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A longitudinal qualitative case study of the large-scale TeleCare North Program

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NETWORK DYNAMICS IN AN INTERORGANIZATIONAL TELEMEDICINE NETWORK

A LONGITUDINAL QUALITATIVE CASE STUDY OF THE LARGE-SCALE TELECARE NORTH PROGRAM

BY
JANNIE KRISTINE BANG CHRISTENSEN

DISSERTATION SUBMITTED 2017

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CV

Jannie Kristine Bang Christensen (1985) holds a master's in sociology from Aalborg University (2011). Her PhD study, performed at the Department of Sociology and Social Work at Aalborg University, has been conducted in relation with the Danish large-scale telemedicine program TeleCare North. Hers is one of the four PhD studies that have been conducted in relation to the program.

During her PhD study, she has been connected to the research group Center of Organization, Management, and Administration at Aalborg University's Department of Sociology and Social Work and Department of Political Science.

As a part of that study, she has also taught various courses in Aalborg's Department of Sociology and Social Work and Department of Political Science, for example in (organizational) sociology, for the Master of Public Administration degree, and for the Master of Public Governance degree. Moreover, she has been a visiting scholar in the Department of Sociology at the University of California, Berkeley.

The dissertation reflects her research interests in interorganizational network dynamics, innovation processes, the health care sector, and welfare technology.

ENGLISH SUMMARY

Telemedicine, as a phenomenon, denotes a rather novel research object and represents an innovative health service, but knowledge about telemedicine from an organizational perspective is limited (Barlow, Bayer, & Curry, 2006; Bower et al., 2011; Bøg, Christensen, Jensen, & Kidholm, 2015; Darkins et al., 2008; Fasterholdt et al., 2011; Hendy et al., 2012; Hueppmeier, Single, & Welte, 2010; Nicolini, 2006; Pare, Jaana, & Sicotte, 2007). Against this backdrop, this dissertation explores telemedicine from the perspective of an organizational sociologist. More concretely, this dissertation explores how a telemedicine innovative project, TeleCare North, unfolds in a systemic network (Alter & Hage, 1993) and the network dynamics related to this project, with a focus on collaboration processes; building, nurturing and maintaining trust; and handing conflicts. This telemedicine network has been studied from a longitudinal perspective covering a period of three years, a period that is extended to 7 years in one of the dissertation's three parts. The dissertation is guided by the following research question:

How can we understand the unfolding of a telemedicine innovation, and its related dynamics in an interorganizational network, from a longitudinal perspective?

This question is operationalized into two sub-questions:

- *How can we through the theoretical lenses of translation and theorization understand the political dynamics involved in scaling up an innovative telemedicine pilot study?*
- *How does a systemic telemedicine network evolve over time with special attention to building, nurturing and maintaining trust, conflicts within the network, and horizontal collaboration dynamics?*

These questions are answered through a monograph and two separate articles entitled, respectively, "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling up Innovations" and "Does Telecare Improve Interorganisational Collaboration?"

A longitudinal qualitative case study is utilized as a research strategy (Antoft & Salomonsen, 2007; Thomas, 2011), and an organizational ethnography-inspired approach is used to produce data (Czarniawska, 2007; Neyland, 2008; Ybema, Yanow, Wels, & Kamsteeg, 2009). The ethnographic data consist of multi-site observations, semi-structured interviews with managers and health professionals, and archival materials.

This dissertation centers on the micro-level and network dynamics by synthesizing the extensive and rather heterogeneous literature about interorganizational relations and networks, with particular attention to network dynamics in terms of horizontal collaboration processes, building and maintaining trust, and conflicts in the network (Alter & Hage, 1993; Brown, 1983; Hardy & Phillips, 1998; Lane & Bachmann, 1998; Lawrence, Phillips, & Hardy, 1999; Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan, Fish, & Sydow, 2007; Vangen & Huxham, 2003; Williams, 2012). This theoretical framework is used in the monograph and, to a certain extent, in the article "Does Telecare Improve Interorganisational Collaboration?" to interpret and explain patterns in the empirical material.

The analysis is performed in the three separate parts that each have their own analytical focus and conclusion. The first is the article entitled "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling Up Innovations," which explores the political dynamics involved in innovation processes. The longitudinal perspective is extended to a 7-year period (2008–2014) covering the time from the initiation of the telemedicine pilot study TELEKAT through the upscaling and development of the large-scale telemedicine program to the implementation and operation of TeleCare North. Two concepts from institutional theory, *translation* (Czarniawska & Joerges, 1996; Czarniawska & Sevón, 2005; Zilber, 2006) and *theorization* (Greenwood, Hinings, & Suddaby, 2002; Meyer & Rowan, 1977), are combined to investigate political dynamics in relation to this telemedicine innovation as it, first, moves forward and materializes in local settings (i.e. is translated) and, second, is legitimated and aligns with prevailing normative structures in the health care field (theorization) (Nielsen, Mathiassen, & Newell, 2014). The article demonstrates how the entire innovation process is characterized by continuing political dynamics generated by the multiple actors' competing logics, by interdependencies among the actors, and by conflicting interests. These various political dynamics are not impediments for the innovation process; instead, they are handled in three distinct ways: *(re)mobilizing networks (to handle interdependencies)*, *strategic translation and theorization (to handle conflicting interests)*, and *co-translation (to handle competing logics)*. These forms of handling ensure aligning of logics, handling of interdependencies, and inclusion of various interests which move the innovation forward. This article concludes that telemedicine innovation proceeds as series of continuing translation and theorization activities. The political dynamics function as generative forces that move the innovation forward through the three ways of handling the political dynamics. Hence, telemedicine innovation is not stabilized but continues to be re-translated and theorized over the entire process.

The second part of the dissertation is the article entitled "Does Telecare Improve Interorganisational Collaboration?" This article closely examines the operation of the program by exploring how telemedicine influences interorganizational collaboration among the various health professionals in the telemedicine network.

The various health professionals were observed and interviewed six and 18 months (only interviews) after the implementation of the large-scale program. The analysis reveals that interorganizational collaboration between the municipal nurses and general practitioners was initially intensified as a result of implementing telemedicine. The level of collaboration, however, changed over time, becoming less intense as the first start-up obstacles were overcome. Moreover, this decreasing intensity was the result of the patients becoming more active in their treatment. Although the intensity of the collaboration decreased over time, the quality of collaboration appeared to improve, since telemedicine enabled more professional and focused communication between the general practitioners and the municipal nurses. By contrast, collaboration within the hospitals was nearly non-existent in relation to telemedicine and was hardly effected by the implementation of the large-scale program. The changes in horizontal collaboration in the network reflected changes in the dependence structures between the network actors (Pfeffer & Salancik, 1978; Rogan & Greve, 2015). While the telemedicine network was initially characterized by asymmetrical dependence structures, these structures became more balanced over time as a result of the municipal actors' (i.e. the weak part) countermoves to balance the asymmetrical dependence. This article concludes that telemedicine influences interorganizational collaboration among the network actors at varying degrees, but it appears particularly to improve collaboration in the primary health sector (i.e. between the municipalities and general practitioners). Moreover, telemedicine both amplifies existing asymmetrical dependence structures and equalizes the asymmetries by enabling the weaker collaborative element to use telemedicine to make countermoves in an attempt to balance these structures.

The third part of the dissertation is the monograph, which elaborates the findings from the article "Does Telecare Improve Interorganisational Collaboration?" by including the dimension of trust and network properties in terms of governance form and structural characteristics. Moreover, it investigates the micro-processes of how the political dynamics unfold, specifically in relation to the collision of logics between the various network actors, the fluctuating asymmetrical dependence structures, and how they are enacted and influence horizontal collaboration, trust, and conflicts in the telemedicine network. In this analysis, the time-frame is extended to include also the upscaling process. The analysis demonstrates how the telemedicine network developed over time in terms of network orientation, governance form, boundary spanners, trust, collaboration, and conflicts. It illustrates, in particular, the multiplicity of trust in terms of the various forms of trust in the network, multiple sources to trust, and how trust is nurtured or eroded.

In summary, this dissertation investigates telemedicine innovation's trajectory and network dynamics, focusing on horizontal collaboration, building and maintaining trust, and conflicts, from a longitudinal perspective by which it demonstrates how *both* telemedicine innovation *and* the telemedicine network are in flux.

The dissertation contributes to the rather limited literature about telemedicine from an interorganizational perspective by providing rich empirical accounts of the implications of telemedicine on horizontal collaboration processes, on building and maintaining trust in the interorganizational telemedicine network, and on conflicts related to telemedicine from a longitudinal perspective. Second, the findings contribute to discovering and illuminating some of the hidden activities in innovation processes and demonstrating how innovations (and their surroundings, i.e. the telemedicine network) are not stable entities, but are re-translated as they transition into new phases or contexts. Third, the dissertation contributes to the extensive network literature, helping to further characterize the micro-processes related to collaboration, trust building, and conflicts, and how these processes are influenced by the enactment of divergent logics in systemic networks.

Theoretically, the dissertation contributes to the literature concerning trust in networks by synthesizing divergent theoretical approaches to create a multidimensional concept of trust through which different forms, sources, and levels of trust are studied within a systemic network where collaboration is partly mandated and embedded in a highly institutionalized health care field. Finally, the dissertation extends the literature about innovation processes by suggesting the use of two concepts, translation and theorization, to investigate the political dynamics of innovation processes. Combining these two concepts enables sensitivity towards the broader institutional context in which the innovation is embedded and the bi-directional relationships between the institutional context and the local innovation.

DANSK RESUME

Telemedicin som et fænomen udgør et relativt nyt forskningsområde og repræsenterer en innovativ sundhedsydelse. Viden om telemedicin fra et organisatorisk perspektiv er begrænset (Barlow et al., 2006; Bower et al., 2011; Bøg et al., 2015; Darkins et al., 2008; Fasterholdt et al., 2011; Hendy et al., 2012; Hueppmeier et al., 2010; Nicolini, 2006; Pare et al., 2007). Med dette udgangspunkt udforsker denne ph.d. afhandling telemedicin fra en organisationssociologs perspektiv. Mere konkret udforsker denne afhandling, hvordan den telemedicinske innovation *TeleCare Nord* udfolder sig i et systemisk netværk (Alter & Hage, 1993) og de relaterede netværksdynamikker med særlig fokus på horisontale samarbejdsprocesser, tillidsopbygning og -vedligeholdelse samt interorganisatoriske konflikter i netværket. Dette telemedicinske netværk er blevet undersøgt i et longitudinelt perspektiv over en treårig periode, hvilken er udvidet til syv år i en af afhandlingens artikler. Afhandlingen er opbygget omkring følgende forskningsspørgsmål:

Hvordan kan vi forstå udviklingen af en telemedicinsk innovation og de relaterede netværksdynamikker i et interorganisatorisk netværk i et longitudinelt perspektiv?

Dette forskningsspørgsmål er operationaliseret i to underspørgsmål:

- Hvordan kan vi ved at anvende de teoretiske optikker *translation* og *teoretisering* (engelsk: theorization) forstå de politiske dynamikker i opskaleringen af et innovativt telemedicinsk pilot studie?
- Hvordan udvikler det *systemiske netværk* sig over tid med særlig fokus på tillidsopbygning og -vedligeholdelse, interorganisatoriske konflikter i netværket og horisontale samarbejdsdynamikker?

Disse spørgsmål besvares gennem nærværende monografi og to særskilte artikler med titlerne: *"Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling up Innovations"* og *"Does Telecare Improve Interorganisational Collaboration?"*.

Det longitudinelle kvalitative casestudie anvendes som forskningsstrategi (Antoft & Salomonsen, 2007; Thomas, 2011) i afhandlingen og en organisatorisk etnografisk inspireret tilgang anvendes til at producere data (Czarniawska, 2007; Neyland, 2008; Ybema et al., 2009). De etnografiske data består af observationer forskellige steder i det telemedicinske netværk, semi-strukturerede interviews med ledere og sundhedsprofessionelle samt arkivmateriale.

I denne afhandling sættes mikro-niveauet og netværksdynamikkerne i fokus ved at syntetisere den omfattende og relativt heterogene litteratur om netværk og interorganisatoriske relationer med særlig fokus på netværksdynamikker i form af horisontale samarbejdsprocesser, tillidsopbygning og -vedligeholdelse samt interorganisatoriske konflikter i netværket (Alter & Hage, 1993; Brown, 1983; Hardy, Phillips, & Lawrence, 1998; Lane & Bachmann, 1998; Lawrence et al., 1999; Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan et al., 2007; Vangen & Huxham, 2003; Williams, 2012). Denne teoretiske ramme anvendes i monografien og til en vis udstrækning i artiklen *"Does Telecare Improve Interorganisational Collaboration?"* til at fortolke og forklare mønstre i det empiriske materiale.

Analysen er opdelt i afhandlingens tre dele, som hver har sit analytiske fokus og konklusion. Første del udgøres af artiklen *"Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling up Innovations"*, der undersøger politiske dynamikker i innovationsprocesser. The longitudinelle perspektiv er i denne artikel udvidet til en syvårig periode (2008-2014), hvilket omfatter initiering af pilotstudiet *TELEKAT* , opskalering og udvikling af storskala programmet og implementering og anvendelse af *TeleCare Nord*. De to begreber fra institutionel teori translation (Czarniawska & Joerges, 1996; Czarniawska & Sevón, 2005; Zilber, 2006) og theoretisering (engelsk: theorization) (Greenwood et al., 2002; Strang & Meyer, 1993) kombineres for at undersøge de politiske dynamikker i relation til den telemedicinske innovation, når den bevæger sig fremad og materialiseres i lokale organisationer (translation) og legitimeres og forbindes med de dominerende normative strukturer i sundhedssektoren (teoretisering) (Nielsen et al., 2014). Artiklen demonstrerer, hvordan hele innovationsprocessen er karakteriseret af politiske dynamikker, der er genereret af aktørernes konkurrerende logikker, gensidige afhængigheder mellem aktørerne samt interessekonflikter. Disse politiske dynamikker skal ikke ses som forhindringer for innovationsprocessen; i stedet bliver de håndteret på tre distinkte måder: *(re)mobilisering af netværk* (håndtering af gensidige afhængigheder), *strategisk translation og teoretisering* (håndtering af interessekonflikter) og *co-translation* (håndtering af konkurrerende logikker). Disse håndteringsmåder sikrer tilpasning af logikker, håndtering af gensidige afhængigheder og inklusion af forskellige interesser, hvilket bevæger innovationsprocessen fremad. Artiklen konkluderer, at den telemedicinske innovation udfolder sig som serier af fortløbende translations- og teoretiseringsaktivitieter. De politiske dynamikker fungerer som generative kræfter, der skaber progression i innovationsprocessen, idet de bliver håndteret. Den telemedicinske innovation stabiliseres dermed ikke, men fortsætter med at blive re-translateret og teoretiseret igennem hele processen.

