment, and incomplete information flow, S2's ability to co-ordinate the unpredictable, meeting points to unite the occupational groups, Fast Track as a guiding star, and also systemic thinking as a prerequisite for viability. Hence, I revisit some of the major findings from the diagnosis presented in the previous chapter.

7.1 Defining S1 management

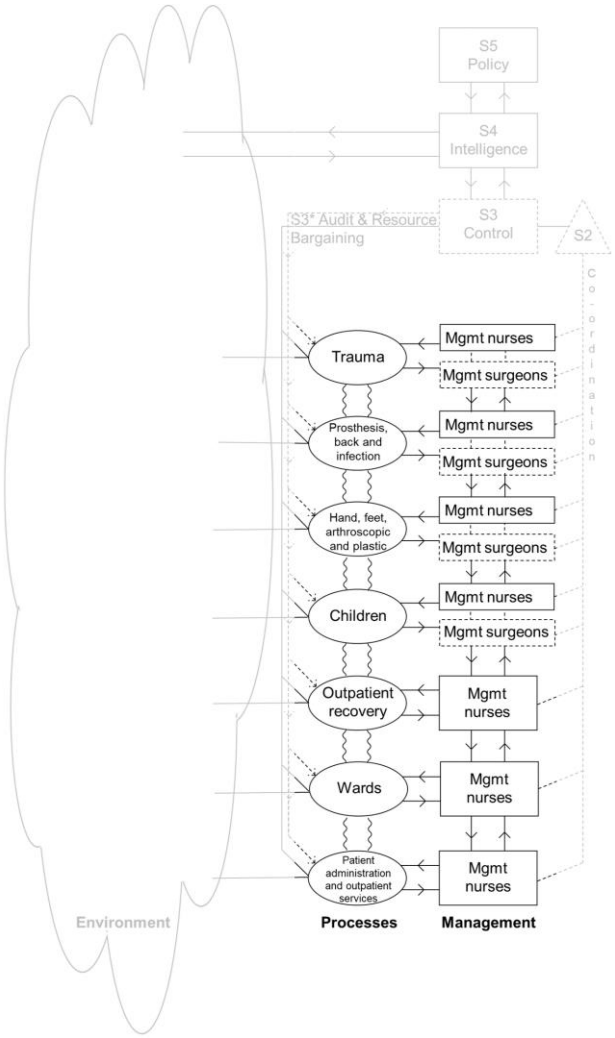

Figure 7.1: The section of the VSM highlighting challenges in S1

Four of the seven different S1 units/processes associated with patient-related activity holds double management functions, i.e. one process might have two management functions. This is illustrated in Figure 7.1. The same processes are split between occupational groups; nurses and doctors. The two different occupational groups have separate managements while being responsible for the same process. This can hinder viability in the way that it requires intervention from S2 functions in order to ensure smooth day-to-day activity and a required level of autonomy. Information flow is more demanding because two separate groups depend on exchanging information to attend to the tasks constituting the activity. Consequently, no management function controls a complete set of resources to perform the activities that the S1 unit is set out to do. Espinosa and Walker (2011) say that each S1 unit

> "should be as autonomous as possible regarding day-to-day decisions and thus needs to be capable of self-regulation; the more it is empowered to respond quickly to an unexpected situation, the more chance it has to develop adaptive responses and thus 'co-evolve' with its changing environmental niche" (p.45).

Having two sets of management functions managing the same set of tasks might lead to this process becoming slower and endangering the local viability. One can ask if the individual S1s are viable units in their own right. Based on the VSM diagnosis, the information flow between the occupational groups is an issue. If not handled correctly, it can threaten S1's ability to quickly adapt to environmental changes.

Also acting as a menace to the stability of the management functions in S1 is the vague border between process and management for the doctors with leadership responsibilities. This endangers S1's viability and puts pressure on S2. Doctors with leadership responsibilities spend a lot of time performing duties in the S1 processes and are directly involved and part of the patient treatment. The doctors' absence from their management post, hinders information flow between the double management function and thus between the two occupational groups. The flow of resources between the S1 units is mainly the nurses' responsibility to co-ordinate and it therefore forms an imbalance in the management function's focus. Doctors spend time on answering to the demands from the environment, while nurses in S1 need to spend a lot of time on S2 functions. This, together with the dual management function makes the information flow uneven and hard to implement. Espinosa and Walker (2011) describe how the viable systems in S1 might have resources moving between them, but that their main focus should be the relationship with their environment. It is S2 and S3's responsibility to ensure system cohesion.

Combined, dual leadership and undefined borders between management and process create a potentially unstable S1, more focused on higher systems' tasks than on adapting the system to the environment. However, I will not suggest merging the management positions into one physical position as the correct solution. Based on the input from the head of the clinic, there are several reasons for retaining management separated by occupation. One reason is that if there should be one single management role across the occupations, the likelihood is that this would end up being a doctor because of differences in various forms of power between them and nurses.

However, nurses are such a huge part of a hospital that there is a need for a management function attending closely to nurse related matters.

Creating a more united management function, implying closer co-operation and a more structured information flow supporting interdisciplinary management, might support viability in S1. This can be done by establishing fixed and interdisciplinary meeting points on all levels. Alternatively, one can alter the organization of management, consider a single management position in each unit. However, the topic of management in health organizations and having joint management positions cross-occupational groups is a continuously debated topic in the Norwegian health sector. E.g. The Norwegian Ministry of Health and Care Services (1997) discussed this in a report created by a committee identifying initiatives regarding management and organization that could improve operation in Norwegian hospitals. Apart from underlining the importance of having a clear management structure supporting interdisciplinary co-operation and operational efficiency, they put forward an alternative for single management points across occupational groups. The suggestion was to have one single management function in a department, having only administrative management responsibilities. This would be combined with a lower level of

management seeing to the occupational responsibilities, to ensure that occupational considerations were ensured. This might enable a uniform information flow and easier co-ordination possibilities across S1, while not having to compromise the professional strength of management.

This is not only an internal debate and challenge, but an important topic in management research. Renown organizational researchers, as Mintzberg and Glouberman (2001), argue that the question of who should manage the various occupational groups in the hospital today, is a burning one and they conclude that the health system needs individuals who can bridge these worlds to help others work collaboratively. While this thesis leaves me no room to further elaborate this important topic, it shows that it is still an ongoing debate, in which this diagnosis could potentially contribute.

7.2 The environment: A premise provider

Many of the challenges detected by the VSM diagnosis are related to a mismatch between available resources and demand. The department delivers according to expectations related to quality, but informants claim that the patients' experience a lack of capacity and that the department takes too long when dealing with them. However, the department does not conduct a systemized measure of the environment's expectations in terms of feedback from patients in units other than Fast Track. Espinosa and Walker (2011) explain how the relationship with the environment, according to organizational cybernetics, should involve strong feedback from the environment to all levels of an organization. Failings in achieving such feedback can lead to a lack of knowledge about the requirements and expectations from the environment and the department is then unable to adapt to important changes.

There exist functions in the department that can, if prioritized, provide valuable knowledge and insight from the environment. The outpatient clinic evaluates patients that are referred by general practitioners and hence generates knowledge about how many patients the department will treat in the future (not including emergency patients.) However, the outpatient clinic depends on the same doctors that the rest of the department, and according to the empirical findings, this activity is not a top priority. This leads to an information gap between S1 and the environment; the department does not have sufficiently updated knowledge about upcoming activity. Prioritizing the outpatient clinic could be regarded as an S4 function because it would enable the system to obtain knowledge about future needs and then form a basis for how to mobilize and adapt the system to meet this demand, hence knowing what capacity the department needs.

The fact that the patients are an integral part of the department's environment, demands that they should be deeply involved in providing feedback and influencing departmental activities on a daily basis. According to Høie (2015) the patients, hence the environment, ought to play an active role in shaping the hospital both by saying something about their needs to aid capacity-planning, and by having a right and easy ways to file a complaint. One of the repeated faults in the department detected by the VSM diagnosis is that some of the S1 units are not viewed as important and do not have a strong enough local management, hence are not realized as viable systems (Flood & Jackson, 1991a; Preece et al., 2015). Even though

the process of patient administration and outpatient services have a strong localized managements, the patient administration is not sufficiently prioritized elsewhere in the department. Hence, if the outpatient clinic is not prioritized to the same degree as for example surgery, then a queue of patients waiting to be evaluated will form. Thus, creating more uncertainty about the environment and the future needs for capacity.

To ensure that demands from the environment are sufficiently considered and implemented into operations, explicit distribution of responsibility is required. Even though looking into the future is a responsibility tied to S4, implementing this function into local S1 management could be wise, to enable them to consider their part of the local environment. However, as previously discussed, there is not much time left in the working day to address these needs for nurses with leadership responsibilities tied to operations. This might lead to vital information from the environment being lost and not addressed.

7.3 An unsteady information flow: A hindrance to viability

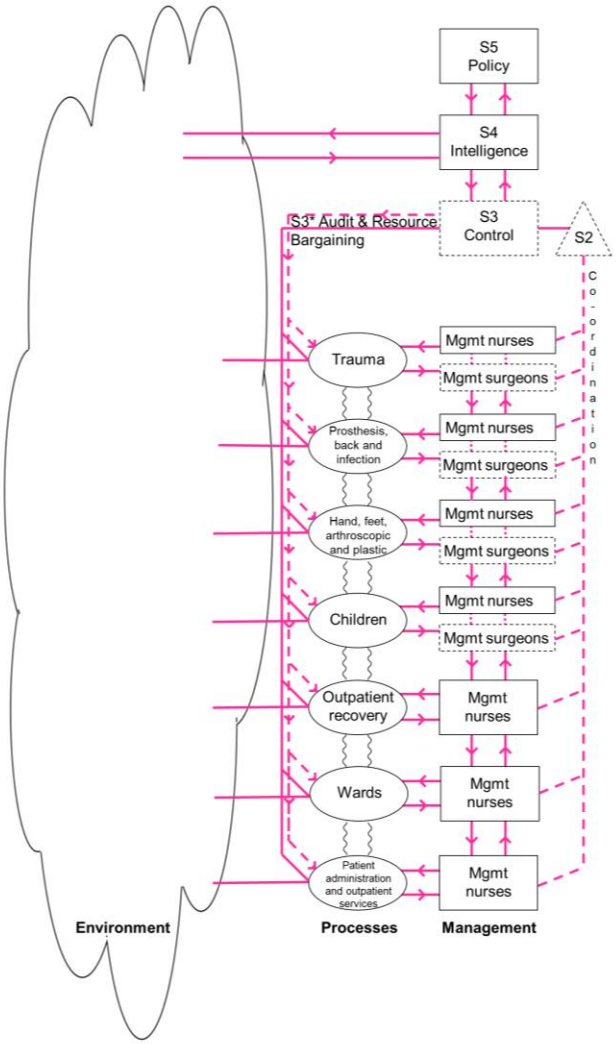

Figure 7.2: The VSM diagnosis highlighting current information flows

Several topics from the VSM diagnosis point to the department's challenge to keep the information flow steady and smooth. However, as pointed out by Flood (1995), VSM diagnosis often detects that parts of S3-S5 intervene directly into S1 without going through VSM recommended channels. For the system in focus, 'the department', the empirical analysis indicates that the system adheres to the information channels advocated by the VSM. However, in some cases, these are rather weak or almost non-existent. Effective information flow is a prerequisite for viability and hence the information flow needs constant attention. In this section, I will discuss how some of the weaker information flows create a hindrance to viability in the system in focus.

7.3.1 Feedback from S3

In the empirical analysis/diagnosis it was shown that even though S3 carries out monitoring and audits through S3*, this information does not regularly reach the units in S1. The information is handled by the administration. Even though personnel with leadership responsibilities have access to this feedback, the nurses directly involved in daily activites are requesting this information in order to be able to adjust their procedures and activity. One of the more common faults discovered through VSM diagnosis is exactly this; feedback about performance data is not provided to S1 by the system fast enough, thus S1 lacks the opportunity to adjust the operations accordingly (Flood & Jackson, 1991a; Preece et al., 2015). Espinosa and Walker (2011) further explain that viability is not possible without the opportunity to incorporate "real-time adjustments" (p. 56) based on constant feedback about how the system interacts with the environment. In my empirical analysis, one of the examples given on the lack of feedback to enable adjustment was that the theatre nurses were not given feedback on the increase in surgery-induced infections. Thus, they were not given the opportunity to evaluate what they were doing wrong and therefore to make required improvements. This might hinder viability because flaws in operations can become standard procedure, and, in a worst-case scenario endanger the patient. The difficulties of implementing lessons from mistakes or deviations, to adapt and adjust activities within health care, is a known challenge and is further discussed by e.g. Braithwaite, Iedema, and Jorm (2007). However, in Fast Track, this feedback is just as systemized as the measuring itself and provides the opportunity for this needed constant adjustment of daily operation.

Some issues that monitoring and audits can help detect are related to more than one of the occupational groups. Infections during surgery as an issue involve both the surgeon and the theatre nurses. In Fast Track, this is solved by interdisciplinary meeting points where statistics and issues are brought forward and discussion conducted between the participating occupational groups. Equivalent discussions in the wards are mainly carried out in the separate occupational groups. An S5 function, the "focus of the month", is for nurses only and the opportunity to address issues as interdisciplinary challenges is lacking. Solutions or ideas are therefore not systematically or indeed systemically communicated.

7.3.2 From S3-S5 to S1

The empirical analysis/diagnosis showed that providing enough information from S3-S5 to operations is a challenge. This is because some of the units are large, leading to too much distance between leader and employee, as well as a hectic schedule where activity is prioritized over information. There is also a need to sort out the correct composition of information for the different units. Not informing S1 enough about policy and long-term plans and changes in the total environment from a VSM perspective, might lead to an inadequate connection between S5 and S1. This combined with a high degree of local autonomy might hurt system cohesion and threaten viability. S1 might act against system policy because the information flow has not informed about the policy, and it might hurt both the relationship with the environment and what the system exists to do in the first place.

7.3.3 Information upwards

Some formal channels for information were identified, bringing information from S1 to the management systems; including appraisal interviews and systems for reporting deviations. However, informal channels are described as more central to communication and employees with leadership responsibilities largely rely on their personal relationship with employees. Success here depends on people showing up to share information about issues and concerns. These information channels are highly dependent on the individual and might undermine formal information channels that exist to support viability.

7.3.4 Means of communication: Enabling or disabling information flow?

The viability of a system depends on information shared and whom the information flows between. In addition, the means of communication, mentioned in the diagnosis, can both enhance and hurt the information flow. Supporting the system's members with means of communication that support the existing information channels promises to help to improve the different function's efficiency. An example is the use of paper to spread information in the department. No matter how quick and substantial the information is by digital means, there always exists a misalignment between existing information and access to it. Neither the nurses in the wards, nor the theatre nurses, most of the time do *not* have access to a computer. Thus, even though the vital information is updated in the system, nurses rely on the paper that was printed out at the beginning of the shift. They need to acquire updated information elsewise. This non-digital form of providing information to the operational link is therefore a hindrance to viability by hindering the information flow in the system. To further support this imbalance in access to information, it is worth mentioning that the cleaning staff members each holds an iPad attached to their trolley to help them keep track on their schedule and activity.