Den anden del af afhandlingen består af artiklen *"Does Telecare Improve Interorganisational Collaboration?"* og denne zoomer ind på anvendelsen af det telemedicinske program ved at undersøge, hvordan telemedicin influerer de

interorganisatoriske relationer mellem de forskellige sundhedsprofessionelle i det telemedicinske netværk. De sundhedsprofessionelle er blevet observeret og interviewet seks og 18 måneder (kun interview) efter implementeringen af *TeleCare Nord*. Analysen viser, at interorganisatorisk samarbejde mellem de kommunale sygeplejersker og de praktiserende læger initialt blev intensiveret som følge af implementering af telemedicin. Dette forandredes dog over tid, hvor samarbejdet blev mindre intenst efter de første opstartsvanskeligheder var løst. Derudover var den faldende intensitet et resultat af, at patienterne blev mere aktive i deres behandlingsforløb. Selvom intensiteten af samarbejdet faldt over tid, så syntes kvaliteten af samarbejdet at forbedres over tid, eftersom telemedicin øgede fagligheden og fokus i kommunikationen mellem de kommunale sygeplejersker og de praktiserende læger. Samarbejdet med hospitalerne var derimod nærmest ikke-eksisterende og var ikke influeret af implementering af telemedicin. Forandringerne i de horisontale samarbejdsprocesser i netværket afspejlede forandringer i afhængighedsstrukturerne mellem netværksaktørerne (Pfeffer & Salancik, 1978; Rogan & Greve, 2015). I begyndelsen var afhængighedsstrukturerne i det telemedicinske netværk asymmetriske, men disse blev mere balanceret over tid som et resultat af de kommunale sygeplejersker (dvs. den svageste aktør i netværket) modtræk og modstand. Artiklen konkluderer, at telemedicin influerer interorganisatorisk samarbejde mellem aktørerne forskelligt, men telemedicin forbedrer i nogle tilfælde samarbejdet i den primære sundhedssektor, dvs. mellem de kommunale aktører og almen praksis. Derudover argumenteres der for, at telemedicin både forstærker de eksisterende asymmetriske afhængighedsrelationer i netværket og på den anden side udjævner dem ved at give de svageste part i netværket mulighed for at lave modtræk i et forsøg på at balancere disse strukturer.

Den tredje del af afhandlingen udgøres af nærværende monografi, der elaborerer resultaterne fra artiklen *"Does Telecare Improve Interorganisational Collaboration?"* ved at inkludere tillids-dimensionen og netværkskarakteristika i form af netværk governance og strukturelle karakteristika. Monografien undersøger derudover, hvordan de politiske dynamikker udfolder sig på et mikro-niveau særligt i forhold til konkurrerende logikker, fluktuerende asymmetriske afhængighedsstrukturer og hvordan disse udøves og influerer horisontalt samarbejde, tillid og konflikter i netværket. Denne analysedel inddrager også opskaleringsprocessen. Analysen demonstrerer, hvordan det telemedicinske netværk udvikler sig over tid i forhold til netværksorientering, governance form, boundary spanners, tillid, samarbejde og konflikter. Særligt illustrerer analysen, hvordan tillid i netværket er multi-dimensionelt og konstitueret af forskellige former for tillid, opbygges gennem forskellige kilder og forandres over tid og analytiske niveau.

Sammenfattende undersøger denne afhandling den telemedicinske innovations 'rejse' og de relaterede netværksdynamikker med fokus på horisontale samarbejdsprocesser, tillidsopbygning og -vedligeholdelse og konflikter i et

longitudinelt perspektiv, hvorved afhandlingen demonstrerer, hvordan *både* den telemedicinske innovation *og* det telemedicinske netværk er i flux.

Afhandlingen bidrager til den relativt begrænsede litteratur om telemedicin fra et interorganisatorisk perspektiv ved at give detaljerede, empiriske beskrivelser af implikationer ved telemedicin for de horisontale samarbejdsprocesser, tillidsopbygning og -vedligeholdelse og interorganisatoriske konflikter i det interorganisatoriske telemedicinske netværk i et longitudinelt perspektiv. For det andet bidrager analyserne med at åbne en 'black box' ved at belyse nogle af de skjulte aktiviteter i innovationsprocesser og demonstrerer, hvordan innovationer (og deres omgivelser, dvs. det telemedicinske netværk i dette tilfælde) ikke er stabile enheder, men bliver re-translateret, når de bevæger sig ind i nye faser eller kontekster. For det tredje bidrager afhandlingen til den omfattende netværkslitteratur med viden om mikro-processerne i form af samarbejde, tillidsopbygning og konflikter og hvordan dette er influeret af de divergerende logikker i systemiske netværk.

Teoretisk bidrager afhandlingen til litteraturen om tillid i netværk ved at syntetisere forskellige teoretiske tilgange for at skabe et nuanceret multi-dimensionelt tillidsbegreb, hvor forskellige tillidsformer, kilder og analytiske niveauer undersøges i et systemisk netværk, hvor samarbejdet delvist er eksternt bestemt og reguleret og indlejret i et institutionaliseret felt. Slutteligt bidrager afhandlingen teoretisk til at udvide litteraturen om innovationsprocesser ved at anvende og kombinere de to begreber translation og teoretisering til at undersøge politiske dynamikker i innovationsprocesser. Kombinationen af disse to begreber muliggør sensitivitet mod det bredere institutionelle felt, som innovationen er indlejret i, og relationerne mellem den institutionelle kontekst og den lokale innovation, som går begge veje.

ACKNOWLEDGEMENTS

Standing at the edge of the submission of this PhD dissertation makes me reflect on my final years as a PhD student at the Department of Sociology and Social Work, Aalborg University. Van de Ven et al. (1999) argued in their famous book *The Innovation Journey* that innovation processes could be perceived as journeys where the actual endpoint is often quite different from the initially envisioned endpoint. One of the reasons for this shift is, according to Nicolini (2010a), that innovations proceed *"according to a fuzzy logic, following multiple tracks, proliferating into many ideas, involving a number of people and, above all, continually mutating in the process"* (p. 1011). So described, the journey of innovation may serve as an analogue to my research process as a PhD student. My PhD study has indeed been a journey—an exploration into the world of telemedicine and interorganizational networks, as well as a journey into academia. When completing such a journey, the luggage one carries is essential, as is guidance from more experienced travelers crucial to keep one from getting lost along the way.

In this PhD study I have been travelling back and forth between two worlds: the world of practitioners and the world of academics. In the country of practitioners, the TeleCare North secretariat and all of the other associated actors have kindly allowed me access to the various sites to which I required access. They have been my guides into the practitioners' world, for which I am very grateful. Thank you for your kind assistance, and thanks to the numerous actors who have participated in the interviews and observations. Without you, this dissertation would not have been possible.

In the world of academics, my research group at the Center of Organization, Management, and Administration, indeed, served as an inspirational and safe place to present my work and further travel plans. Your careful and constructive feedback on several pieces of my work made my route clearer. My most important guides have been my main supervising professor, Janne Seemann, and assistant supervisor, associate professor Jeppe Gustafsson. Your deep knowledge and experience has pushed the boundaries of my world-view and introduced me to new worlds. You have let me travel my own paths (including different detours), and most importantly, with you my journey has been safe. Particularly, Janne has played a tremendous role on my journey. Your continuous belief in me has carried me through this PhD study. Our endless conversations about our shared research interests in interorganizational collaboration in the health care system *and* about more personal issues like family and life have made my journey interesting and eventful. Thanks for your endless support, care, warmth, and encouragement. My gratitude is beyond expression!

Moreover, I wish to thank Jeppe Agger Nielsen. Thank you for your inspirational collaboration and for pushing the boundaries of my knowledge. I have learned much from our collaboration, and it has been most rewarding working with you!

My PhD study brought me to UC Berkeley, where I was a visiting scholar at the Department of Sociology. I am very grateful for this opportunity, and my stay in the Bay Area was very stimulating and valuable in my further work.

Moreover, I wish to thank my co-travelers, namely the other PhD students at the department and in Center of Organization, Management, and Administration; my sojourn has been more fun and enjoyable because of you. Specially, I would like to thank Sophie and Julie for their warm support, the friendship we have shared, and our endless conversations about PhD life.

Lastly, I want to thank my family and friends for giving me my most important luggage: your support and love carried me through this, sometimes rough, journey. Thank you to my two children, Anton and Rose, for bringing so much joy into my life—you have certainly contributed with a great deal of uncertainties and unplanned events during this journey, but you have also grounded me and insistently reminded me of the most important things in life. However, balancing motherhood and a demanding PhD study is difficult; it would have been impossible, in fact, without my husband Steffen. Therefore, the biggest thanks goes to you. Your continuing curiosity in my work, encouragement, and patience have been invaluable. Thank you for believing in me and for your limitless love and support! Without you, this dissertation could never have reached its final destination.

Jannie Kristine Bang Christensen
February 2017
Aalborg University

PREFACE

This PhD study is embedded in the extensive research activities that relate to the Danish large-scale telemedicine program TeleCare North. The main research activities of this program have consisted of four PhD studies, each focusing on different dimensions of the telemedicine program (see Figure 1.1).

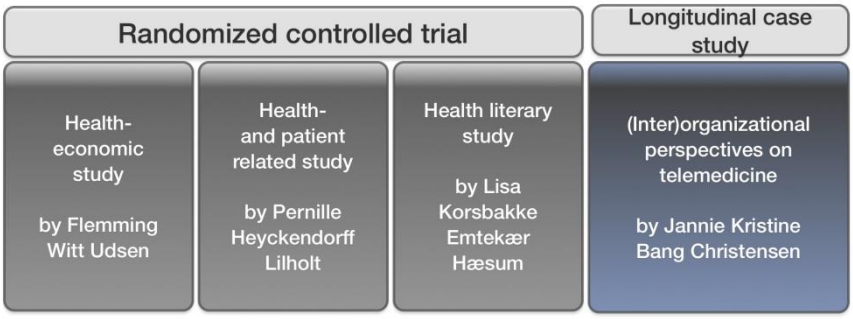

Figure 1.1: Research activities in relation to TeleCare North.

Three of the PhD studies have been conducted through a randomized controlled trial, whereas this dissertation about (inter)organizational perspectives on telemedicine has been conducted as a longitudinal qualitative case study covering a period of three years. It consists of a monograph and two separate articles, entitled "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling up Innovation" and "Does Telecare Improve Interorganisational Collaboration?"

This PhD study was initiated in December of 2012, and the dissertation was submitted in January of 2017. This period included a one-year maternity leave.

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CHAPTER 1. INTRODUCTION

Telemedicine, as a phenomenon, denotes a rather novel research object and an innovative health service. Knowledge of telemedicine from an organizational perspective is limited, however (Barlow, Bayer, & Curry, 2006; Bower et al., 2011; Bøg, Christensen, Jensen, & Kidholm, 2015; Darkins et al., 2008; Fasterholdt et al., 2011; Hendy et al., 2012; Hueppmeier, Single, & Welte, 2010; Nicolini, 2006; Pare, Jaana, & Sicotte, 2007). On this backdrop, this dissertation explores telemedicine from the perspective of an organizational sociologist. More specifically, the dissertation is *theoretically* grounded in the literature on interorganizational networks and innovation processes (e.g. Alter & Hage, 1993; Czarniawska & Joerges, 1996; Czarniawska & Sevón, 2005; Garud, Tuertscher, & Van de Ven, 2013; Lawrence et al., 1999; Pfeffer & Salancik, 1978; Provan et al., 2007; Rogan & Greve, 2015; Thompson, 1967). It is *empirically* grounded in an innovative large-scale telemedicine program in the northern region of Denmark. The telemedicine program started as a research and innovation project (TELEKAT) initiated by researchers from Aalborg University in 2008. The aim of the project was to develop a cross-sectorial telemedicine service based on remote home monitoring through user-driven innovation processes (Dinesen, Seemann, & Gustafsson, 2011). A mix of public and private actors were part of this innovation process, including the three main health providers in Denmark: the municipalities, hospitals, and general practitioners (GPs). The results from TELEKAT were promising in several ways. First, they showed a significant increase in patients' satisfaction, quality of life, and feelings of safety. Second, they demonstrated significant savings and cost effectiveness, as admission rates, lengths of hospitalization, and re-admissions decreased. Third, health professionals expressed satisfaction with the new method of delivering service and the attempt to improve collaboration across municipalities, hospitals, and GPs, and experienced improvement of the treatment quality (Dinesen et al., 2011; Haesum et al., 2012; Seemann, Dinesen, & Gustafsson, 2013). These findings corresponded with prior international telemedicine pilot studies (Bower et al., 2011; Currell, Urquhart, Wainwright, & Lewis, 2000; Ekeland, Bowes, & Flottorp, 2010; Pare et al., 2007; Udsen, Lilholt, Hejlesen, & Ehlers, 2014). Based on these findings, the contours of a large-scale telemedicine program emerged. After a lengthy transformation process, the large-scale telemedicine program termed "TeleCare North" was made reality. The program covered the entire northern region of Denmark and targeted patients with chronic obstructive pulmonary disease (COPD). TeleCare North involved 11 municipalities, four hospitals, and approximately 225 GPs. This empirical point of departure is rather unique in three senses. Firstly, successfully scaling up a pilot study to a large-scale program represents a relatively exceptional case, as a great number of pilot studies (both in general and specific to telemedicine pilots) are never taken to scale, despite positive outcomes (Garud et al., 2013; Simmons, Fajans, & Ghiron, 2007; Singh, Mathiassen, Stachura, & Astapova, 2010; Zanaboni & Wootoon, 2012). Secondly,

TeleCare North is one of the largest telemedicine programs in Europe and one of the world's largest telemedicine randomized controlled studies to rigorously test cost-effectiveness and patient outcomes concerning telemedicine (Udsen, Lilholt, et al., 2014). Thirdly, the telemedicine program has been developed and implemented in a cross-sectorial setting involving municipalities, hospitals, and GPs, whereas the majority of prior national and international telemedicine studies have been performed in a mono-organizational context (Ballegaard, Thorsen, Bro, & Wentzer, 2012; Hendy et al., 2012). The telemedicine program and selections from the telemedicine literature are more thoroughly presented in Chapter 4.

Such an empirical case contains many stories and numerous theoretical and analytical possibilities to contribute to the rather limited knowledge about telemedicine from an organizational perspective—more stories and knowledge, in fact, than can be fully represented here. Selecting some theoretical and empirical points of departure is necessary to specify the focus of this dissertation. These points of departure are selected on the basis of their uniqueness within the context of telemedicine, that is, the upscaling of a pilot study and the cross-sectorial setting, combined with less-explored avenues in organizational studies.

The first theoretical point of departure relates to the upscaling of the pilot study and, more specifically, it concerns the research on innovation processes. The dissertation addresses a gap within the stream of literature on innovation processes regarding the process of scaling up innovations. The literature depicts as difficult the movement from invention to broader implementation and usage (Bartel & Garud, 2009; Dougherty & Hardy, 1996; Garud, Gehman, & Kumaraswamy, 2011; Garud et al., 2013; Simmons et al., 2007). Furthermore, the political dynamics of such scaling-up processes, and of innovation processes more generally, remain rather underexplored (Garud et al., 2011; C. Koch, 2004; Swan & Scarbrough, 2005). Particularly, political dynamics seem important in the upscaling processes that unfold in interorganizational networks because such dynamics constitute a multi-stakeholder environment in which multiple interests and goals collide. Besides contributing to the literature on innovation processes and their political dynamics, studying the process of scaling up the telemedicine pilot constitutes the contextual background against which one can understand how building, nurturing, and maintaining trust, how conflicts, and how horizontal collaboration processes emerge and evolve in the interorganizational telemedicine network, as it is implemented in health care organizations.