The second part of the challenge related to IT systems is the various use of it. An issue that can hinder important meeting points, for example, is that the calendar function in Outlook is not utilized in the same way by nurses as by doctors. Establishing fixed routines for how to summon a meeting could therefore back up the information flow across both units and occupational groups.

Some means of communication also act as a double-edged sword. The telephones used in operations are vital to get through daily activities. Not only do they support information flow in a hectic schedule where decisions need to be made quickly, they also help to prevent infections during surgery because they reduce the need to open doors during surgical interventions. The benefits of phones need no further discussion, seeing that is rather well known in today's society. However, the diagnosis demonstrated that phones interfere with people's attention to what is going on in every situation. This might be a result of the thought of a phone call implying a life or death situation with a patient or that the phone always implies a pressing situation. If phone use is not regulated, it might lead to the entire meeting structure being undermined and important information failing to reach the correct people.

Consequently, on the downside, phones, paper and inconsistent use of IT systems, harm the information flow.

7.4 S2's ability to co-ordinate the unpredictable

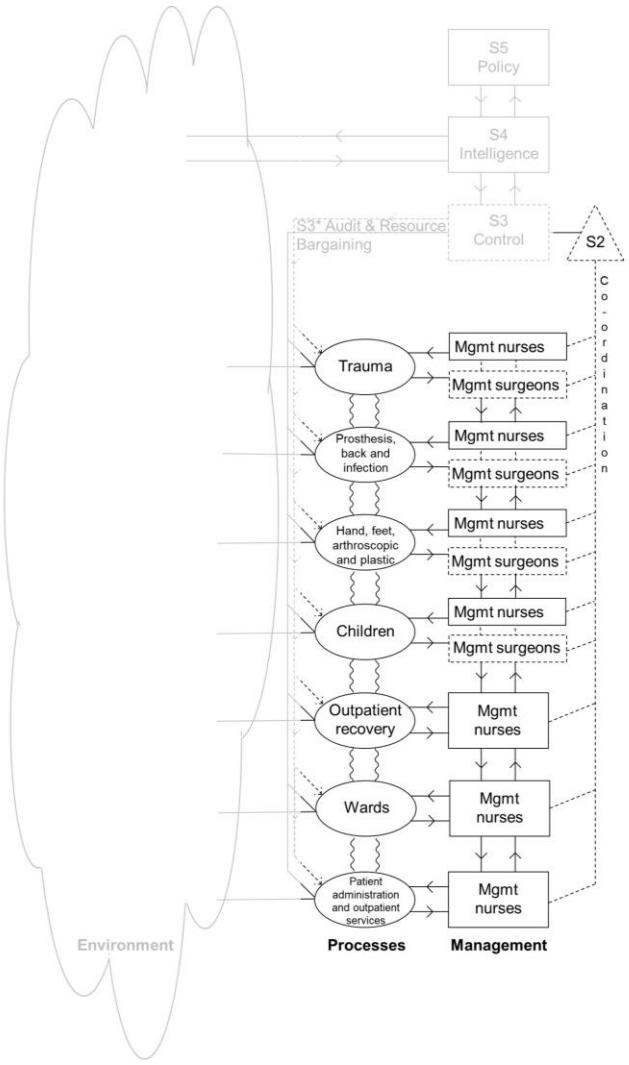

Figure 7.3: The section of the VSM diagnosis showing S2

The VSM diagnosis of S2 demonstrated that there exist regular meetings, a staffing center, IT systems and an activity plan, all of which are supposed to serve as co-ordinating functions for the system. On paper, these functions are well suited to fulfill the roles as S2 functions. However, in reality, the VSM analysis shows that they are not sufficient. Doctors and nurses are not able to exchange enough information on a day-to-day basis, meetings are cancelled or conducted with lack of structure, the staffing center is unable to provide support, and the IT systems are not used consistently.

On a daily basis, situations arise where there is a need for additional resources either in the form of extra beds or personnel due to sickness absence or a high number of incoming patients. Apart from the meeting between nurse leaders at the wards during every shift, there is no system in place to support the management in the various S1 units in co-ordinating personnel and patient capacity on a daily basis. Consequently, a lot of the S2 responsibility is today handled by S1 and time is spent on fire-fighting and making ends meet, instead of being spent on other tasks related to the leadership responsibilities. Flood (1995) argues that when the need for non-budgeted resources arises, this is a control challenge. An S3 function ideally should exist to intervene when the S2 function fails. Applying the VSM as a diagnostic tool in an organization often show that the S2 function is not complete and can hinder organizational viability (Flood & Jackson, 1991a; Preece et al., 2015) and so the problem in the department is not an uncommon one in organizations in general.

Likewise, weaknesses in the S2 function can enforce tensions between the S1 units and hinder system viability by endangering system cohesion if resources are not utilized effectively and if S1 is not given the time to meet demands from the environment; in this case, dealing with patient treatment.

Most meetings related to S2 are held for the individual occupational groups, e.g. morning meetings, weekly meetings etc. This renders interdisciplinary problem solving difficult. Lack of interdisciplinary meeting points impacts on the information flow, hence affecting the daily operations. A lot of time is spent finding the needed resources and to carry through meeting points, like the doctor's round, that should have been fixed and permanent. Likewise, the low threshold for cancelling meetings, the lack of a meeting structure, and a high level of meeting interruptions (telephone, people entering and leaving etc.) affect the quality of the already existing S2 functions, affecting both S1 and the information flow. There exists a large number of meetings for both occupational groups to meet separately, and it might be helpful to revisit the intentions with meeting points serving as S2 functions to consider making the meeting structure more stable and interdisciplinary, to release time and capacity to S1 activity, while at the same time strengthening co-ordination abilities and information flow.

While IT systems are great tools for S2, the inconsistent use of and access to them in this department indicates a weakness in S3. An S3 responsibility is to "ensure compliance with existing rules" (Hildbrand & Bodhanya, 2014, p. 2055). Even though the use of IT system is not decreed by law, it is important to have firm guidelines for systems like these to ensure that they protect the principles of S2. Today, these IT systems benefit parts of the system, while creating frustration in other places.

This lack of co-ordination and attendance to co-ordination is likely to prevent detection of misalignments or imbalance between S1 units in terms of resources, demand and capacity.

S2 is important in terms of damping oscillation in S1. The diagnosis revealed that there might be worries about the risk of putting both units and occupational groups up against each other because the fight for resources becomes so absorbing. This aligns with Espinosa and Walker (2011) who argue that a weak S2 might lead to the "oscillatory dis-ease" (p. 47), meaning that it might provoke competition over collaboration and conflict over harmony. The fact that informants do not describe the other occupational groups as colleagues might underline the fact that there is a need for a stronger S2 mechanism.

Many of the S2 functions are today conducted in the S1 units; success is down to the leaders' ability to co-operate and problem solve. Flood (1995) argues that to evaluate the effectiveness of an S2 function in the system in focus, some questions might be asked. Among them are

> "Does co-ordination respond with reasonable speed? Are there co-ordination procedures carried out at level 1 that would be more effectively handled at level 2 or level 3? Are co-ordinators adequately skilled and qualified to carry out their tasks?" (p. 149-150).

In this case, the answers to these questions reinforce the argument of a weak co-ordinating function. Co-ordination in the wards is characterized by fire fighting and solving S2 issues so slowly that sometimes they are not solved at all. S1 management spends a lot of time figuring out the same information in parallel, likely being handled more effectively if handled by S2. The individuals currently carrying out co-ordination in S1 work very hard to get through the list of daily needs. In most cases, they eventually find a solution, but after having spent close to a full work day trying to solve co-ordination issues like sick absence or bed capacity. However, these are nurses and are not particularly trained or specialized in logistics and co-ordinating activity, other than being experienced in doing the job itself. This suggests a more effective solution is needed, having an S2 function specialized in these challenges, focusing on that alone. Today, the weak S2 also weakens the benefits of having a common S2 function. Espinosa and Walker (2011) describe how the focus for S1 should be the environment and what they exist to do. S2 and S3, on the other hand, should be the ones concentrating on making sure that the units are co-ordinated to support system cohesion.

The functions related to S2 should therefore be reassessed and the needs for co-ordination should be revisited in order to find more effective measures to handle S2 problems.

The VSM diagnosis revealed that the S2 functions are especially vulnerable to meeting structures being cancelled due to daily activity. S3 functions dealing with longer-term issues are better planned and have a clearer meeting structure. Meetings dealing with day-to-day or week-to-week co-ordination are not structured as well, despite them affecting the operation just as much. Addressing issues related to meeting disturbances, the need for a clear leader, and a structured agenda, would strengthen S2 and provide safe havens for information flow and co-ordination related challenges.

7.5 Meeting points: Uniting the occupational groups

Despite patient focus and treatment being at the very center of the system in focus, the two most important occupational groups required to complete patient-related activity have few common meeting points. In the wards, the only meeting point that is interdisciplinary on a daily basis is the doctor's round. This hinders the department in creating an interdisciplinary problem-solving capacity on all levels. The Operational meeting is a meeting point where everyone involved in S1 operations are represented. However, this meeting is vulnerable to commitments staff have to other activities and is frequently cancelled. This removes the assurance that there exists a fixed and permanent S2 function that provides interdisciplinary co-ordination. Establishing fixed meeting points with clear meeting structures might enable a smoother information flow between the occupational groups and support S2's position in the system.

The need for interdisciplinary is not only pressing between doctors and nurses. Introductorily in this thesis, I discussed the need for a more holistic approach to patient treatment due to the increasing complexity of diagnoses. The increasing sub-specialization described in the diagnosis and the struggle to get an expert judgement for patients due to non-orthopaedic conditions stands in contrast with the need for a holistic approach. Interdisciplinary meeting points are becoming increasingly important, both across occupations and sub-specializations,.

However, setting up meetings is not enough. The lack of meeting structure and leadership in several of the existing meeting points needs to be addressed in order for the system to support the management functions. A weak meeting structure can greatly hurt information flow, and in a hospital department like can create serious consequences if information is not received by the right people. An initial step in addressing this is to create structured meeting agendas for the various meeting points, appointing a leader, and making quality meetings happen!

7.6 Fast Track: A guiding star?

Today, only the two Fast Track pathways are somewhat shielded against other activities. Special circumstances do not affect this part of the operation to the same degree as it does other units. Fast Track patients are the last to be cancelled when resources are squeezed, while other activities have to reschedule and be replanned. In order to ensure that the S1 units are viable systems, they need to be autonomous enough to survive and adapt on their own. Today, a lot and probably too much of the activity depends on S2 functions, to get resources flowing between the units. This creates flexibility, but also in some periods harms activities of various units.

Two Fast Track pathways exist in the department today and they are found at a lower level of recursion than the system in focus. This provides a good example of VSM principles already implemented into the organization. The Fast Track can act as a guiding star to implementing lessons from the VSM. This is because the implementation of the Fast Track pathways that work so well has already provided the department with certain capabilities and the confidence to know that it is possible. Of course, this has wider considerations because it means tying down resources that currently are drawn upon to deal with short-term crises.

I now summarize some aspects of Fast Track that supports the VSM mindset to show how this process can support viability and that the department already has addressed some hindrances to viability.

- There exists a fixed interdisciplinary meeting point that takes place every week, being prioritized by the attendees and therefore not easily cancelled. It is a stable S2 and S3 function that creates the assurance that interdisciplinary challenges will be dealt with.

- The meetings have a clear meeting structure and enabling information to reach all attendees

- This Fast Track meeting acts as an S2 function, where the previous week's activity is evaluated and where upcoming activities are planned. Every occupational group represented gives input to what will be important for the coming period and problems to be addressed.

- Some of these meetings are extended Fast Track meetings, acting as an S3 function. When used to treat challenges or feedback from the environment, e.g. patients, it enables them to adapt accordingly.

- There is a clearly established information flow with the environment. Patients are informed about key information prior to the surgery and all patients provide systematic feedback on the process to enable S1 processes to adapt.

- Using the extended Fast Track meetings as an arena for decision making across occupational groups supports the autonomy in the pathway because the meeting has been given decision-making power to react to environmental changes or feedback.

The final point in my list, points to the important principle in the VSM about redistribution of decision-making power and moving away from the traditional hierarchic structure to implement change and to make decisions. Both Leonard (2009) and Flood (1999) lift this as a strength of the VSM.

However, it should be mentioned that the Fast Track pathways only handle elective patients, meaning planned patients that know about the surgical intervention beforehand. Information to and from patients, the ability to plan etc. is therefore not directly applicable to the part of operation dealing with emergency patients. Neither emergency patients nor the department knows that they will become ill and the time frame to plan and interact with the patient is therefore far shorter. Nonetheless, many of the principles are applicable to the remainder of the department. Interdisciplinary meeting points and S2 and S3 functions enabling the unit to adapt to the environment are principles that are both needed and possible to implement, in addition to the feedback.

7.7 Systemic thinking: A prerequisite for viability

VSM principles presuppose a systemic view of organizations. The VSM is built on the idea that organizations are systems and where internal and external relationships are of great importance. The diagnosis also revealed some challenges tied to systemic principles.

Negative attitudes towards organizational changes mentioned in the diagnosis might act as a hindrance to viability. The reason for this is that to show requisite variety, an organization needs to adapt to the changes in the environment. Not wanting or knowing how to change is therefore something potentially harmful to the organization. Flood (1995) supports the need for being open to change and claims that “Management functions exist to deal with change. All forms of organization experience and need to respond to change” (p. 148). Thus, in order to establish well-functioning management functions, attitudes towards changes need to be addressed. Likewise, capabilities and skills necessary to make changes possible must also be addressed. As revealed by the diagnosis, initiating change through projects might be a challenge because not enough people are involved in the initiatives. Consequently, addressing one problem in isolation without the required resources might lead to different results than intended, or none at all, because it disregards the relationships between challenges and occupational groups.
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8 Conclusion

In this thesis, I have identified six main deviations from the ideal principles of the VSM that are likely, or even proven, to act as hindrances to viability in the Department of Orthopaedic surgery at St. Olav's Hospital. To do this, I have completed an empirical case study in a large department in one of Norway's largest hospitals. By analyzing interviews and observations, I have created a diagnosis using the VSM to identify hindrances to viability. In this chapter, I will briefly summarize my findings, present some implications for practice, outline further or follow up research that I think is required, and finally address limitations of this study.

Based on the VSM diagnosis and subsequent discussion, the prominent hindrances within the case department are: No clearly defined management function in some of the S1 units, weak systems for dealing with the environment, an S2 function under threat, few and unstable interdisciplinary meeting points, and a somewhat reductionist approach to management. However, the diagnosis show that parts of the operation, the two Fast Track pathways, to a high degree adhere to the principles of VSM and can be used as a guiding star when developing the department (notwithstanding implications for limited resources). The findings; the six main deviations, in addition to the possibility of using Fast Track as a guiding star, are further summarized in table 8.1.