The second theoretical point of departure relates to the interorganizational network literature. The municipalities, hospitals, and GPs in the telemedicine program constitute an interorganizational telemedicine network, and various reviews state that research on micro-dynamics in networks remains limited. More concretely, the investigation of how trust, conflicts, and horizontal collaboration evolve among the network actors at a micro-level is relatively limited compared to the macro-aspects

of networks, for example network structures (Jack, 2010; Provan et al., 2007; Williams, 2012). In addition, it has been noted that network studies often offer only a snapshot in time, making it difficult to investigate dynamics and patterns of collaboration over time (Bergenholtz & Waldstrøm, 2011; Clegg, Josserand, Mehra, & Pitsis, 2016; Jack, 2010; Knoben, Oerlemans, & Rutten, 2006; Owen-Smith & Powell, 2008; Parkhe, Wasserman, & Ralston, 2006). Correspondingly, this dissertation contributes to the literature on interorganizational networks through its exploration of the emergence and development of micro-dynamics, with special attention to building, nurturing, and maintaining trust, to conflicts, and to horizontal collaboration processes in a telemedicine network in a longitudinal perspective.

The study's empirical point of departure centers on the fragmentation of health care systems. Most Western health care systems struggle with fragmentation issues (see for instance, Gittell, 2009; Lluch & Abadie, 2013; Seemann & Gustafsson, 2016; Williams, 2012). Digital technologies, such as telemedicine, present as tools that integrate activities and services across different health providers through the improvement of interorganizational collaboration (Lluch & Abadie, 2013; Murray et al., 2011), as is the case for TeleCare North. Most telemedicine services are developed and implemented within one organizational domain (mostly in a hospital setting) (Hendy et al., 2012). As a result, knowledge is limited about interorganizational telemedicine services and how they might effect existing collaboration processes. The large-scale telemedicine program under study here (re)connects previously separated locations, such as the GPs' clinics, district nurse units, health centers, hospital wards, and outpatient clinics. Hence, on the surface, the telemedicine program seems to enable improved collaboration across various health providers by offering efficient information-sharing through the telemedicine monitoring system and shared access to the monitoring system for the municipal actors, hospital staff, and GPs. Correspondingly, the telemedicine program appears as a tool to address fragmentation issues in the Danish health care system. This dissertation provides rich empirical data on how telemedicine is utilized in practice and how it effects interorganizational collaboration among health professionals at the strategic and administrative level, as well as at the operational level.

With these different theoretical and empirical points of departure, the research question is presented, as well as the structure of the dissertation.

1.1. RESEARCH QUESTION AND STRUCTURE FOR THE DISSERTATION

The introductory remarks and the different theoretical and empirical points of departure form the background for the following research question that has been guiding the dissertation:

> *How can we understand the unfolding of a telemedicine innovation, and its related dynamics in an interorganizational network, from a longitudinal perspective?*

This research question is operationalized into two sub-questions:

- *How can we through the theoretical lenses of translation and theorization understand the political dynamics involved in scaling up an innovative telemedicine pilot study?*
- *How does the systemic telemedicine network evolve over time with special attention to building, nurturing, and maintaining trust, to conflicts within the network, and to horizontal collaboration dynamics?*

The dissertation consists of a monograph and two separate articles, entitled "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling up Innovations" (hereafter, "Launching a Large-Scale Telemedicine Program") and "Does Telecare Improve Interorganisational Collaboration?"

An overall *theoretical framework* for the study is constructed by synthesizing the rather heterogeneous research streams on interorganizational networks, with particular focus on collaboration, trust, and conflicts (see Chapter 2). This theoretical framework is extended in the article "Launching a Large-Scale Telemedicine Program," which builds on insights from research into innovation processes and which utilizes two concepts from institutional theory, *translation* (Czarniawska & Joerges, 1996; Czarniawska & Sevón, 2005) and *theorization* (Greenwood, Hinings, & Suddaby, 2002; Strang & Meyer, 1993) to investigate the political dynamics in the process of scaling up the telemedicine pilot study to a large-scale program.

The longitudinal qualitative case study is appropriated as the *research design* to gain empirical knowledge about telemedicine from an (inter)organizational perspective, as well as more generally about the dynamics of interorganizational networks, and to elaborate on the existing literature on interorganizational networks. Through an organizational ethnography-inspired approach, *multiple qualitative methods* are used

to produce different forms of data to elucidate the empirical case from various angles and levels to answer the research question (see Chapter 3). The study most resembles a real-time study (Hoholm & Araujo, 2011), in which telemedicine innovation is studied in the making as the large-scale program was developed and implemented. More specifically, this telemedicine case was followed for three years, from 2012 to 2015, covering the period during which the large-scale program was developed, implemented, and translated into practice. This period, however, is extended in the article "Launching a Large-Scale Telemedicine Program" to 7 years: that is, from 2008, when the pilot study was initiated, to the implementation of the large-scale program in 2014.

The *analysis* of the empirical data is divided into the three parts in this dissertation. The article "Launching a Large-Scale Telemedicine Program" investigates the innovation process from pilot initiation, through upscaling, to the large-scale implementation of the telemedicine program and the related political dynamics and their management; it completes this analysis using a theoretical framework consisting of the two concepts *translation* and *theorization*. Hence, this article addresses the first sub-question regarding political dynamics in upscaling processes, and more generally in innovation processes.

The article "Does Telecare Improve Interorganisational Collaboration?" explores how telemedicine effects horizontal collaboration at the operational level from a longitudinal perspective covering a period of 18 months after the program was implemented in the various health organizations. Particularly, changes in the dyadic relations between municipal actors and GPs (i.e. within the primary health care sector) and between the primary health care actors and the hospital staff (i.e. between primary and secondary health care sector) are explored by studying changes in dependence structures and intra- and inter-professional struggles over domain. Hence, this article addresses the second sub-question by analyzing changes in horizontal collaboration processes and conflicts at the operational level in the telemedicine network.

The analysis in the monograph extends this second article by exploring network dynamics in terms of building, nurturing, and maintaining trust, of conflicts in the network, and of horizontal collaboration over a period of three years, which includes the upscaling of the pilot study and the period after implementation of the large-scale program (Chapters 6–8). Thus, the monograph also addresses the second sub-question.

Based on the three parts of the dissertation, the empirical and theoretical contributions of the dissertation are discussed (Chapter 10), followed by the study's conclusion (Chapter 11).

CHAPTER 2. THEORETICAL FRAMEWORK

In a modern, complex world with ongoing functional differentiation and specialization and increased demand for innovation, flexibility, and competitiveness it is necessary to collaborate and to integrate activities across different professions, organizations, sectors, and political levels (Alter & Hage, 1993; Provan et al., 2007; Vangen & Huxham, 2003). This trend of collaboration is reflected both in practice, where various forms of interorganizational relations and network rapidly arise, and in academia, where scholars from a wide range of academic traditions have engaged in research on such collaborative efforts and in investigation of *interorganizational networks*. Therefore, great diversity in network perspectives and theories has emerged in recent decades (Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan et al., 2007; Provan & Milward, 1995). This chapter synthesizes the various perspectives, with special attention to network dynamics in terms of trust, conflicts, and horizontal collaboration processes, along particular attention to the micro-level in networks.

Various reviews and meta-reviews have sought to divide the different theoretical stances and empirical studies on networks and interorganizational relations into different perspectives, categories, and types. Briefly outlined, the results of this categorization exercise, based on selected reviews, are as follows:

- Organizations may have different intentions for forming and engaging in interorganizational networks (Parmigiani & Rivera-Santos, 2011; Provan et al., 2007).
- Multiple forms and types of networks exist (Bergenholtz & Waldstrøm, 2011; Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan et al., 2007).
- Most network studies draw on existing theoretical traditions and perspectives (Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011).
- Multiple analytical levels, approaches and methods are used when conducting network studies (Bergenholtz & Waldstrøm, 2011; Jack, 2010; Oliver & Ebers, 1998; Provan et al., 2007).
- Networks have mostly been studied at the organizational level (Oliver & Ebers, 1998; Provan et al., 2007).

Common to the reviews is that they reveal the network studies' tendency to emphasize the structural, institutional and macro-level. Accordingly, micro-level details and the individuals in the network have been omitted in most network studies (Williams, 2012). However, these individuals are foregrounded in concepts

about *boundary spanners*, a term that denotes individuals at the interfaces between organizations (Williams, 2002, 2012). By including individuals' collaborative efforts and negotiation processes, the network can be understood more thoroughly. Furthermore, this attention on boundary spanners may enhance the understanding of how different goals and joint tasks are translated, enacted, and negotiated, how conflicts crystalize and are handled, and how trust emerges and develops in networks with multiple organizations. These boundary-spanning activities may lead to changes in practice. Such changes in practice may cause temporary or permanent reconfigurations of boundaries between organizations (Meier, 2015; Mørk, Hoholm, Maaninen-Olsson, & Aanestad, 2012).

However, boundary spanners, organizations, interorganizational relations, and networks do not exist in a vacuum. Instead, they are embedded in larger *organizational fields* (Scott, 1991). These fields are constituted by a community of organizations that are involved in common activities (DiMaggio & Powell, 1983; Powell, White, Koput, & Owen-Smith, 2005) and face similar regulations and contextual conditions (Quirke, 2013). Accordingly, health care systems can be perceived as organizational fields encompassing various health care providers. Recent studies on organizational fields argue that such fields are segmented into subfields and characterized by a multiplicity of logics (Quirke, 2013). The co-existence of different and sometimes competing institutional logics therefore prevails in organizational fields, which may be reflected in interorganizational networks and network organizations, as well as in the behavior of the boundary spanners following diverse logics in the field, according the specific situation and context (Quirke, 2013; Scott, Reuf, Mendel, & Coronna, 2000). Although it is beyond the scope of this dissertation to explore telemedicine innovation from the perspective of institutional theory and to further investigate the organizational field in which the telemedicine network is embedded and in which telemedicine innovation unfolds, it is important to keep in mind that macro-level dynamics in the organizational field and at the institutional level are related to the micro-level dynamics at the center of this dissertation.

Based on these short introductory remarks about the network literature, the remaining sections of this chapter present the theoretical concepts that inform the empirical data in this dissertation. Section 2.1 briefly introduces why organizations form interorganizational networks and specifies how interorganizational networks are conceptualized in this dissertation; it defines interorganizational networks and the specific characteristics that separate them from hierarchies and other organizational forms. Particular attention is given to *systemic networks* (Alter & Hage, 1993), the type of network of interest in this dissertation. Related to networks is the concept of *collaboration* and how it is facilitated in networks that cross professional and organizational boundaries. Therefore, collaboration is presented as a means of integrating activities in networks. In connection with this integration are *boundary objects*, characterized as mediators and supporting tools for boundary-

crossing activities. The individuals performing these collaborative activities are addressed, in short, through the concept of *boundary spanners*. In the Section 2.2, theoretical perspectives on *trust* in interorganizational networks are presented, as trust is perceived as an integral component in networks (Sydow, 1998; Vangen & Huxham, 2003). Distrust and suspicion make it difficult and sometimes impossible to collaborate (Webb, 1991; Williams, 2002). Therefore, understanding sources of trust, trust creation, and trust preservation is pivotal when analyzing interorganizational networks. In relation to these different analytical levels, the movement of trust between the levels through institutionalization processes is outlined. This consideration is followed by a discussion of the closely interrelated concept of *power*, along with a differentiation of trust-based and power-based interorganizational relationships. In this vein, Section 2.3 concerns *conflicts* in networks. Conflicts form an inherent component of any interorganizational network. Conflicts in networks may be the result of conflicting goals and interests; power asymmetries; differences in organizational or professional culture, norms, and values; or disagreements about work domain, and so forth (Alter, 1990; Alter & Hage, 1993; Hardy, Phillips, & Lawrence, 1998; Seemann et al., 2013). However, conflicts should not be understood as counter-productive. Rather an appropriate level of conflicts may foster development of relationships in the network and enhance mutual understanding. Suppression of conflicts may, on the contrary, lead to inertia, withdrawal or *pro forma* collaborative efforts (Brown, 1983).

2.1. INTERORGANIZATIONAL NETWORKS

Various reviews of the literature on interorganizational relations and networks have sought an overview of the diverse theoretical and methodological approaches to network studies (e.g., Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan et al., 2007). The reviews, however, differ greatly in regard to focus and scope, and no uniform overview of interorganizational networks is given in these different kinds of reviews. As a result, this short introduction to interorganizational networks synthetizes insights from the different reviews by focusing on one single theme, as such focus seems to address the most basic question when investigating networks—that of *why* organizations form networks—because this question is important for understanding dynamics in terms of trust-building efforts, conflicts in the network, and horizontal collaboration processes.

Before discussing the network perspective more fully, the type of network that is at the center of this dissertation is presented. Interorganizational networks encompass very different types of networks in regard of structure, culture, intensity, and duration: for example, joint ventures, strategic alliances, business networks and so forth (Alter & Hage, 1993; Parmigiani & Rivera-Santos, 2011; Provan & Kenis, 2008; Vangen & Huxham, 2003). However, two main types of networks can be

identified: isomorphic networks and systemic networks (Alter & Hage, 1993; Gustafsson, 2009; Seemann et al., 2013). Isomorphic networks contain similar organizations with the same kind of competencies, services, or products. In contrast are the systemic networks constituted by different organizations with complementary competencies, services, or products (Alter & Hage, 1993). Systemic networks have collective goals, and the different organizations work together to solve a shared task. This type of network deploys functional differentiation in regard of roles, responsibilities, and tasks, as well as horizontal processes of coordination and integration of activities in the network:

> Systemic networks produce a common output by the means of the operational processes of coordination and task integration, through differential structural characteristics and by developing specialized participation via function and role.
>
> (Alter & Hage, 1993, p. 77)

Intrinsically systemic networks consist of divergent organizations and are characterized by a high degree of functional specialization and complexity. In this dissertation, the systemic network occupies a position of central focus, since the telemedicine network is characterized by organizations with complementary capabilities that work together to develop and operate a shared telemedicine program.

Section 2.1.1 outlines the motives for forming interorganizational relations and networks, establishing an understanding of the antecedents necessary to form networks. Sections 2.1.2 and 2.1.3 concern interorganizational networks and their structural properties and characteristics. Section 2.1 subsequently explores collaboration as a means of integration of activities in the network (Section 2.1.4) and introduces boundary objects as supporting tools for collaboration, as well as boundary spanners (Section 2.1.5), to more thoroughly understand network activities at the individual level.