Table 8.1: Summary of the main findings in the thesis

MAIN FINDINGS
1) Not clearly defined management function in some of the S1 units - Distinct management for each occupational group (i.e. doctors and nurses) - The doctors' management spend much time conducting operational activity, leaving less time for managerial tasks
2) Weak systems for dealing with the environment as a premise provider - Low prioritization of activities providing knowledge about the future activity (e.g. outpatient clinic)
3) An unsteady information flow - Lack of feedback from audits and other monitoring activity that could provide valuable input for adjusting daily activity - Large and composite units make information flow challenging - Informal channels are utilized to obtain information from S1 - The use of phones and paper, imbalanced access to digital information and lack of clear meeting structures restrict the information flow
4) A threatened co-ordination function - Double management functions render co-ordination difficult between the occupational groups - Few and vulnerable interdisciplinary meeting points - No formal function to help support co-ordination cross units - Personnel conducting co-ordination does not have the sufficient formal training to carry through co-ordination activity - Inconsistent use of IT-systems
5) Few and unstable interdisciplinary meeting points - Lack of interdisciplinary meeting points - Easily cancelled - Lack of clear meeting structure and leadership - The use
6) Systemic thinking as a prerequisite for viability - Attitude towards change - High degree of projects that are not given priority by everyone involved
Fast Track: A guiding star? - Pathways adhering to VSM principles to a great extent - Fixed, stable and structured interdisciplinary meeting points - Clear decisions making power supporting autonomy - Established communication channels with the environment

Implications for practice, implications for further research, and limitations

The study described in this thesis has implications for research and practice. This will be described in this section and I also identify some limitations to my study.

I argue that my thesis is timely because we are approaching a future with ever-scarce resources and ever-increasing needs for hospital services. The need to evaluate isolated problems and to increase local efficiency, is replaced by the need for system effectiveness and the need for a system working together and constantly adapting to demands in the environment. Introductorily, I mentioned the need for increased knowledge about what attributes to great differences in efficiency between the Norwegian hospitals. Connected to this, Kotter (1995) claims that structures within a system can act as hindrances to change. Thus, this study can help make the organizational structures in Norwegian hospitals visible and also visualize how the structures hinder the changes required to increase efficiency and help meet future demand.

This empirical study revealed hindrances to viability, that in many ways are recognizable to the system's members, confirming that the VSM is a useful tool for management in Norwegian hospitals. Additionally, of significance, there are no previous applications of the VSM to Norwegian hospitals. Likewise, the study is timely; increased demand, fewer resources, and a need to view and handle the Norwegian hospital in a different way require a fresh look at how hospitals work and the principles of VSM resonate strongly with those needs.

Furthermore, in the Introduction of this thesis, I introduced a patient anticipating a package tour having everything prepared and planned, but experienced a journey more like a backpacker trip. More and more patients are diagnosed with complex and composite diseases with the need for interdisciplinary attention. This study contributes to the debate about Norwegian hospitals becoming more and more sub-specialized and divided into occupational groups and specializations in the context of an environment that is complex, interdisciplinary and composite. This thesis, through VSM and systemic thinking, addresses the negative tendencies to reductionism in Norwegian hospitals, and in this regards the VSM offers a common tool for discussion across occupational groups enabling an interdisciplinary discussion about vital current challenges. In addition, the study can contribute to the debate regarding what kind of management structure we should see in Norwegian hospitals and what kind of leadership skills that are really required.

This thesis is concerned only with the part of the VSM toolbox dealing with system identification and system diagnosis. There is so much more that could be achieved given more time, at least more time than a Master's thesis permits. The next step I would take is to think through redesign of the organization by addressing the deviations from the ideal VSM structure. As the VSM only helps to provide a diagnosis of the system in focus, and not 'solutions', further efforts would need to employ other methods (like the ones found in what is called Action Research) to handle some of the challenges detected through the diagnosis. It would be helpful to create a plan of action based on an agenda for debate. In my view, creating an agenda for debate with departmental stakeholders is the critical next step to harness the value of the findings generated by the VSM diagnosis reported above. The agenda I would propose would be in the form of questions addressing issues surfaced by the

VSM diagnosis. The questions would aim to generate dialogue between stakeholders with the aim that the stakeholders themselves would reconsider the points that I make, and then work out plans for action and change. In this way, they would take ownership of both the challenges and change processes.

I consider the principles of Action Research highly relevant to such a process and would explore these principles as a means by which to facilitate change processes based on the VSM diagnosis. Action Research at its most basic, aims to generate dialogue between stakeholders, ensuring meaningful participation, overcoming processes of power, leading to action to improve matters in terms of the stakeholders' perceptions and needs (Flood, 2010; Greenwood & Levin, 2007). It is somewhat frustrating for me as a researcher to have to conclude the project at this stage when the VSM diagnosis has generated so many useful insights that promise to be of high value to staff in the department, staff who work so hard at delivering patient care. However, the findings have been discussed with the Head of the Department and the response was very positive, almost amounting to surprise that the VSM diagnosis has generated so many valuable insights and identified many areas for improvement.

As far as further research is concerned, it would not only be interesting to continue the research revolving around these hindrances. Additionally, in a time where digitalization is at the very centre of organizational development, it would be of interest to apply the VSM to see how co-ordination challenges are attempted solved using technology. This would be especially interesting in the light of the findings in this study, considering how great the potential is for digitalization in the Norwegian hospitals in general.

This thesis is limited because it does not consider in any detail how this level of recursion might be linked to other levels of recursion and how it might fit into the bigger picture. It does not problematize how the information channels at higher levels of recursion are organized and thus a major part of the terms/conditions that the department is working under. Due to time constraints, defining a Master's thesis where the aims were achievable in the rather short time available, the scope of this thesis was limited to surfacing a deeper understanding of the system. However, further research could reveal how challenges raised in this thesis could be affected by events or characteristics in higher or lower levels of recursion.

As discussed several times in this thesis, the patients are an integral part of the system's environment. Thus, to make a VSM diagnosis in a truly systemic way, requires gathering empirical data from patients. It would be of great interest to further study the patients' view of the system and how they perceive it. I did not delve into this area because of a wide range of issues. In particular, my lack of experience in dealing with patients suffering from problematic ailments and ethical issues arising therefrom.

As this case study only evaluated one department within one hospital, it would be of interest to carry out several more case studies in similar systems or at other levels of recursions, to be able to say something about how general these hindrances are to the Norwegian hospital system. A multiple case study (Stake, 2005) could be conducted to verify the findings of this study.

Political and socio-cultural conditions most definitely have a large influence on how any VSM diagnosis turns out. Espinosa and Walker (2011), argue that “where there is social organisation one will always witness the play of politics” (p. 61). However, this was outside the scope of this thesis and it would be interesting to study this in light of the outcomes of this study. The findings of this study would act as a starting point for such a discussion by including questions like *why* and *how* might we handle the issues.

The hospital does not merely consist of nurses and doctors, by no means. A large number of occupational groups with different skill sets are required to perform the activities that takes place within the hospital every day. I saw it necessary to restrict the scope of analysis to get a sufficient understanding of their workday. However, further research would enable a wider VSM diagnosis by including even more occupational groups.

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Part VI
Appendices

Appendix I: Interview guide

Introduction:

- Estimated length
  This interview will take maximum 45 minutes. It will of course vary how much time we need, but I will do my best to keep us within the time frame.

- Needed qualifications
  There are no right or wrong answers and it requires no knowledge or qualifications to answer the questions. Please describe situations as best as you can.

  I will do my best to use terminology in the correct manner, but if you are not sure about what I am referring to, please ask.

- Norwegian Centre for Research Data (NSD)
  I have reported my study to Norwegian Centre for Research Data (NSD) and my research is done in accordance with their guidelines.

- Information about the study
  I am writing my Master's thesis within Strategic Change Management at the Department of Industrial Economics and Technology Management (IØT) at NTNU.

  The purpose of the study is to reveal challenges in the Norwegian hospital by analyzing it as a system where you cannot necessarily isolate individual challenges because everything is connected. Changes one place could affect the rest of the system. The Department of Orthopaedic surgery is my case and through interviews and observations, I will try to say something about how the system is connected. The objective of these interviews is to enable me to describe elements related to communication and information flow, hence also effectiveness. By interviewing people from different units in the department, I will aim to describe a picture that is as realistic as possible.

- Anonymity
  Quotes will be anonymized if used in the thesis.