2.1.1. WHY INTERORGANIZATIONAL NETWORKS?

It is widely acknowledged that organizations form networks and engage in interorganizational relations to achieve goals that are impossible to obtain on their own (Alter & Hage, 1993; Oliver & Ebers, 1998; Parmigiani & Rivera-Santos, 2011; Provan et al., 2007; Provan & Kenis, 2008; Vangen & Huxham, 2003). Depending on the theoretical lenses, the primary motives for forming interorganizational networks differ. Inspired by March's (1991) concepts of exploration and exploitation in organizational learning, Parmigiani and Rivera-Santos (2011) suggest that interorganizational relationships reflect two ideal types:

co-exploration and *co-exploitation*. Based on the motives behind network formation, interorganizational relations can be analyzed primarily as co-explorative, co-exploitative, or a mix. Co-exploration denotes relationships that focus on creating new knowledge, where the main activities are learning and innovation. Co-explorative relationships are characterized by reciprocal interdependence (Thompson, 1967) and involve rich, ongoing communication and joint decision-making among a few, select individuals. This form of collaboration allows exchange of ideas and tacit knowledge used to co-produce new knowledge, but it also requires interpersonal contacts to coordinate activities. Co-exploration allows flexibility and agility in relationships. Lastly, co-explorative relations are characterized by a high degree of uncertainty, since the outcome is unknown (Parmigiani & Rivera-Santos, 2011). In contrast, *co-exploitation* focuses on existing knowledge and how this is utilized, efficiently used, and expanded. The interdependence in co-exploitative relationships is characterized by pooled or sequential interdependence (Thompson, 1967), where decisions are made separately by the actors. Correspondingly, the need for communication and coordination is not as pronounced as in co-explorative relationships, and communication becomes routinized and thin. Coordination of activities does not require the same kind of flexibility and may rely on impersonal standards operating procedures and routines (Parmigiani & Rivera-Santos, 2011). The characteristics of co-explorative and co-exploitative relationships are illustrated in Table 2.1.

Characteristics	Co-exploration	Co-exploitation
Focus of the Network	New knowledge	Existing knowledge
Key Activity	Learning	Expansion
Type of Value Creation	Innovation	Efficiency
Knowledge Type	Tacit	Explicit
Type of Interdependence	Reciprocal	Pooled or sequential
Decision-making	Joint	Divided
Communication	Rich, ongoing, few people	Thin, routine, more people
Coordination	Interpersonal	Routines, standard operating procedures

Source: Adopted from Parmigiani and Rivera-Santos (2011, p. 1122).

Table 2.1: Co-explorative and co-exploitative interorganizational relationships.

In practice, interorganizational relations are often a mix of co-exploring and co-exploiting projects, and depending on the theoretical lenses, different aspects of the relations are brought into center. In this dissertation, the two ideal typical relationships are used to understand the overall orientation in the telemedicine network and how this orientation changes over time.

Parmigiani and Rivera-Santos (2011) use some of the dominant macro-oriented organizational theories to elaborate on these two ideal typical interorganizational relationships and to further our understanding of organizational motives to form interorganizational relationships. In the following, the two most-used theories in network studies are briefly presented to elaborate on the motives for forming interorganizational relationships, though without a detailed, in-depth presentation of the two theories. The first theory centers on the perspective on *resource dependence* (inspired by Pfeffer & Salancik, 1978) that is the most dominant theoretical perspective in network studies (Oliver & Ebers, 1998). From this perspective, networks and interorganizational relations are conditioned by mutual dependence on resources between organizations. The underlying assumption is that organizations are dependent on resources controlled and owned by other organizations, and this dependence creates uncertainty, contingency, and power struggles between the organizations. However, by creating robust interorganizational relations with other organizations that possess important resources, organizations can reduce uncertainty and contingency (Alter & Hage, 1993; Parmigiani & Rivera-Santos, 2011). Thus, organizations can gain a more powerful position compared to their competitors by engaging in interorganizational collaboration where they gain access to important resources (Hardy, Phillips, & Lawrence, 2003). The weaker member in the interorganizational relationship may attempt to balance power imbalances by seeking other ways to access resources, thus minimizing dependence on the stronger member. Such attempts to balance the relationship may consist of forming alliances or searching for new partners to replace the stronger partner (Pfeffer & Salancik, 1978). However, such behavior may trigger responses and countermoves from the stronger partner, attempting to rebalance the relationships to preserve power (Rogan & Greve, 2015). As a result, interorganizational relations are often variable, characterized by political dynamics and power struggles. Correspondingly, the resource-dependence perspective provides analytical tools for investigating interorganizational relations in terms of resource dependence, diverging interests and power struggles among the different organizations in relation to resources, goals, and power (Wry, Cobb, & Aldrich, 2013).

More specifically, though, in relation to the two ideal typical relationships, co-explorative relationships are formed to control creativity and to create new resources, whereas co-exploitative relationships enhance control with capacity and combine existing resources to solve certain tasks or activities from a resource-dependence perspective (Parmigiani & Rivera-Santos, 2011). However, this use of the resource-dependence perspective appears to be rather narrow and reduces the analytical possibilities to explore interorganizational networks (and thus networks) from a resource-dependence perspective since this perspective offers a much broader and deeper understanding of interorganizational relations than merely the motives to form these relations. In this dissertation, the resource-dependence perspective is used to explore how interdependencies and divergent interests are

enacted, shift and respond to balance and rebalance the relations among the network actors and the power struggles over control of resources and domains. The telemedicine network is a systemic network in which the actors have complementary capabilities and are interdependent of each others' resources. However, the telemedicine network does not represent a zero-sum play, as the resources in the network come from the separate network organizations and as allocation of resources in one network organization is not dependent on resource allocation in others. Accordingly, the network actors in the telemedicine network do not compete for resources.

The second prominent theoretical perspective informing network studies is *institutional theory* (Oliver & Ebers, 1998). One of the central dimensions of this theory is legitimacy building (DiMaggio & Powell, 1983; Human & Provan, 2000; Meyer & Rowan, 1977). This dimension is used by Parmigiani and Rivera-Santos (2011) to explain motivations to engage in interorganizational relations. To gain legitimacy, organizations must behave according to the prevailing norms in the organizational fields in which they are embedded. Another strategy to gain legitimacy is to mimic successful organizations in the field or to form networks with highly esteemed organizations (DiMaggio & Powell, 1983; Parmigiani & Rivera-Santos, 2011). The motives to engage in interorganizational networks may be to build legitimacy and imitate other successful organizations, which already participate in such networks. As a result, interorganizational networks may be formed to develop or strengthen an organization's legitimacy within a given field. Co-explorative interorganizational relationships require legitimacy-building in a field with new or underdeveloped institutions, whereas co-exploitative relationships transfer and expand existing legitimacy in a matured field (Parmigiani & Rivera-Santos, 2011). Nevertheless, this limited use of institutional theory to understand interorganizational relations omits some central dimensions of institutional theory, for example institutional logics, meaning systems and, particularly, meaning how interorganizational networks and organizational fields interrelate (Owen-Smith & Powell, 2008; Powell et al., 2005). In this dissertation, institutional theory is used to situate telemedicine in a broader organizational field, particularly in relation to the field-level dynamics that may influence the network dynamics. In the article "Launching a Large-Scale Telemedicine Program," the institutional lenses are more pronounced than in the rest of the dissertation, as article uses the two concepts from institutional theory, *translation* and *theorization*, to understand the political dynamics in the telemedicine innovation process as it is developed in local settings and theorized at the institutional level.

2.1.2. CHARACTERISTICS OF INTERORGANIZATIONAL NETWORKS

Interorganizational networks are social entities constituted on the basis of repeated interaction between actors (individuals or organizations) who represent different organizations. They consist of more than two organizations (Alter & Hage, 1993; Provan et al., 2007). This makes them different from dyadic interorganizational relations in several aspects. Inspired by Kilduff and Tsai's (2003) notion about triads (Simmelian ties), some differences between dyadic relations and networks have been extracted. *First*, networks have other dynamics, as the network organizations can form internal coalitions to avoid one dominating organization's interests being forced upon the whole network. *Second*, conflicts in networks between the actors can be moderated and solved by the intervention of other network organizations. On the other hand, as demonstrated in the article "Does Telecare Improve Interorganisational Collaboration?" conflicts may more easily lead to the exclusion of one of the conflicting organizations. In this case, other organizations can avoid interaction with conflicting organizations and instead strengthen more agreeable ties in the network in an attempt to reinforce their own positions and, if possible, substitute the conflicting organizations. Reconfiguration of networks and dependence structures may be the result of such conflicts (Rogan & Greve, 2015). This occurrence also demonstrates how interorganizational relationships in a network are interrelated and mutually constitutive. *Third*, and final, networks do not face the same threat of break-down if one organization leaves the network, unlike in dyadic relations (Kilduff & Tsai, 2003). Based on these notions, this dissertation considers the networks it examines as more than the sum of the actors in the network and their dyadic relations.

One of the most distinctive attributes of networks is that they are non-hierarchical and represent a different form of organization than hierarchical or market-based forms (Alter & Hage, 1993; Lawrence et al., 1999; Powell, 1990; Provan & Kenis, 2008). Therefore interorganizational networks have no monolithic line of authority. Instead, authority and power are distributed, negotiated, and shifted between the network actors, which make the power structure complex and fluctuating (Alter & Hage, 1993; Lawrence et al., 1999). As a result, networks self-regulate and demonstrate joint decision-making, horizontal collaborative processes, and mutual adaption processes (Alter & Hage, 1993; Powell, 1990). Even though networks are non-hierarchical, they still require some governance and management (Koppenjan & Klijn, 2004; Provan & Kenis, 2008), as elaborated in Section 2.1.3.

Besides their non-hierarchical structure, networks have five general organizational properties that effect their structures and processes (Alter, 1990; Alter & Hage, 1993). The *first property* concerns the degree of (de)centralization, which effects the flow of input, knowledge, products and the like in the network. When the network is centralized, one organization controls this flow, giving the central organization a powerful position in the network (Alter, 1990; Provan et al., 2007).

Therefore centrality may be a measure of power and dominance in networks, whereas formal power within organizations is connected to an individual's position in the hierarchical structure. The *second property* concerns functional specialization. The degree of specialization of function is high in systemic networks because the roles and functions are complementary instead of interchangeable. The *third property* relates to the degree of complexity. When the interorganizational network handles different tasks—for example every aspect of diagnosing, treating and providing care for chronically ill patients with multiple diagnosis—then the network is characterized as highly complex. However, if the network produces only one specialized service or product, it exhibits low complexity (Alter, 1990). The *fourth property* denotes the density of the ties between the network actors in regard to frequency of interaction and communication in the network (Provan & Milward, 1995; Rowley, 1997). Dense networks efficiently facilitate communication and diffusion of shared norms and values among the different network actors, whereas low density makes it more difficult to get communication and norms to flow through the network (Rowley, 1997). The *fifth property* concerns whether the network is coherent or fragmented (Provan et al., 2007). Within coherent networks, the organizations are well-connected, whereas in fragmented networks one or more organizations are disconnected from the rest of the network. These five structural properties are used to analyze networks at the network level in this dissertation.

With this description of network characteristics and structural properties, networks may appear to be static and rather stable; however, nothing could be further from the truth. Networks are dynamic and "vital living organisms, changing, growing and developing over time" (Jack, 2010, p. 125). They evolve and vanish according to different internal and external dynamics (Ahuja, Soda, & Zaheer, 2012; Human & Provan, 2000; Jack, 2010; Majchrzak, Jarvenpaa, & Bagherzadeh, 2015; Vangen & Huxham, 2003). Scarce attention has been paid to network dynamics (Ahuja et al., 2012; Majchrzak et al., 2015), although Powell et al. (2005) have investigated the macro-level dynamics of network. *Dynamics* refers to changes in content, processes or mechanisms in networks (Majchrzak et al., 2015) or to changes in network architecture (actors, relations, and structure) (Ahuja et al., 2012). Based on a review of studies on interorganizational collaboration dynamics, Majchrzak and colleagues (2015) have identified six dynamics related to the characteristics of the network: (1) goal dynamics, (2) contract frame dynamics, (3) interaction style dynamics, (4) decision-making control dynamics, (5) organizational structure dynamics, and (6) actor composition dynamics. These six dynamics often co-exist, and they are interrelated and multifaceted, encompassing changes in multiple directions (e.g. interaction changing to more competitive behavior, later reverting to more cooperative behavior) and at different stages of the network (Majchrzak et al., 2015). The sources for network dynamics may differ. Some of the dynamics are grounded in differences between the network actors. Such differences may lead to compromises between the actors in regard to, for example, working methods or norms. In other cases, the differences may lead to alignment of the network

activities, norms and so forth, with the dominating organization in the network. Other sources of network dynamics may be external to the network, for example in the organizational contexts or the organizational fields, or internal to the network, for example performance failure, changes in goals and so forth (Majchrzak et al., 2015). Correspondingly, investigation of network dynamics yields sensitivity towards the actors in the network, the network itself, and the network context (both the organizational and institutional context).

2.1.3. NETWORK GOVERNANCE

Various and sometimes conflicting values, norms, organizational cultures and structures, and logics are brought together in systemic networks, making it difficult to develop a shared network of goals, norms, structures, and network culture. One way of dealing with these difficulties and conflicts if through the governance structure in the network. According to Provan and Kenis (2008), network governance is important to *"ensure that participants engage in collective and mutually supportive action, that conflict is addressed, and that network resources are acquired and utilized efficiently and effectively"* (p. 231). They identify three different forms of governance in networks. In the first, the governance is shared among all network members and involves a high degree of shared decision-making, on both the operational and the strategic level. Governance may be formal, through formalized meetings among network actors, or more informal, through the ongoing activities in the network. This shared governance is characterized by being decentralized, dense, and performed by the network organizations themselves (Provan & Kenis, 2008). By contrast, lead organization governance maintains network governance by that one node in the network. Often, this form of governance is identified within the public sector, where one organization is the central and primary provider of a service, for example in health care (Provan & Kenis, 2008). This form of governance is characterized by a high degree of centralization and lower density in the network, because the lead organization coordinates network level activities and key-decisions, and facilitates the achievement of shared network goals. Consequently, this form of governance creates asymmetrical power relations, as the lead organization gains a rather powerful position in the network. Both shared governance and lead organization governance represent internally lead governance. The third form of governance differs from the two former in that an external actor, a network administrative organization (NAO), is responsible for network governance. The composition of the NAO varies from one individual to a secretary, board or steering group. As in the lead organization, governance in the network is also highly centralized, and with a lower density than in shared governance. The NAO coordinates activities and facilitates achievement of network goals and efficiency (Provan & Kenis, 2008). Governance with an NAO may co-exist with either shared governance or lead

organization governance (Provan et al., 2007). Table 2.2 highlights the distinctive traits of the three governance forms:

	Shared Governance	Lead Organization Governance	Network Administration Organization (NAO)
(De)centralization	Decentralized	Centralized	Centralized
Density	High	Low	Low/medium
Internally or Externally Governed	Internal	Internal	External

Table 2.2: Distinctive traits of the three network governance forms.

Network governance may change over time, depending on network structures, size, relations and so forth. Application of governance form must be situational, and it may change over time as the network evolves (Hesterly, Borgatti, & Jones, 1997; Provan & Kenis, 2008). Still, centralized governance forms seem to be more efficient when the network is large and complex, where consensus about network goals is often low. Conversely, shared governance is most efficient when the network is rather small and enjoys a much consensus and little complexity (Provan & Kenis, 2008). Governance in networks must be sensitive to shifting dynamics in the network. For instance, shared governance may foster trust and the development of a shared culture in the network. This form of governance demands investment of time, though, and requires much effort at the expense of network efficiency. Therefore, shared governance may be appropriate in the early development of the network, but when the network matures and consolidates, shared governance may become too inefficient, and more centralized governance may become more appropriate (Provan & Kenis, 2008).