- Access to data
  Only my supervisors and myself will have access to the raw data.

- Permission to audio record
  Is it okay that I audio record this interview? The recording will be deleted once the study is completed.

Background:

1. Title/position

2. Education/occupation

3. How long have you been working within this department (orthopaedic)?

4. Have you moved between different positions within this department (orthopaedic)?
- Ask for examples

A normal day at work:

5. Please describe a normal day at work for you

6. What are your main responsibilities?
- Do you have any leadership responsibilities?

Communication/Information flow:

7. Whom do you need to co-operate/communicate with throughout your workday?
- Are these people easily available to you?

8. What type of information do you need to be able to do your job?
- Is this easily available? Why/why not?

9. What are the main means for communication within the unit?

10. What fixed meeting points do you have throughout the course of a day, a week, a month etc.?

11. How often do you talk to your nearest leader?
- How often do you talk to leaders at higher levels/other units?
- Do leaders get directly involved in your daily activities?

12. (If leadership responsibilities):
- How do you follow up on your employees?
- How do you see to that you get aware of concerns and challenges in your area of responsibility?
- How do you inform your employees about challenges, changes and future need?

Operations/Management:

13. Are you working within set teams? Do you mainly work with the same people?

14. Do you rotate between tasks or do you stick to your specialization?

Goals:

15. How do you plan your activities (the section)?

16. How are goals determined/set?
- How are goals measured?

17. Do your feel that someone or something oversees/monitors your work?

Co-ordination:

18. You work within x, how well would you say that you cooperate with y?

19. Do you have any means of coordinating activities across the orthopedic department so that resources are utilized and goals met?

Audit and resource bargaining/Control:

20. What is the unit's largest constraint/limitation on a daily basis? (For example anesthesia, people, hours, rooms etc.)

21. If you experience lack of resources, how is that handled?
- Do you feel that frustration related to this is understood/heard?

22. Do different parts of the department lend resources to each other when needed? Give examples

Intelligence:

23. Are you familiar with your units future needs?
- How well do you feel that you are responding to the needs in the environment?

24. Do you have any arenas that inform you about the future development and needs?

25. What do you believe are the patients' greatest concerns and needs?
- How do you think they are met?

Policy:

26. How would you describe the unit's overall objective?

27. Are you part of strategic/organizational decisions?

Closing up:

28. What do you think the orthopedic department is good at right now/what are its greatest strengths?

29. In what areas do you believe the orthopedic department have the greatest challenges right now/what are its greatest weaknesses?

30. Do you have anything you want to add, which you feel that this questionnaire has not addressed?

Appendix II: Report to the Norwegian Centre for Research Data

MELDESKJEMA

Meldeskjema (versjon 1.6) for forsknings- og studentprosjekt som medfører meldeplikt eller konsesjonsplikt (jf. personopplysningsloven og helseregisterloven med forskrifter).

1. Intro		
Samles det inn direkte personidentifiserende opplysninger?	Ja ● Nei ○	En person vil være direkte identifiserbar via navn, personnummer, eller andre personentydige kjennetegn. Les mer om hva personopplysninger er. NB! Selv om opplysningene skal anonymiseres i oppgave/rapport, må det krysses av dersom det skal innhentes/registreres personidentifiserende opplysninger i forbindelse med prosjektet. Les mer om hva behandling av personopplysninger innebærer.
Hvis ja, hvilke?	■ Navn ⊔ 11-sifret fødselsnummer ⊔ Adresse ⊔ E-post ⊔ Telefonnummer ⊔ Annet	
Annet, spesifiser hvilke		
Skal direkte personidentifiserende opplysninger kobles til datamaterialet (koblingsnøkkel)?	Ja ○ Nei ●	Merk at meldeplikten utløses selv om du ikke får tilgang til koblingsnøkkel, slik fremgangsmåten ofte er når man benytter en databehandler.
Samles det inn bakgrunnsopplysninger som kan identifisere enkeltpersoner (indirekte personidentifiserende opplysninger)?	Ja ● Nei ○	En person vil være indirekte identifiserbar dersom det er mulig å identifisere vedkommende gjennom bakgrunnsopplysninger som for eksempel bostedskommune eller arbeidsplass/skole kombinert med opplysninger som alder, kjønn, yrke, diagnose, etc. NB! For at stemme skal regnes som personidentifiserende, må denne bli registrert i kombinasjon med andre opplysninger, slik at personer kan gjenkjennes.
Hvis ja, hvilke	Stillingstittel/yrke	
Skal det registreres personopplysninger (direkte/indirekte/via IP-/epost adresse, etc) ved hjelp av nettbaserte spørreskjema?	Ja ○ Nei ●	Les mer om nettbaserte spørreskjema.
Blir det registrert personopplysninger på digitale bilde- eller videoopptak?	Ja ○ Nei ●	Bilde/videoopptak av ansikter vil regnes som personidentifiserende.
Søkes det vurdering fra REK om hvorvidt prosjektet er omfattet av helseforskningsloven?	Ja ○ Nei ●	NB! Dersom REK (Regional Komité for medisinsk og helsefaglig forskningsetikk) har vurdert prosjektet som helseforskning, er det ikke nødvendig å sende inn meldeskjema til personvernombudet (NB! Gjelder ikke prosjekter som skal benytte data fra pseudonyme helseregistre). Les mer. Dersom tilbakemelding fra REK ikke foreligger, anbefaler vi at du avventer videre utfylling til svar fra REK foreligger.
2. Prosjekttittel		
Prosjekttittel	The Viable System Model in the Norwegian Hospital sector	Oppgi prosjektets tittel. NB! Dette kan ikke være «Masteroppgave» eller liknende, navnet må beskrive prosjektets innhold.
3. Behandlingsansvarlig institusjon		
Institusjon	NTNU	Velg den institusjonen du er tilknyttet. Alle nivå må oppgis. Ved studentprosjekt er det studentens tilknytning som er avgjørende. Dersom institusjonen ikke finnes på listen, har den ikke avtale med NSD som personvernombud. Vennligst ta kontakt med institusjonen. Les mer om behandlingsansvarlig institusjon.
Avdeling/Fakultet	Fakultet for økonomi (ØK)	
Institutt	Institutt for industriell økonomi og teknologiledelse	
4. Daglig ansvarlig (forsker, veileder, stipendiat)		