Network governance supports integration of activities in interorganizational networks. However, this integration is not fully obtained or understood through governance forms. Section 2.1.4 introduces and discusses collaboration as a means to integrate networks.

2.1.4. INTEGRATION THROUGH COLLABORATION

Interorganizational networks create a frame in which loosely coupled organizations can integrate their activities, tasks, services and so forth. Integration is facilitated by the network structure, culture, and processes (Alter & Hage, 1993; Gittell & Weiss, 2004; Lawrence et al., 1999; Webb, 1991). Depending on the characteristics of the

network and the joint tasks involved in the network, the need for integration varies. When the network is highly differentiated (both functionally and structurally) and when the joint tasks are complex, require inter-professional knowledge, and entail high uncertainty about outcomes, the need for integration is high (Alter & Hage, 1993). The need for integration is therefore high in systemic networks, but effective integration poses difficulties. Without integration, activities, services, and other joint tasks, the network becomes fragmented, resulting in problems with inefficiency, lower quality, and difficulties with achieving shared network goals. One way of achieving integration may be through network structure. Several scholars have suggested that a centralized network structure supports integration (Alter, 1990; Alter & Hage, 1993; Provan et al., 2007; Provan & Milward, 1995). Yet the structural properties of a network do not reveal much about the processes of integration. To understand the processes of integration, *collaboration* is explored as a means of integration in networks.

As outlined in the article "Does Telecare Improve Interorganisational Collaboration?" integration can be obtained through different mechanisms, depending on the authority structures. When the actors have a common hierarchical system, integration can be obtained through coordination, which relies on hierarchical control mechanisms. Axelsson and Axelsson (2006) refer to this kind of coordination as vertical integration, and it is often used *within* an organization where there is a common hierarchical system. However, coordination may also be used in an interorganizational field in which organizations refer to a common hierarchical system, for example in government regulations. Most often, a common hierarchical system is absent or lacks a mandate to coordinate activities in interorganizational fields. In these cases, integration is obtained through collaboration, which rests upon the actors' willingness to work together and their mutual adaption to each other (Alter & Hage, 1993; Axelsson & Axelsson, 2006). Hence, collaboration is often used to integrate activities *between* organizations. A third method of establishing integration is through cooperation, a combination of coordination and collaboration. Correspondingly, cooperation relies on voluntary agreements and some sort of common hierarchical system. The health care system often uses all three methods to create integration within each health care organization and between the different health care providers.

Other scholars use the concepts of coordination, cooperation, and collaboration differently. Several scholars place the concepts on a continuum, depending on the degree of collaboration (Alter, 1990; Alter & Hage, 1993; Sandfort & Milward, 2008; Williams, 2012). From these perspectives, the concepts are differentiated by the degree of work carried out together, rather than by the presence or absence of a common authority. In a rather different way, Lawrence, Phillips, and Hardy (1999) define collaboration as a discursive process in which interests, problem-definition, roles, responsibilities, and the benefits of the relations are continually negotiated.

This definition emphasizes the emergent nature and political dimension of collaboration across organizational and professional boundaries.

This dissertation takes inspiration from the above concepts of collaboration, although they are explained by distinguishing between administrative integration and task integration. "Administrative integration" refers to coordination and collaboration at the administrative levels of the network organizations, whereas "task integration" refers to coordination and collaboration at the operational level (Alter, 1990; Alter & Hage, 1993). Previous research indicates that administrative integration is obtained through formalized procedures, communication, policies, and meetings between the network actors (Alter & Hage, 1993). On the other hand, task integration is often obtained by both formalized mechanisms and extensive use of informal mechanisms such as mutual adjustments and *ad hoc* coordination (Alter & Hage, 1993; Denis, Lamothe, Langley, & Valette, 1999; Gittell, 2009; Lawrence et al., 1999; Meier, 2015; Sandfort & Milward, 2008). The perception of collaboration is further extended by perceiving collaboration as a dynamic and political process where values, norms, and interests inevitably clash and recurrently are negotiated and contested by the collaborating actors. Integrating these different perspectives, the following understanding of interorganizational collaboration emerges to guide discussion in this dissertation:

> Interorganizational collaboration is a *dynamic* and *political* process in which collaborating actors negotiate about definition of the joint tasks (problem-definition), roles, responsibilities, and shared goals at both the administrative and operational level. Through interorganizational collaboration, loosely coupled organizations can *integrate* their activities without the use of direct hierarchical control.

Although it may be difficult to collaborate across organizational boundaries due to the diverse structural and cultural barriers the can arise (Axelsson & Axelsson, 2006), the literature outlines different ways of facilitating collaboration; boundary objects enter the discussion here, described as tools that support collaboration across professional and organizational boundaries.

2.1.5. BOUNDARY OBJECTS AND BOUNDARY SPANNERS

Boundary objects are translating and transforming objects that enable knowledge sharing and integration across professional and organizational boundaries, as they create an infrastructure for interaction and, hence, mediated inter-professional and interorganizational collaboration (Carlile, 2004; Levina & Vaast, 2005; Nicolini,

Mengis, & Swan, 2012; Spee & Jarzabkowski, 2009; Star, 2010; Star & Griesemer, 1989). Nicolini and colleagues (2012) put it as follows:

> [Boundary objects] carry details that can be understood by both parties, but neither party is required to understand the full context of use by the other because the object itself takes care of performing such mediation.
>
> (Nicolini et al., 2012, p. 617)

The boundary objects create a tangible object around which to collaborate, and they facilitate shared understanding and structure among the collaborating actors by creating a shared language among them. Furthermore, they illuminate differences and interdependencies between the collaborating actors, and understanding of such provides a framework to articulate these differences and interdependencies. This discussion, in turn, enables awareness of the different (organizational and professional) perspectives, thus making it possible for collaborators recognize each other's the perspectives (Nicolini et al., 2012).

Boundary objects are not necessarily material objects but may also be immaterial ones, such as ideas, concepts, methods or processes (Nicolini et al., 2012; Spee & Jarzabkowski, 2009). Further, they are not fixed entities but are characterized by an interpretative flexibility whereby actors can adapt them differently and attach different meaning to them according to their professional, organizational or sectorial affiliation. Correspondingly, boundary objects *"are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites"* (Star & Griesemer, 1989, p. 393). They can be given different meanings by various groups, depending on the specific context in which they are used. For instance, telemedicine can be utilized and understood as a rehabilitation tool in health centers to make it a meaningful tool that corresponds with their existing practices. Yet, in a hospital setting, telemedicine can be interpreted as a monitoring method, for instance with lung physicians using a device to support treatment of their patients. This example demonstrates the potential of boundary objects and their strength, in that they, when performing their intentional role, enable actors from different organizations or professions to communicate without full consensus regarding shared goals or interests, or extensive knowledge about each other's contexts (Star, 2010; Zeiss & Groenewegen, 2009). On the other side, this interpretative flexibility may disguise tensions and conflicts over meaning, goals, and interests (Allen, 2009).

Boundary objects can be divided into designated boundary objects and boundary objects-in-use (Spee & Jarzabkowski, 2009). Designated boundary objects denote those artefacts that are formally selected because of their (supposed) ability to support and facilitate boundary-spanning activities (Levina & Vaast, 2005). Actors with powerful positions and legitimacy, for example powerful organizations or top

managers, can designate such boundary objects (Spee & Jarzabkowski, 2009). Yet these designated boundary objects may not become boundary objects-in-use because this status depends on how they are used in practice. They must be meaningful and useful for the actors who are supposed to use them, and they must be recognizable to all actors. Boundary objects-in-use can be designated, or they can emerge as a result of boundary-spanning activities, and their use may shift according to context (Spee & Jarzabkowski, 2009). As their use can vary across contexts, so boundary objects themselves may change during the course of collaboration (Lindberg & Walter, 2013; Nicolini et al., 2012). Both designation and the process of adopting the boundary object for use are political processes in which different practices, norms of behavior, values, and interests are contested and negotiated among the various heterogeneous actors who are supposed to use and are effected by the boundary object (Carlile, 2004).

When boundary objects are utilized in practice, they enable integration of knowledge across boundaries, and they thereby mediate and facilitate interorganizational collaboration. Correspondingly, they become tools for integration of activities, knowledge, services and so forth in systemic networks. However, boundary objects cannot stand alone. They must be supported by boundary-spanning activities such as interaction between the collaborating actors, such as meetings and the like (Nicolini et al., 2012). These activities are performed by *boundary spanners* who act as organizational representatives in the interfaces between organizations, professions, sectors, or political levels, for example in interorganizational networks (Kroeger, 2011; Levina & Vaast, 2005; Perrone, Zaheer, & McEvily, 2003; Williams, 2002, 2012). They perform a vital role as the link between their organization and the network, since they enact interorganizational relations (Janowicz-Panjaitan & Noorderhaven, 2009). They interact and interpret information from the other boundary spanners in the network, and they then transfer this interpretation to their own organization. This interpretation plays a significant part in creating and maintaining a shared understanding of the other network actors in their own organizations. On the other hand, the boundary spanners' behavior in the network is interpreted as representative of the boundary spanner's organization (Lumineau, Eckerd, & Handley, 2015). If the boundary spanners act according to the organization's values and norms, then the organization's reputation is maintained. By extension, if they act improperly boundary spanners may damage, even destroy, their organization's reputation and trustworthiness, even in the cases where they are not perceived as representative of the organization's members (Kroeger & Bachmann, 2014; Perrone et al., 2003). In this line it can be discussed whether the boundary spanners are primarily organizational representatives or primarily represent the interorganizational network's common goals. In this dissertation, boundary-spanning roles are perceived as dynamic and changeable and as representative of a continuum on which one pole denotes boundary spanners who predominantly represent their organization and the other pole represents boundary spanners who

largely orient themselves and their actions with shared network goals. The degree to which boundary spanners orient themselves towards either their own organization's goals or the network's goals may change over time.

Boundary spanners can be divided into two categories where the first contains individuals who have a *role dedicated to spanning boundaries* (such as case coordinators). In the second category, the boundary-spanning activities are only a *part of the individuals' work* (such as general practitioners) (Williams, 2012). Common to the two categories is that the boundary spanners and their activities are performed on all levels of the hierarchies. Correspondingly, boundary-spanning roles and functions are undertaken by individuals who hold positions from top managers to frontline personnel (Williams, 2013).

The boundary spanners have *"a crucial political function including trust brokering and negotiating relations among conflicted groups"* (Levina & Vaast, 2014, p. 295). Due to this political dimension, the boundary spanners must be able to operate in a political environment with divergent and potential conflicting interests and goals, where power is continuously shared, negotiated, and contested. This role thus implies communication skills where boundary spanners translate across boundaries and create a shared understanding, identify and acknowledge mutual dependencies, and are aware of the differences and similarities in the organizations. Furthermore, it is important that boundary spanners manage differences constructively (Williams, 2002, 2012). As such, spanning boundaries requires political savvy, relational competencies, and inter-personal skills, instead of the knowledge-based or professional competencies used within their own organizations (Brown, 1983; Williams, 2002).

Since boundary spanning entails involvement in the collaborating organizations, it may be a conflict-laden role in that boundary spanners are subject to pressure and demands from both their own organization and from collaborating actors (Perrone et al., 2003). How to respond to these divergent pressures and demands depends on a boundary spanner's level of autonomy and discretion. Williams (2012) finds that effective boundary spanners are empowered to negotiate and decide what to do, as they have a mandate from their own organization to act with relative autonomy in the organizational interface. On the contrary, boundary spanners with no mandate or autonomy are perceived as ineffective, as they have to "get permission" from their own organization before any shared decision-making or activities can be carried out. However, in his studies of boundary spanners, Williams (2012) finds that most boundary spanners are allowed to work with much discretion and autonomy:

> There was little doubt that many boundary spanners were permitted to work above their formal status in many organisations because of their potential to lever in extra resources into their organisation.

> They were allowed additional flexibilities to bypass some bureaucratic processes in pursuit of higher goals.
>
> (Williams, 2012, p. 46)

The boundary spanners' mandated authority gives them a position of relative power, because they can take part in decision making and influence activities in networks, sometimes for their own interest. Additionally, their boundary-spanning role amplifies their power within their own organization, as their role grants them access to and control over external resources, information, and knowledge (Kroeger, 2011; Kroeger & Bachmann, 2014; Williams, 2012). This amplification of power is especially the case when boundary spanners are reserved about their interorganizational relationships, because the relationships continue to be highly personalized and disconnected from the rest of the organization. In these cases, the boundary spanners keep control over external resources and are able to manage the organization's external dependencies (cf. resource dependence theory), which gives them power within their own organization (Wry et al., 2013). As a result, boundary-spanners are powerful. However, the cost of this power is the decoupling of the boundary spanners from their organization, where they are excluded from internal decision-making and other internal activities.

Though boundary-spanning roles imply a certain degree of institutionalization of roles, it is not entirely clear whether these roles are detached from the personalized dimension of collaboration. On the one hand, it can be argued that highly institutionalized and mature fields and work practices are institutionalized and taken for granted, such as the Danish health care field, including boundary-spanning roles, expectations, competencies. The personalized dimension of the individuals who occupy the roles is less important, and interorganizational collaboration is sustained the despite high turnover of boundary spanners. From this perspective, the role is more important than the individual who occupies it. On the other hand, boundary spanning and collaboration are highly dependent on the actual individuals who (inter)act at the interface between organizations. As mentioned above, their actions and behavior become a founding element in forming a collective understanding of their organization in the other collaborating organizations. Further, trust between boundary spanners may be the result of a longer process, where trust is incrementally built and deepened (see Section 2.2). Correspondingly, the relation and collaboration between boundary spanners may still be highly personalized, even though the roles are institutionalized.

As demonstrated, spanning boundaries requires interpersonal skills and political savvy, as the interfaces between organizations are political environments laden with divergent interests and goals. Boundary spanners' collaborative efforts across professional and organizational boundaries are supported by the use of boundary objects. By investigating boundary spanners, their activities, and boundary objects, whether designated or not, collaboration in interorganizational networks can be

more deeply understood. This deeper understanding fosters attention to processes, behaviors, and the individuals who interact in such networks.

2.2. TRUST IN INTERORGANIZATIONAL NETWORKS

Trust has been widely studied within different academic traditions such as sociology, economics, psychology, and management (Hardy et al., 1998). Common to the different understandings of trust is that it functions as a social and relational phenomenon that reduces complexity and uncertainty. Trust thereby enables and supports interactions and collaboration in a complex modern world where actors and actions are separated in time and space (Lane & Bachmann, 1998; Sydow, 1998; Zaheer, McEvily, & Perrone, 1998).