Fornavn	Hanne	Før opp navnet på den som har det daglige ansvaret for prosjektet. Veileder er vanligvis daglig ansvarlig ved studentprosjekt. Les mer om daglig ansvarlig. Daglig ansvarlig og student må i utgangspunktet være tilknyttet samme institusjon. Dersom studenten har ekstern veileder, kan biveileder eller fagansvarlig ved studiestedet stå som daglig ansvarlig. Arbeidssted må være tilknyttet behandlingsansvarlig institusjon, f.eks. underavdeling, institutt etc. NB! Det er viktig at du oppgir en e-postadresse som brukes aktivt. Vennligst gi oss beskjed dersom den endres.
Etternavn	Finnestrand	
Stilling	Førsteamanuensis	
Telefon	99024720	
Mobil		
E-post	hanne.finnestrand@ntnu.no	
Alternativ e-post	hanne.finnestrand@ntnu.no	
Arbeidssted	NTNU	
Adresse (arb.)	Alfred Getz vei 3	
Postnr./sted (arb.sted)	7491 Trondheim	
5. Student (master, bachelor)		
Studentprosjekt	Ja ● Nei ○	Dersom det er flere studenter som samarbeider om et prosjekt, skal det velges en kontaktperson som føres opp her. Øvrige studenter kan føres opp under pkt 10.
Fornavn	Maren Berge	
Etternavn	Vik	
Telefon	97153226	
Mobil		
E-post	marenbvik@gmail.com	
Alternativ e-post	marenbvi@stud.ntnu.no	
Privatadresse	Olav Tryggvasons gate 28	
Postnr./sted (privatadr.)	7011 Trondheim	
Type oppgave	● Masteroppgave ○ Bacheloroppgave ○ Semesteroppgave ○ Annet	
6. Formålet med prosjektet		
Formål	By diagnosing a clinic at St.Olav Hospital in Trondheim, I will in this Master's thesis empirically test the Viable System Model's value for change management within in the Norwegian hospital sector.	Redegjør kort for prosjektets formål, problemstilling, forskningsspørsmål e.l.
7. Hvilke personer skal det innhentes personopplysninger om (utvalg)?		
Kryss av for utvalg	␣ Barnehagebarn ␣ Skoleelever ■ Pasienter ■ Brukere/klienter/kunder ■ Ansatte ␣ Barnevernsbarn ␣ Lærere ■ Helsepersonell ␣ Asylsøkere ␣ Andre	Les mer om forskjellige forskningstematikker og utvalg.
Beskriv utvalg/deltakere	Ansatte ved Klinikk for ortopedi, revmatologi og hudsykdommer ved St. Olavs hospital i Trondheim. Det vil bli tatt en avgjørelse om avgrensning. Jeg har også et ønske om å intervju pasienter/brukere av klinikken. Det vil ikke bli kartlagt forhold rundt sykdomsbilde, men rundt deres opplevelse av kontakten med klinikken.	Med utvalg menes dem som deltar i undersøkelsen eller dem det innhentes opplysninger om.
Rekruttering/trekking	I dialog med ledelsen på klinikken velges de ansatte som vil kunne være hensiktsmessige for kartleggingen. Jeg vil også ta i mot tips fra intervjuobjekt om hvilke stillinger som ville kunne bidra. Mål er å få dekket ulike perspektiv og nødvendigvis ikke kvantitet.	Beskriv hvordan utvalget trekkes eller rekrutteres og oppgi hvem som foretar den. Et utvalg kan rekrutteres gjennom f.eks. en bedrift, skole, idrettsmiljø eller eget nettverk, eller trekkes fra registre som f.eks. Folkeregisteret, SSB-registre, pasientregistre.

Førstegangskontakt	Ledelsen på klinikken informerer de ansatte om mitt forskningsprosjekt og setter med i kontakt med en initiell gruppe. Senere vil jeg selv kontakte ansatte på avdelingen. Pasienter vil, hvis det lar seg gjøre, bli "rekruttering" via klinikken.	Beskriv hvordan førsstegangskontakten opprettes og oppgi hvem som foretar den. Les mer om førstegagskontakt og forskjellige utvalg på våre temasider.
Alder på utvalget	⊔ Barn (0-15 år) ⊔ Ungdom (16-17 år) ■ Voksne (over 18 år)	Les om forskning som involverer barn på våre nettsider.
Omtrentlig antall personer som inngår i utvalget	20	
Samles det inn sensitive personopplysninger?	Ja ○ Nei ●	Les mer om sensitive opplysninger.
Hvis ja, hvilke?	⊔ Rasemessig eller etnisk bakgrunn, eller politisk, filosofisk eller religiøs oppfatning ⊔ At en person har vært mistenkt, siktet, tiltalt eller dømt for en straffbar handling ⊔ Helseforhold ⊔ Seksuelle forhold ⊔ Medlemskap i fagforeninger	
Inkluderes det myndige personer med redusert eller manglende samtykkekompetanse?	Ja ○ Nei ●	Les mer om pasienter, brukere og personer med redusert eller manglende samtykkekompetanse.
Samles det inn personopplysninger om personer som selv ikke deltar (tredjepersoner)?	Ja ○ Nei ●	Med opplysninger om tredjeperson menes opplysninger som kan identifisere personer (direkte eller indirekte) som ikke inngår i utvalget. Eksempler på tredjeperson er kollega, elev, klient, familiemedlem, som identifiseres i datamaterialet. Les mer.
8. Metode for innsamling av personopplysninger		
Kryss av for hvilke datainnsamlingsmetoder og datakilder som vil benyttes	⊔ Papirbasert spørreskjema ⊔ Elektronisk spørreskjema ■ Personlig intervju ⊔ Gruppeintervju ■ Observasjon ⊔ Deltakende observasjon ⊔ Blogg/sosiale medier/internett ⊔ Psykologiske/pedagogiske tester ⊔ Medisinske undersøkelser/tester ⊔ Journaldata (medisinske journaler)	Personopplysninger kan innhentes direkte fra den registrerte f.eks. gjennom spørreskjema,intervju, tester, og/eller ulike journaler (f.eks. elevmapper, NAV, PPT, sykehus) og/eller registre (f.eks.Statistisk sentralbyrå, sentrale helseregistre). NB! Dersom personopplysninger innhentes fra forskjellige personer (utvalg) og med forskjellige metoder, må dette spesifiseres i kommentar-boksen. Husk også å legge ved relevante vedlegg til alle utvalgs-gruppene og metodene som skal benyttes. Les mer om registerstudier. Dersom du skal anvende registerdata, må variabelliste lastes opp under pkt. 15 Les mer om forskningsmetoder.
	⊔ Registerdata	
	⊔ Annen innsamlingsmetode	
Tilleggsopplysninger		
9. Informasjon og samtykke		
Oppgi hvordan utvalget/deltakerne informeres	■ Skriftlig ■ Muntlig ⊔ Informeres ikke	Dersom utvalget ikke skal informeres om behandlingen av personopplysninger må det begrunnes. Les mer.Vennligst send inn mal for skriftlig eller muntlig informasjon til deltakerne sammen med meldeskjema. Last ned en veiledende mal her. Les om krav til informasjon og samtykke. NB! Vedlegg lastes opp til sist i meldeskjemaet, se punkt 15 Vedlegg.
Samtykker utvalget til deltakelse?	● Ja ○ Nei ○ Flere utvalg, ikke samtykke fra alle	For at et samtykke til deltakelse i forskning skal være gyldig, må det være frivillig, uttrykkelig og informert. Samtykke kan gis skriftlig, muntlig eller gjennom en aktiv handling. For eksempel vil et besvart spørreskjema være å regne som et aktivt samtykke. Dersom det ikke skal innhentes samtykke, må det begrunnes. Les mer.
10. Informasjonssikkerhet		