Among the multiple understandings of trust, two other components seem basic. *The first* concerns expectations about predictability in another's behavior and reliability in relation to the fulfillment of obligations (Hardy et al., 1998; Lane & Bachmann, 1998; Sydow, 1998; Vangen & Huxham, 2003; Zaheer et al., 1998; Zucker, 1986). Hence, trust safeguards against uncertainty and risk, but at the same time trusting someone involves taking a risk that the other will fail to meet the expectations. As a result, trust and risk are reciprocal (Vangen & Huxham, 2003). *The second* component relates to expectations about fairness and goodwill from the collaborator. This component entails that no one acts opportunistically to seek his or her own advantage in the situation by exploiting the truster's vulnerability (Hardy et al., 1998; Lane & Bachmann, 1998; Newell & Swan, 2000; Van de Ven & Ring, 2006; Vangen & Huxham, 2003; Zaheer et al., 1998). This component adds a moral foundation to concept of trust (Paul & McDaniel, 2004) and implies that collaborators behave according to common interests (Hardy et al., 1998).

From an (inter)organizational perspective, trust is an essential component in networks, as engagement and collaboration in such networks involves a high degree of uncertainty and complexity (Lane, 1998; Newell & Swan, 2000; Paul & McDaniel, 2004; Vangen & Huxham, 2003). In the literature it is often argued that trust may serve as an alternative to hierarchical control or market mechanisms to integrate activities when collaborating across organizational boundaries (Bachmann & Zaheer, 2006; Lane & Bachmann, 1998; Sydow, 1998). Trust is in the literature outlined as a fundamental condition of collaboration; without trust, it is extremely difficult to collaborate. Webb's (1991) explanation exemplifies how trust is articulated in the literature on collaboration and interorganizational networks:

> Trust is pivotal to collaboration. Attitudes of mistrust and suspicion are a primary barrier to cooperation across organisational and

> professional boundaries: collaborative behavior is hardly conceivable when trusting attitudes are absent.
>
> (Webb, 1991, p. 237)

Aside from this rather uniform conception of trust as pivotal to collaboration, trust in interorganizational networks is associated with several advantages, such as efficient collaboration, better network performance, strong stability in network relations, stimulated knowledge exchange and mutual learning, and a positive impact on innovation capacity (Koppenjan & Klijn, 2004; Lane & Bachmann, 1998; Newell & Swan, 2000; Zaheer et al., 1998). Against this backdrop, the rest of this section explores different aspects of trust in interorganizational networks. Section 2.2.1 defines trust and different forms of trust to create a common background for further investigation of the concept of trust. Section 2.2.2 outlines three generalized sources of trust. Section 2.2.3 explores trust as a multilevel phenomenon on two specific levels, the interpersonal and the interorganizational, since these levels are most essential to this dissertation when exploring interorganizational networks and collaboration among organizations and boundary spanners. Section 2.2.4 discusses building and maintaining trust in interorganizational networks, outlining some structural properties that support trust building. In section 2.2.5, power-based relationships are compared with trust-based relationships, as the two ideal types of relationships may be functionally equivalent, and therefore difficult to distinguish in practice, but they have different outcomes; hence it is important to reflect upon whether collaboration is characterized mostly by power or by trust. Section 2.2.6 considers trust and whether it is always desirable in networks.

The sections are based on selected literature on trust that illuminates the concept from an organizational theoretical perspective, with special attention to interorganizational networks. As a consequence, macro-sociological theories on trust (e.g., Luhmann, 1979; and Giddens, 1990), theories on social capital (e.g. Putnam, 2002), and economic transaction theories (e.g., Williamson, 1993) are omitted, as they go beyond the scope of this dissertation's focus.

2.2.1. FORMS OF TRUST

In the literature, trust is divided into different forms. Even though these forms vary, there seems to be a degree of similarity regarding the content of the different forms of trust across the literature (Lane, 1998; Newell & Swan, 2000; Paul & McDaniel, 2004). As presented in Newell and Swan (2000), three distinct types of trust are derived from the literature: (1) companion trust, (2) calculative or commitment trust, and (3) competence trust.

Companion trust has a moral foundation in the expectation that others will behave fairly and not attempt to behave opportunistically. Relations characterized by companion trust are personal, almost friendship-like, and are built over time. Therefore, companion trust has a strong emotional element and is rather robust to changes and potential conflicts. This kind of trust is fundamental in social networks (Newell & Swan, 2000; Paul & McDaniel, 2004; Zucker, 1986). Contrary to companion trust is *calculative or commitment trust*, based on calculations of gains and losses of engagement in collaboration or networking with other organizations. This kind of trust is often built on contractual agreements in which each organization gains mutually from the relationship. Especially when the collaborating actors or organizations have little knowledge about each other, contractual trust seems to be the prominent form of trust. This form of trust may be vital to new networks and proprietary networks that are founded on financial or property rights (e.g. joint ventures) (Newell & Swan, 2000). As trust is based only on contractual agreements, it is rather fragile; it is easily built but also easily broken. Calculative trust has been widely criticized, as it presumes rational actors who assess interorganizational relations before engaging in them. Rather actors may also be viewed as acting irrationally, according to their institutional context, emotions, personal experience and so forth (Koppenjan & Klijn, 2004; Lane, 1998; Newell & Swan, 2000; Paul & McDaniel, 2004). The last type of trust is *competence trust*, and it refers to the trust and respect for other actors' or organizations' competences, along with their ability to solve a given task (Newell & Swan, 2000; Paul & McDaniel, 2004). Accordingly, competence trust may be essential in systemic networks where the competencies are complementary and each part has its specific role to play in solving the joint task in the network (Alter & Hage, 1993). Competence trust is not necessarily related to the specific individual but can also be based upon an organization's reputation, professional affiliation and so forth. Therefore, competence trust can be institutionalized in relation to professional status or institutions (Newell & Swan, 2000).

2.2.2. SOURCES OF TRUST

Building trust is a difficult task in which multiple strategies may be used. However, as trust may be the result of both unintended and intended strategies and behavior, this process is even more complicated and challenging (Sydow, 1998; Vangen & Huxham, 2003; Zucker, 1986). Nevertheless, knowledge about different sources of trust may be helpful in this process. Zucker (1986) identifies three sources of trust: (1) characteristic-based, (2) process-based, and (3) institution-based trust. The first is tied to individuals, emerging between individuals who share the same personal characteristics, such as belonging to the same social group or ethnicity, religion, age, sex and so forth. These ascribed personal characteristics ensure that the actors have "a world in common". A second set of trust-related characteristics stems from

membership to the same subgroup or subculture in which members are expected to share the same intersubjective understandings of a delimited part of the social world, for example work. Examples of such subgroups are professional associations and people with shared professional certification. Hence, these characteristics are obtained through education, certification, and organizational affiliation (Zucker, 1986). Characteristic-based trust occurs spontaneously and intuitively between socially and culturally similar actors and may not be created intentionally.

In contrast, *process-based trust* is produced incrementally through a cyclical process founded on previous experiences (Vangen & Huxham, 2003). Accordingly, interorganizational trust is often the result of a "policy of small steps" (Sydow, 1998). This incrementally built trust often involves modest investment of resources and low expectations for outcomes in the beginning of the interorganizational relationships. These features of the early relationship lower risk and increase the chances of success (Vangen & Huxham, 2003). If the outcomes meet the expectations, then the trusting relationship is consolidated and can be expanded in future collaborations. Over time, this accumulated trust becomes more resilient and enables more ambitious collaboration (Sydow, 1998; Vangen & Huxham, 2003). However, for this kind of trust to evolve, relative stability in the interorganizational network and the network actors is necessary (Lane, 1998). The stability and sustainability of the network also enable the development of a macro-culture in the network, where shared norms, values, and mutual expectations are formed which enhance predictability in behavior and, hence, the trustworthiness of the network actors. Over time, process-based trust can develop into a more resilient reputation for organizations, which is beneficial when selecting new network partners and establishing new interorganizational relations (Sydow, 1998). However, this incrementally built trust may not be possible in every situation: for example, when serious problems need to be addressed quickly, when pressure is applied at the political level, when the need arises to demonstrate notable outcomes for an external funding body or when organizations are pressured to collaborate despite distrust or previous negative experiences, and so forth (Vangen & Huxham, 2003). In these situations other strategies and sources for trust building must be used.

The last source of trust is *institution based*. This trust is not tied to a single individual but is disembedded from personal relationships. Institutional trust is based on formal social structures, roles, rules, regulations, and institutions (e.g. police, health care, professions, etc.) (Zucker, 1986). The social structures, roles, rules, regulations, and institutions create trust as it establishes a high degree of taken-for-grantedness, which enables shared expectations between actors without any prior history of interaction (Möllering, 2006).

Building institutional trust is a long-term process which demands continuing efforts to gain and maintain legitimacy, trustworthiness, and reliability (Lane, 1998). It emerges as a result of continuing interactions between different groups (e.g.

organizations) that are disembedded in time and space and re-embedded in other interaction contexts (Sydow, 1998). Besides the fact that institutions can be sources and carriers of trust, they also serve as objects of trust; that is, we can trust institutions. Möllering (2006) explicates this multidimensional role institutions have in relation to trust:

> Institutions can be seen as bases, carriers and objects of trust: trust between actors can be based on institutions, trust can be institutionalized, and institutions themselves can only be effective if they are trusted.
>
> (Möllering, 2006, p. 365)

Following this statement it can be argued that the institutional context influences how this source of trust is relevant and may be drawn on when establishing trust among actors (both individuals and organizations) in an interorganizational network. However, as Möllering reminds, the different analytical levels of trust can be studied on, for example, the individual level and the organizational level.

2.2.3. INTERPERSONAL AND INTERORGANIZATIONAL TRUST

Trust is a multilevel phenomenon that exists between individuals, within and between organizations, and at a societal level (Currall & Inkpen, 2006; Janowicz & Noorderhaven, 2006; Kroeger, 2011; Lane, 1998). These different levels of trust have been conceptualized by distinguishing between the level of the trustor and that of the trustee, as depicted in Table 2.3.

		Who is trusted?	
		Individual	Organization
Who trusts?	Individual	Individual-individual (interpersonal trust)	Individual-organization
	Organization	Organization-individual	Organization-organization (interorganizational trust)

Source: Janowicz and Noorderhaven 2006, p. 267.

Table 2.3: Conceptualizations of levels of trust.

Table 2.3 illustrates the four distinctive levels of trust that emerge when distinguishing between who is trusting and who is being trusted. The table also illuminates some methodological concerns when investigating trust on the different levels, especially in the relation to the two lower quadrants where organizations are the defined as trustors, because these two kinds of trusting relationships lead to the question of whether trust only is an individual attitude or also can be a collectively held attitude of an organization. Can organizations trust? This discussion will not be fully elaborated, as it goes beyond the scope of this dissertation (see Janowicz & Noorderhaven, 2006, and Kroeger, 2011, for more sustained discussion on this topic). However, in the rest of this section it is argued that interorganizational trust is a collectively held trust that emerges and is continuously (re)produced by the individuals who act in the interfaces between the organizations, for instance through the interaction of boundary spanners in interorganizational networks. Interorganizational trust is, in this dissertation, perceived as a supra-individual phenomenon that is something other than accumulated interpersonal trust, although it is still rooted in and closely connected to interpersonal trust.

Interpersonal and interorganizational trust (marked with grey in the table) are discussed more thoroughly in this section: they are used as analytic concepts because they relate most directly to investigating trust in interorganizational networks. As a consequence of this study's presumption of interorganizational trust as emanating from interpersonal trust and closely related to the actions of the boundary spanners, exploration of interorganizational trust must take interpersonal trust into account and investigate it equally. This conception means that trust between individuals and organizations (lower left and upper right quadrant in Table 2.3) is delimited from this dissertation. Further, *intra*organizational trust is not included in this dissertation as an independent concept. Instead it is incorporated as a part of the (organizational) context for the interaction and trust building in the analyses of the interorganizational network that is studied. As such, trust within each network organization is accounted for as an explanation of behavior, interaction, conflicts, structures and so forth, where relevant to the analysis. Correspondingly, intraorganizational trust is used as necessary when it has explanatory power in the analyses.

The trust that develops and exists between individuals is denoted as *interpersonal trust* and is tied to specific individuals. Interpersonal trust can be characterized as one of three types of trust (companion, calculative, or competence), depending on what the main components are (emotions, contracts, or abilities). From an organizational perspective, interpersonal trust is relational and is an attribute of the relationship between organizational actors, such as boundary spanners. The sources of interpersonal trust may be multiple, as they can be incrementally constituted through repeated interactions or can more spontaneous materialize as a result of

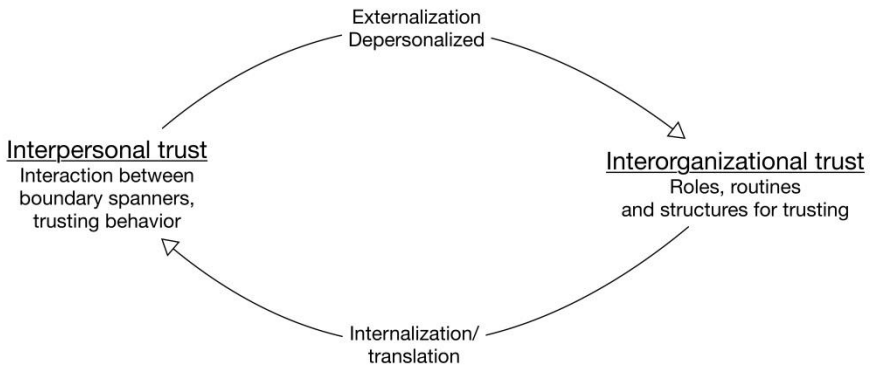
either social similarity or institution-based trust in certain competencies, certifications, authorizations and the like (Kroeger, 2011; Zaheer et al., 1998). Nevertheless, as interpersonal trust is tied to individuals, the boundary spanners perform a vital role in building and maintaining trust in interorganizational networks, and their competencies to navigate the interfaces between organizations are highly important when establishing and maintaining trust (Kroeger, 2011; Sydow, 1998; Williams, 2002). Such competencies may be the result of socialization through presence in the interface and interaction with other boundary spanners, or they may be the result of socialization from the organization of which the boundary spanner is a member. In the latter case, the level of trust within the organization and how attitudes of trust and trustworthy behavior exist within the organization are important, effecting how boundary spanners act in the interface between organizations (Kroeger, 2011).

Janowicz and Noorderhaven (2006) argue that the boundary spanners may possess rather different positions within their own organizations and that this position effects outcomes of trust. For instance, top managers are more likely to directly effect how interorganizational networks and collaborative efforts are structured. Hence, trust between top managers may be crucial to explaining and understanding why the network is structured as it is, how network goals are formed and so forth. In contrast, trust between boundary spanners on the operational level may be fundamental for understanding how the goals are met and how joint tasks are solved, as they are *"responsible for the actual implementation of the collaboration and the efficient execution of its everyday tasks"* (Janowicz & Noorderhaven, 2006, p. 274). Following this distinction between *strategic-level trust* and *operational-level trust*, the outcomes of interpersonal trust may depend upon the boundary spanners' position and authority in their own organization. Attention to interpersonal trust at both the strategic and operational level broadens the explanatory power of the concept of trust in this dissertation, as the boundary spanners hold quite different positions in their own organizations.