Spesifiser	Stillingstittel og navn vil lagres i en seperat liste og intervjunotater nummereres for å koble disse. Listen over tittel og navn vil lagres seperat.	NB! Som hovedregel bør ikke direkte personidentifiserende opplysninger registreres sammen med det øvrige datamaterialet. Vi anbefaler koblingsnøkkel.
Hvordan registreres og oppbevares personopplysningene?	␣ På server i virksomhetens nettverk ␣ Fysisk isolert PC tilhørende virksomheten (dvs. ingen tilknytning til andre datamaskiner eller nettverk, interne eller eksterne) ␣ Datamaskin i nettverkssystem tilknyttet Internett tilhørende virksomheten ■ Privat datamaskin ␣ Videoopptak/fotografi ■ Lydopptak ■ Notater/papir ␣ Mobile lagringsenheter (bærbar datamaskin, minnepenn, minnekort, cd, ekstern harddisk, mobiltelefon) ␣ Annen registreringsmetode	Merk av for hvilke hjelpemidler som benyttes for registrering og analyse av opplysninger. Sett flere kryss dersom opplysningene registreres på flere måter. Med «virksomhet» menes her behandlingsansvarlig institusjon. NB! Som hovedregel bør data som inneholder personopplysninger lagres på behandlingsansvarlig sin forskningsserver. Lagring på andre medier - som privat pc, mobiltelefon, minnepinne, server på annet arbeidssted - er mindre sikkert, og må derfor begrunnes. Slik lagring må avklares med behandlingsansvarlig institusjon, og personopplysningene bør krypteres.
Annen registreringsmetode beskriv		
Hvordan er datamaterialet beskyttet mot at uvedkommende får innsyn?	Datamaskin er beskyttet med brukernavn og passord og er alltid overvåket/innelåst. Utskrifter oppbevares i låst skap.	Er f.eks. datamaskintilgangen beskyttet med brukernavn og passord, står datamaskinen i et låsbart rom, og hvordan sikres bærbare enheter, utskrifter og opptak?
Samles opplysningene inn/behandles av en databehandler (ekstern aktør)?	Ja ○ Nei ●	Dersom det benyttes eksterne til helt eller delvis å behandle personopplysninger, f.eks. Questback, transkriberingsassistent eller tolk, er dette å betrakte som en databehandler. Slike oppdrag må kontraktsreguleres.
Hvis ja, hvilken		
Overføres personopplysninger ved hjelp av e-post/Internett?	Ja ○ Nei ●	F.eks. ved overføring av data til samarbeidspartner, databehandler mm.
Hvis ja, beskriv?		Dersom personopplysninger skal sendes via internett, bør de krypteres tilstrekkelig. Vi anbefaler ikke lagring av personopplysninger på nettskytjenester. Bruk av nettskytjenester må avklares med behandlingsansvarlig institusjon. Dersom nettskytjeneste benyttes, skal det inngås skriftlig databehandleravtale med leverandøren av tjenesten. Les mer.
Skal andre personer enn daglig ansvarlig/student ha tilgang til datamaterialet med personopplysninger?	Ja ○ Nei ●	
Hvis ja, hvem (oppgi navn og arbeidssted)?		
Utleveres/deles personopplysninger med andre institusjoner eller land?	● Nei ○ Andre institusjoner ○ Institusjoner i andre land	F.eks. ved nasjonale samarbeidsprosjekter der personopplysninger utveksles eller ved internasjonale samarbeidsprosjekter der personopplysninger utveksles.
11. Vurdering/godkjenning fra andre instanser		
Søkes det om dispensasjon fra taushetsplikten for å få tilgang til data?	Ja ○ Nei ●	For å få tilgang til taushetsbelagte opplysninger fra f.eks. NAV, PPT, sykehus, må det søkes om dispensasjon fra taushetsplikten. Dispensasjon søkes vanligvis fra aktuelt departement.
Hvis ja, hvilke		
Søkes det godkjenning fra andre instanser?	Ja ○ Nei ●	I noen forskningsprosjekter kan det være nødvendig å søke flere tillatelser. Søkes det f.eks. om tilgang til data fra en registereier? Søkes det om tillatelse til forskning i en virksomhet eller en skole? Les mer om andre godkjenninger.
Hvis ja, hvilken		
12. Periode for behandling av personopplysninger		
Prosjektstart Planlagt dato for prosjektslutt	05.02.2018 11.06.2018	Prosjektstart Vennligst oppgi tidspunktet for når kontakt med utvalget skal gjøres/datainnsamlingen starter. Prosjektslutt: Vennligst oppgi tidspunktet for når datamaterialet enten skalanonymiseres/slettes, eller arkiveres i påvente av oppfølgingsstudier eller annet.
Skal personopplysninger publiseres (direkte eller indirekte)?	␣ Ja, direkte (navn e.l.) ␣ Ja, indirekte (identifiserende bakgrunnsopplysninger) ■ Nei, publiseres anonymt	Les mer om direkte og indirekte personidentifiserende opplysninger. NB! Dersom personopplysninger skal publiseres, må det vanligvis innhentes eksplisitt samtykke til dette fra den enkelte, og deltakere bør gis anledning til å lese gjennom og godkjenne sitater.

Hva skal skje med datamaterialet ved prosjektslutt?	■ Datamaterialet anonymiseres ⌞ Datamaterialet oppbevares med personidentifikasjon	NB! Her menes datamaterialet, ikke publikasjon. Selv om data publiseres med personidentifikasjon skal som regel øvrig data anonymiseres.Med anonymisering menes at datamaterialet bearbeides slik at det ikke lenger er mulig å føre opplysningene tilbake til enkeltpersoner. Les mer om anonymisering av data.
13. Finansiering		
Hvordan finansieres prosjektet?		Fylles ut ved eventuell ekstern finansiering (oppdragsforskning, annet).
14. Tilleggsopplysninger		
Tilleggsopplysninger		Dersom prosjektet er del av et prosjekt (eller skal ha data fra et prosjekt) som allerede har tilrådning fra personvernombudet og/eller konsesjon fra Datatilsynet, beskriv dette her og oppgi navn på prosjektleder, prosjekttittel og/eller prosjektnummer.
15. Vedlegg		
Vedlegg	Antall vedlegg: 2. ● 20180124_temaliste__1._utkast_.doc.docx ● 20180124_informasjonskriv__1._utkast_.doc	

Appendix III: Approval from the Norwegian Centre for Research Data

Hanne Olofsson Finnestrand

7491 TRONDHEIM

Vår dato: 21.02.2018 Vår ref: 58671 / 3 / AGL Deres dato: Deres ref:

Tilrådning fra NSD Personvernombudet for forskning § 7-27

Personvernombudet for forskning viser til meldeskjema mottatt 24.01.2018 for prosjektet:

58671	*The Viable System Model in the Norwegian Hospital sector*
Behandlingsansvarlig	*NTNU, ved institusjonens øverste leder*
Daglig ansvarlig	*Hanne Olofsson Finnestrand*
Student	*Maren Berge Vik*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er unntatt konsesjonsplikt og at personopplysningene som blir samlet inn i dette prosjektet er regulert av § 7-27 i personopplysningsforskriften. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:
•opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
•vår prosjektvurdering, se side 2
•eventuell korrespondanse med oss

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Ved prosjektslutt 11.06.2018 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

NSD – Norsk senter for forskningsdata AS Harald Hårfagres gate 29 Tel: +47-55 58 21 17 nsd@nsd.no Org.nr. 985 321 884
NSD – Norwegian Centre for Research Data NO-5007 Bergen, NORWAY Faks: +47-55 58 96 50 www.nsd.no

Vennlig hilsen

Dag Kiberg

Audun Løvlie

Kontaktperson: Audun Løvlie tlf: 55 58 23 07 / audun.lovlie@nsd.no
Vedlegg: Prosjektvurdering
Kopi: Maren Berge Vik, marenbvik@gmail.com

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 58671

Formålet er å teste verdien av VSM i endringsledelse ved et norsk sykehus.

Du har opplyst i meldeskjema at utvalget vil motta skriftlig og muntlig informasjon om prosjektet, og samtykke skriftlig til å delta. Vår vurdering er at informasjonsskrivet til utvalget er godt utformet.

Ombudet mener det må tas høyde for at det kan komme til å bli behandlet sensitive opplysninger om helseforhold under intervju med pasienter.

Personvernombudet forutsetter at du behandler alle data i tråd med NTNU sine retningslinjer for datahåndtering og informasjonssikkerhet. Vi legger til grunn at bruk av privat pc er i samsvar med institusjonens retningslinjer.

Prosjektslutt er oppgitt til 11.06.2018. Det fremgår av meldeskjema/informasjonsskriv at du vil anonymisere datamaterialet ved prosjektslutt.
Anonymisering innebærer vanligvis å:
- slette direkte identifiserbare opplysninger som navn, fødselsnummer, koblingsnøkkel
- slette eller omskrive/gruppere indirekte identifiserbare opplysninger som bosted/arbeidssted, alder, kjønn
- slette lydopptak

For en utdypende beskrivelse av anonymisering av personopplysninger, se Datatilsynets veileder:
https://www.datatilsynet.no/globalassets/global/regelverk-skjema/veiledere/anonymisering-veileder-041115.pdf