Where interpersonal trust is tied to the actors, *interorganizational trust* is tied to organizations and, hence, to a social system (Sydow, 1998). Interorganizational trust is thus constituted by an intersubjective, collectively held trust among the organizational actors towards another organization and is thereby a supra-individual phenomenon (Zaheer et al., 1998). It is not directed towards a specific person in the other organization but is rather directed towards the organization's institutionalized roles and routines for behaving in a trustworthy manner (Kroeger, 2011). For instance, interorganizational trust in a network may materialize in the institutionalization of behavior and routines that signals trustworthiness and supports trust building (e.g. open communication) and institutionalization of the boundary-spanning roles. This interorganizational trust endures turnover in boundary spanners, as trust is directed towards the roles of the boundary spanners instead of the specific person. Furthermore, interorganizational trust may be the

directed towards the organization as such, for example based on their reputation, certifications, accreditations and so forth. Although trust of an organization may concern only a certain part of the organization, for example a specific ward at the hospital (Sydow, 1998).

There seem to be two main origins of interorganizational trust, where the first is based on the institutional source of trust. Interorganizational trust is then established as a result of institution-based assumptions about the organizations, even in the absence of prior interactions or experiences with the organization. This institution-based trust may be an important source of interorganizational trust in highly institutionalized fields, as the structures are relatively stable and well-known for their organizational actors (Fuglsang & Jagd, 2013). The other main origin of interorganizational trust is institutionalization processes, meaning trust developed incrementally through repeated interactions between boundary spanners, which over time materialize into more stable interaction patterns, roles, and rules of behavior. Hence, interorganizational trust may be the result of institutionalized interpersonal trust (Kroeger, 2011; Sydow, 1998; Zaheer et al., 1998). On the other hand, boundary spanners draw on interorganizational trust in their specific interactions, and interorganizational trust can function as an antecedent to interpersonal trust (Kroeger & Bachmann, 2014). Thereby, interactions and behavior are both facilitated and constrained by interorganizational trust. As a result, the relationship between interorganizational and interpersonal trust is mutually constituted through a cyclical process, as illustrated in Figure 2.1.



Source: Inspired by Kroeger, 2011.

Figure 2.1: Institutionalization process as the connection between interpersonal and interorganizational trust.

Interpersonal and interorganizational trust are connected through institutionalization processes in which organizational actors produce and reproduce trust through their continuing interaction (Giddens, 1990; Sydow, 1998). Through the institutionalization process, trust is externalized and de-personalized (Berger & Luckmann, 1967; Giddens, 1990) from specific interactions and personal ties, and trust is thereby sustained despite turnover in boundary spanners. Through socialization, new boundary spanners internalize the existing norms, roles, and structures that support trust at the organizational interface. However, boundary spanners are not passive *"pre-programmed robots*" (Kroeger, 2011, p. 748). Instead, they enact such norms, roles, and structures creatively, constantly translating, modifying and transforming the institutionalized patterns of behavior. This institutionalization process is embedded both in divergent organizational contexts (the network organizations) and in an institutional context (Möllering, 2006) that influences and is influenced by the recursive interaction of interpersonal and interorganizational trust.

2.2.4. BUILDING AND MAINTAINING TRUST IN NETWORKS

The different sources of trust are not mutually exclusive, but can coexist and interact when establishing, consolidating, and maintaining trust. Accordingly, all three sources of trust may be relevant when building trust in interorganizational networks. More specifically, some structural properties of the network are highlighted as supportive for building and maintaining trust (Sydow, 1998). Correspondingly, network *density* may effect the development of trust. When the density is high, the network actors communicate frequently and openly, making it easier to establish trust because trust enhances mutual understandings of each other and of the shared goals. As a result, it becomes easier to predict and understand each other's behavior. Thus, through a dense network structure, collaborators seem more predictable and reliable (Hardy et al., 1998; Provan & Kenis, 2008; Sydow, 1998). Density is often related to the level of *centralization* and the *size* of the network. In centralized networks, density around the dominant actor is high and trust is often built through the central network actor, whereas trust is built by all actors in a decentralized network structure (Sydow, 1998). Similarly, the size of the network influences the development of trust. Large networks may increase the risk of fragmentation where some network actors are de-coupled or have a weak connection to the rest of the network. In contrast, smaller networks make it easier to communicate frequently, establish ties between network actors, and negotiate goals. This ease of operation is enforced when the turnover of organizations and actors in the network is low (Sydow, 1998). In these cases, a companion form of trust may evolve over time, which is further nourished if the network is not limited in *duration*, because such endurance enables the incremental accumulation of trust by with the politics of small steps, and it supports the development of strong

relationships and a shared network culture (Hesterly et al., 1997; Sydow, 1998). Furthermore, the relationships between network actors become stronger when there are *multiple reasons* for collaboration, and the content is related to different things (e.g. information, competencies, knowledge, services, products, innovations, etc.). In these cases, trust is constructed on the basis of many different expectations, and if they are not met in one area, they may be compensated for in others. Thus, multiplexity in network relations makes the ties between network organizations more robust (Sydow, 1998). Multiplexity in relations is more likely when the actors have complementary capabilities, as in systemic networks.

Furthermore, the *governance form of the network* effects how trust evolves in networks. When trying to establish trust in networks, it may be beneficial to use a form of shared governance in which the different network actors are involved in decision-making processes (Provan & Kenis, 2008). The opposite, however, may also create appropriate conditions for trust development, because governance through a lead organization may induce trust if the lead organization is perceived to be trustworthy. Furthermore, it could be argued that a form of external lead governance is the most appropriate: for instance, when collaboration is mandated and there is no trust, or there is even distrust, between the actors. This external governance may increase network actors' trust in decisions and network activities in that the external governance does not represent one (dominant) network actor's own interests.

In addition to structural properties and governance forms, other contextual factors effect the development of trust. One contextual factor is the culture in which the network and the actors in the network are embedded. This culture concerns the organizational, professional, and field levels, as well as the national culture by which actors are surrounded. Network actors that share the same culture (in one or more aspects) are more likely to have some similar characteristics, and these make it easier to develop trusting relations (see characteristic-based trust) (Sydow, 1998). Another contextual factor relates to the institutional surroundings in terms of regulation, as prior studies show that the degree of regulation effects how trust in a network develops and what kind of trust typically evolves (Bachmann, 2001; Fuglsang & Jagd, 2013). In highly regulated organizational fields, it is more likely that trust emerges on an interorganizational level between organizations in a network, whereas less-regulated fields tend to support development of interpersonal trust between the boundary spanners (Bachmann, 2001; Bachmann & Inkpen, 2011). Finally, the history of the actors' prior collaborative efforts effects how trust is built and maintained (Van de Ven & Ring, 2006; Vangen & Huxham, 2003). When the actors have a history of successful collaboration, trust is probably already established, whereas a lack of experiences often means that trust must be built from the beginning. More difficult is when there is a negative history of failed or strained collaboration, because trust in these cases most likely takes inverse form, distrust.

However, a number of causes can enter to create difficulty establishing and maintaining trust in networks. *First*, establishing trust involves common goals, but interorganizational networks, particularly systemic networks, are constituted by different organizations with diverging (and sometimes conflicting) goals and interests, making it a demanding task to establish trust (Alter & Hage, 1993; Kroeger, 2011; Sydow, 1998; Vangen & Huxham, 2003). *Second*, dilemmas regarding the balance of organizational autonomy and interdependency and the harmony of trust and control mechanisms present tensions integral to networks, tensions that can make trusting difficult (Sydow, 1998). *Third*, trust may relate more closely to individuals than to organizations in interorganizational networks, especially when trust is not institutionalized in roles, rules, and norms of behavior. This lack of institutionalization makes trust more vulnerable to changes in actors in the network. Consequently, trust is more difficult to build and sustain in networks (Kroeger, 2011; Sydow, 1998). *Fourth*, due to the dynamic nature of networks, maintaining trust demands continuous efforts (Vangen & Huxham, 2003). The establishment and maintenance of trust can be seen as a process in which the type of trust evolves and changes. Over time, it is likely that trust will change character from conditional trust—based on contracts or competences—to a companion or institutionalized trust between organizations (Koppenjan & Klijn, 2004; Newell & Swan, 2000; Paul & McDaniel, 2004; Sako, 1998; Zucker, 1986). In an interorganizational network, neither the level nor the type of trust are stable. Rather, trust in networks fluctuates (Vangen & Huxham, 2003). Accordingly, the maintenance of trust requires many resources, continuing attention, and "trust sensitive management" (Sydow, 1998). Such trust sensitive management may come with challenges, though, as trust is also the result of unreflective practice and the unintended bi-product of interaction related to other issues (Sydow, 1998; Vangen & Huxham, 2003; Zucker, 1986).

In the processes of establishing, developing and sustaining trust in interorganizational networks, it is important to distinguish between different sources of trust and how they may be utilized in the specific case. Such consideration may be supported by focusing attention on the structural properties of the network and the form of governance. By adjusting the structural properties or changing the form of governance, trust building and maintenance can be facilitated and may become the subject of trust sensitive management. However, trust is dynamic in terms of the type, the amount, the level, and the differences in relations within the network. Over time, trust changes, and different strategies should be applied accordingly. Additionally, trust can shift from interpersonal to interorganizational trust (and vice versa) through a process of institutionalization (Kroeger, 2011; Sydow, 1998; Zaheer et al., 1998).

2.2.5. POWER AND TRUST

Interorganizational networks are, as mentioned earlier, characterized by the absence of a hierarchical power structure. Accordingly, power is complex, constantly contested and negotiated between network members (Lawrence et al., 1999; Williams, 2012). Even though power may seem the antithesis of trust, the two forces can be considered *"functionally equivalent"* in regard to creating predictability in behavior (Hardy et al., 1998, p. 66). Therefore, power may be used as a coordination mechanism in interorganizational networks. Furthermore, power can create a relatively stable environment for interorganizational relations to develop in (Bachmann, 2001). Hence, power may be perceived as both an enabling resource for action (Giddens, 1990) and a means of domination and suppression (Hardy et al., 1998).

Empirically, power can be difficult to distinguish from trust, since power may cultivate attitudes that appear to represent trust (Hardy et al., 1998; Kroeger, 2011; Lane & Bachmann, 1998; Vangen & Huxham, 2003). Concerning this relationship, Clegg and Hardy (1996) argue that

> Power can be hidden behind the façade of 'trust' and the rhetoric of 'collaboration', and used to promote vested interests through the manipulation of and capitulation by weaker partners.
>
> (Clegg & Hardy, 1996, p. 225)

Whether network relations are based on trust or the mere façade of trust impacts collaborative efforts, outcomes, mutual learning and other advantages associated with trusting interorganizational relationships (Clegg & Hardy, 1999; Hardy et al., 1998). Therefore it is important to distinguish between trust-based relationships and power-based relationships (Hardy et al., 1998).

To separate trust-based and power-based relationships, one must remember that trust is constituted both by predictability in behavior *and* by goodwill and sharing of collectively held goals. Power can create predictability in behavior, as weaker collaborating partners have no alternative but to act according to the dominant organizations' goals and interests (Hardy et al., 1998). However, in this sort of collaboration, voluntary good will and shared expectations about common goals are absent. In these cases, positive synergy in the network is constrained, and certain advantages of collaboration disappear. Such network relationships are power-based rather than trust-based. Yet, in the literature this impact of relationship type has not been fully investigated, and asymmetrical power relations in the network have often been perceived as less important, since interdependency between network organizations would allegedly reduce or equalize such difference (Clegg & Hardy, 1999) (see e.g., Alter & Hage, 1993, and Vangen & Huxham, 2003, for such perspectives).

Hardy et al. (1998) identify two different types of power-based relationships. In the *first type*, consensus about goals is reached through manipulation; goals and agreements are disguised as the result of a fair and equal process, even though obtained by skillfully manipulative strategies. Collaborating organizations may have the impression of having influence in this type of relationship. However, they lose power for the benefit of the manipulating organization. The gains for the manipulating organizations include more powerful positioning and the predictability of the collaborating organizations' behavior, as their alternatives are reduced (just as the synergy and creativity in the collaboration). Such relationships lack reciprocity and good will (Hardy et al., 1998).

The *second type* of power-based relationship is characterized by capitulation of the weaker organizations in the network. In these situations collaboration is based on asymmetrical dependency in the network. The dependent organizations act as the *"tools of the dominant ones"* (Hardy et al., 1998, p. 82). The shared meanings and common goals are imposed by the dominant organization, and the weaker organizations do not challenge them because of the potential for negative sanctions and reactions to result. Instead of resisting the domination, they capitulate. The result is a façade of trust, where organizations act predictably, despite the lack of reciprocity, goodwill, and room for creativity (Hardy et al., 1998). Over time these power-based relationships may become institutionalized in certain roles, interaction patterns, and structures. Because the asymmetrical power structures are both institutionalized— hence, taken for granted—*and* hidden behind a façade of trust, these structures are extremely difficult to identify and change.

Standing in contrast to the power-based relationships are the two types of *trust-based* relationships. The *first type* is based on spontaneous trust in the network. This trust may appear when the institutional context offers a framework for shared meanings to emerge spontaneously. Another source of this spontaneous trust is related and trusted relationships, due to which a transferal of trust may imbue the new relationship with trust (Hardy et al., 1998). Finally, spontaneous trust may emerge as a result of the similarities of the boundary spanners (see Zucker, 1986). Such relationships are characterized by both predictability and goodwill. Trust is quickly established, but it can also be quickly broken, and this makes it fragile. In the *second type* of trust-based relationship, trust is generated through a *"management of meanings"* (Hardy et al., 1998, p. 81) whereby mutual understandings and goals are constructed. In this management of meanings, conflicts often occur. However, a conflict is perceived as constructive in negotiating and aligning common understandings and reciprocal expectations:

> Trust, rather than power, allows partners to resolve this conflict creatively and arrive at a mutually advantageous, co-operative relationship.
>
> (Hardy et al., 1998, p. 76)

However, a condition for solving conflicts constructively is that the actors are assured that their collaborators are not acting opportunistically or unfairly.

Despite these differences between trust-based and power-based relationships, they may be extremely difficult to distinguish from the outside, as power can be disguised as trust and since the two relationships may mix, coexist, and blur together (Hardy et al., 1998). This ambiguity may be the case especially in complex networks with multiple organizations, where the different dyadic relationships in the network each may represent (predominantly) trust- or power-based relationships, making the internal dynamics even more complex and contingent. For instance, if the dyadic relationship between actor *A* and actor *B* is mostly characterized as trust based, but the relationships between *B* and *C*, and *A* and *C* are mostly characterized as power based, how do these different forms of relationships mutually effect each other and how does this mutual dependence effect the network dynamics, outcomes and so forth? This dimension is not explored in Hardy, Phillips, and Lawrence's (1998) article on trust- and power-based relationships, but this discussion is closely related to the methodological discussion in Section 3.1 about network levels and the interrelatedness between the various dyadic relations in the network. It can be argued that important network dynamics and interconnections between the interorganizational relationships are missed if one studies such relationships only on a network level and not on a dyadic level. Accordingly, the empirical analysis will take this consideration into account and explore both the dyadic level and the network level in the matter of trust- and power-based relationships.

To elaborate further on Hardy et al. (1998) initial ideal types of relationships, the institutional context may also impact whether interorganizational relationships are predominantly trust- or power based. Accordingly, trust-based relationships are more likely to emerge in highly institutionalized and mature surroundings (Fuglsang & Jagd, 2013). Such surroundings offer a stable environment, common expectations and a *"world in common"* (Bachmann & Inkpen, 2011, p. 285), and shared symbols of trustworthiness. On the contrary, power-based interorganizational relationships are more prone to occur in unsettled and newly established institutional fields (Bachmann, 2001; Fuglsang & Jagd, 2013).

Finally, it may be argued that a substantial commitment of resources must be made to establish, nurture, and maintain trust in interorganizational relationships. It may be risky to trust other organizations, and therefore it may be tempting, when possible, to use power to coordinate and control activities in the network. However, the benefits of trust (e.g. positive synergy, efficiency, and innovation) are not obtained in power-based relationships (Hardy et al., 1998).

2.2.6. SUMMARIZING TRUST

Throughout Sections 2.2.1–2.2.5, several concepts and aspects of trust have been introduced, as summarized and compared to one another in Table 2.4, along with specific challenges relating to each type of trust. As the table demonstrates, companion trust is characterized by being personal and emotional, which makes it rather resilient. This form of trust is predominantly established over time and is thus process based. However, it may be difficult to maintain this form of trust in interorganizational networks where there is a turnover in boundary spanners. Calculative trust relies on contracts and regulations and not the individual boundary spanners in the network. Instead, the source of this trust is the institution. This form of trust is relatively easily established, but it is also easy broken. There also remains a risk of the interorganizational relations in the network becoming power-based, which may constrain collaborative advantages. Moreover, this form of trust may be difficult to establish and rely on in newly established organizational fields or unstable environments. Lastly, competence trust concerns abilities, status, and reputation and relies on both institutions and social similarity (e.g. belonging to same profession). This form of trust can both be interpersonal and interorganizational and is also relatively fragile. However, it can be challenging to build trust among professions that normally compete for domains or resources. Moreover, this form of trust, too, may be difficult to establish and rely on in newly established organizational fields or unstable environments.

Dimensions	*Companion*	*Calculative*	*Competence*
Main Component	Personal and emotional	Contracts, regulations, laws	Abilities, status, reputation
Source	Process-based	Institution-based	Characteristic-based (e.g. professional belonging) Institution-based (e.g. certification)
Level	Interpersonal	Interpersonal Interorganizational	Interpersonal Interorganizational
Robustness	Resilient	Fragile	Fragile
Examples of Challenges	Maintaining trust when there is a turnover in boundary spanners	Risk of becoming a mandated or power-based relationship, which may constrain collaborative advantages Difficulty relying on newly established organizational fields or unstable environments	Building trust among professions and business that normally fight over domain and jurisdiction Difficulty relying on newly established organizational fields or unstable environments

Table 2.4: Different types and dimensions of trust.

Finally it should be noted that studies of trust must take the structural level and individual level equally into account. Focusing on merely the individual level will not suffice to understand trust as an intersubjective phenomenon that differs from individual-based trust. On the other hand, investigating trust from only a structural perspective neglects how boundary spanners' actions and perceptions shape, translate, and transform trust, roles, and rules in the network through their enactment. Correspondingly, this dissertation perceives trust in networks as constituted by the continuous and recursive intertwining of interpersonal and interorganizational trust.

2.3. CONFLICTS IN INTERORGANIZATIONAL NETWORKS

Conflicts between actors are unavoidable in interorganizational networks, due differences and divergent interests between network actors. Conflicts may be constructive, however, in that they challenge status quo and foster discussions that may result in new shared understandings, mutual learning, and development in the network. On the hand, conflicts can be counterproductive, prohibiting the exchange of information and communication and constraining collaborative efforts (Brown, 1983; Hardy & Phillips, 1998; Lumineau et al., 2015). Management of conflicts plays an important role in whether conflicts are constructive or counterproductive and in mediating the conflict level. In a study of different interorganizational service delivery systems, Alter (1990) finds that conflicts are associated with the structural characteristics of the network. A high degree of differentiation and complexity in the network, as well as external regulation, is correlated with the level of interorganizational conflict. Following these results, it can be argued that conflicts in systemic networks are unavoidable, especially regarding public health care networks, since external regulation is high, for example government regulation. Further, it can be argued that differences in motivation for engaging in interorganizational networks may be a source of conflict, independent of structural conditions. For instance, if the network organizations join the network for different reasons in regard to co-exploration and co-exploitation, this difference of motivation may precipitate substantially divergent approaches to collaboration and expectations, leading to fundamental conflicts in the network.

As with other aspects in networks, for example trust, conflicts can be studied at different analytical levels, distinguishing between conflicts among individuals and conflicts at a more aggregated level, among organizations (Lumineau et al., 2015). Though the interpersonal and interorganizational levels are closely connected and may effect each other, this dissertation focuses primarily on conflicts that materialize on the interorganizational level. Consequently, conflicts that are highly personal and reflect individual interests and behavior are not further explored. Rather, conflicts that represent collective perceptions, behaviors, stereotypes, roles (e.g. boundary-spanning roles) and the like are perceived at the (inter)organizational level. With inspiration from Brown (1983) interorganizational conflicts in this study are conceptualized as incompatible behavior between actors (organizations or boundary spanners) whose interests differ. These conflicts have consequences on both an organizational level and an individual level, that is, between organizations and boundary spanners. To further examine interorganizational conflicts, Brown's (1983) conceptualizations of conflict levels, interaction patterns, and outcomes are used, as they offer an analytic framework for understanding conflict types and dynamics in interorganizational networks.

2.3.1. CONFLICT LEVEL

Following Brown (1983), this study conceives that the level of conflict can be insufficient, appropriate, or excessive. When the level of conflict is either too low or too high, the conflicts become counterproductive, whereas an appropriate level creates synergy and positive outcomes.

More specifically, an *insufficient conflict level* is characterized by lack of acknowledgement of conflicts over interests and incompatible behavior. There are two distinct interaction patterns when the conflict level is insufficient. The first is *withdrawal* where interaction that exposes differences and problematic behavior is avoided. Instead of solving the problematic issues and dealing with the differences, the actors in the network become passive (both boundary spanners and the organizations). Consequently, this passivity may lead to *interorganizational isolation*, where the actors withdraw from the network and fail to recognize mutual dependency in the network (Brown, 1983; Seemann & Antoft, 2002). The other interaction pattern associated with an insufficient conflict level is *suppression* of differences in interests. In this case, the actors act as if their interests are similar, and conflicts are neglected. This suppression may significantly reduce the autonomy of the network actors, as it results in little acknowledgement and exploration of differences, and their perceptions of themselves as independent organizations vanish. Instead, similarities are overemphasized, and the organizations' individual interests are not pursued unless they are aligned with the network's interests. This interaction pattern may be the result of a power-based relationship, where the dominating organization sets the agenda and the weaker network organizations comply and act as *"tools of the dominant ones"* (Hardy et al., 1998, p. 82) (see Section 2.2.5). This type of interaction pattern leads to *interorganizational collusion*, where everybody knows that something is dysfunctional, but no one takes action (Brown, 1983; Seemann & Antoft, 2002).

Similarly, an *excessive level of conflict* results in counterproductive conflicts and a dysfunctional interaction pattern: conflicts escalate. Interaction becomes hostile, characterized by suspicion and distrust. This hostility thus creates distance and tensions between the organizations in the network. In practice, such tension may crystalize as negative stereotypes, the withholding or distorting of information, the deliberate causing of annoyance, fights, and other visibly hostile behavior. This these consequences can, in turn, lead to *interorganizational warfare* (Brown, 1983; Seemann & Antoft, 2002).

Between these extremes is an *appropriate conflict level*, associated with constructive conflicts and interaction patterns. The first interaction pattern is characterized by *mutual understanding* and focus on common interests. Interaction between the boundary spanners and the organizations in the network is characterized by trust (see Section 2.2.5 Trust and Power). This kind of behavior

supports the development of shared solutions and a focus on maximizing benefits and gains for all actors in the network. Consequently, trust, shared goals and collaborative efforts are developed, and in the long term this level of conflict may result in continued collaboration and new joint activities. Correspondingly, the outcome of this interaction pattern is shared *interorganizational problem-solving*. However, there may yet be a risk of developing an insufficient conflict level in this type of interaction (Brown, 1983; Seemann & Antoft, 2002). The other interaction pattern associated with an appropriate level of conflict is *negotiation*, by which the actors confer about differences in order to create shared solutions. The focus is on divergent interests instead of commonalities. As a result, differences and interdependencies are clarified and recognized by the actors. Such negotiation may mobilize the resources in the network and support more open and honest communication. This interaction pattern encourages compromises in the network and prevents conflicts from escalating. Consequently, *interorganizational bargaining* takes place. There may be a risk escalating conflicts that leads to a too-excessive level of conflict (Brown, 1983; Seemann & Antoft, 2002). Table 2.5 summarizes the conflict levels and the associated consequences and outcomes.

Conflict Level	Interaction Pattern	Consequences	Outcomes
Insufficient	Withdrawal	Avoidance of differences Unacknowledged dependency Low commitment	Inter-organizational isolation
Insufficient	Suppression	Reduced information flow Reduced autonomy Unacknowledged differences	Inter-organizational collusion
Appropriate	Understanding	Open communication Clarification of common interests Development of trust Maximizing gains	Inter-organizational problem-solving
Appropriate	Negotiation	Clarification of differences and interdependencies Mobilization of resources Achieving compromises Common acceptance of solutions	Inter-organizational bargaining
Excessive	Escalation	Distorted information Distrust and suspicion Fighting each other	Inter-organizational warfare

Table 2.5: Conflict Level and Outcomes.

Conflicts have both positive and negative consequences. Furthermore, it can be suggested that management of conflicts requires interventions that adjust the level of conflicts in the network (Brown, 1983). Additionally, some of the literature on trust further argues that trust has a positive impact on conflicts, since it reduces conflict among collaborating actors (Hardy et al., 1998; Zaheer et al., 1998). It seems like the relationship between trust and conflict is complex and mutually constitutive. For instance, a sufficient level of trust may create an appropriate conflict level through which trust can be further developed and nurtured. This feedback effect creates a positive synergy between conflicts and trust in the network. In other cases, though, excessive levels of trust may create an insufficient conflict level that creates a façade of trust because the relationship becomes based on withdrawal and avoidance of interaction that would illuminate tensions and divergent interests.

2.4. SUMMARY

The theoretical framework constitutes a rich conceptual toolkit for exploring how the telemedicine network evolves over time, in relation to network orientation, in terms of co-exploration or co-exploitation, structural properties, and governance form. Moreover, the theoretical framework enables nuanced investigation of the various network processes and dynamics in terms of the following: horizontal collaboration processes; forms and sources of trust in the network; building, nurturing, and maintaining trust at the interpersonal and interorganizational level in the network; and conflicts in the telemedicine network. Accordingly, the theoretical framework provides for a rich the study of the micro-processes and dynamics in the telemedicine network and the network structures that create a frame for these processes.

CHAPTER 3. METHODOLOGICAL REFLECTIONS

The research design performs a vital role in scientific studies, as it forms a nexus for the study's different parts, from the research question to the choice of methods, theoretical concepts, and strategy of analysis to the conclusion. In other words, the research design enables the researcher to draw sound conclusions based on a clear and transparent research strategy. The choice of research design must be based on thorough reflection on the field of study, the subject, and its distinctive traits. Section 3.1 confronts three methodological challenges raised in the network literature concerning the execution of network studies. Addressing these methodological challenges, Section 3.2 presents the longitudinal qualitative case study as the proper research design for this study. Reflections about how to construct the case, the levels of analysis, and the presentation of the case are outlined in Section 3.2.1. Lastly, the organizational ethnography-inspired approach for producing data in this dissertation is presented and discussed in Section 3.3.

3.1. METHODOLOGICAL CHALLENGES

In the network literature, different challenges and issues related to network studies are raised. The *first challenge* concerns something basic but quite important: *defining the network and its boundaries*. Delimiting the network is difficult, as the formally established boundaries of the network are often not the same as the one practiced in reality. Often, the boundaries in practice are temporal and socially constructed, and change according to the specific context of (inter)action (Hardy et al., 2003; Meier, 2015; Mørk et al., 2012). Boundary-spanning activities may transform and reconfigure boundaries, since boundaries are constructed through interactions in which demarcations between "us" and "them" are (re)constructed, depending on context. An example of this flexibility can be found in Meier's (2015) empirical study of a hospital ward, where boundaries between professional groups, wards, and teams were dynamic, changing according to the specific context in which the boundaries were drawn. These ongoing boundary (re)configurations are the result of the boundary spanners' interactions in the interorganizational networks. In this study, however, network boundaries are analytically constructed (Klijn, 2008), and the challenge of defining the boundaries of the telemedicine network is met with definition on the basis of the formal network structure and formal statements about who is part of the telemedicine program.

The *second challenge* relates to the dynamic and unstable nature of networks. This instability becomes a challenge when networks are investigated at only one point in time, because in such an investigation the emergent and changing organization of the network is not captured (Clegg et al., 2016). Prior studies have shown that interorganizational relations and dyadic relations change significantly and often dissolve over time, for varying reasons (Human & Provan, 2000; Klijn, 2008; Knoben et al., 2006). Still, there is a call from several researchers for more *longitudinal studies* on networks to further understand the network dynamics (Bergenholtz & Waldstrøm, 2011; Clegg et al., 2016; Jack, 2010; Knoben et al., 2006; Owen-Smith & Powell, 2008; Parkhe et al., 2006).

The *third and last challenge* addressed in this section concerns the *level of analysis* in network studies. Network analysis is a complex process due to the multiple analytical levels and their interconnectedness. Networks can be analyzed at the following levels: at an individual or interpersonal level representing the boundary spanners; at an organizational level representing the perspective of all organizations or a focal organization in the network; at a dyadic level representing the dyadic relations between the organizations in the network; or at a network level representing the whole network. These different analytical levels are illustrated in Figure 3.1.

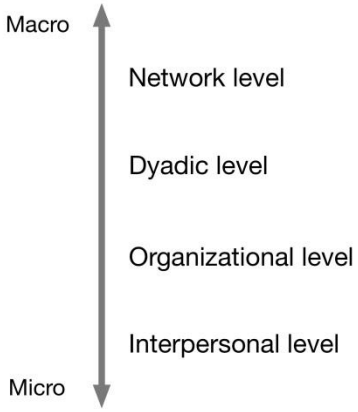


Figure 3.1. Analytical levels in network studies.

In their review on studies of networks at a network level, Provan, Fish, and Sydow (2007) find that networks have been investigated mostly at the organizational level or at the dyadic level. Although these studies contribute with important knowledge and insights about the organizations and the dyadic relations within a network, these studies fail to encompass the complex network dynamics that are caused, altered, and reconfigured by the interconnectedness of the multiple

interorganizational relations; and they miss careful examination of how the network becomes a social entity in itself. More specifically, Provan et al. (2007) put it as follows:

> Although dyads are the basic building blocks of networks, dyad-focused research is in most cases limited in that the network is primarily seen as a collection of two-party relationships rather than as a unique, multiorganizational social structure or even a social system in its own right.
>
> (Provan et al., 2007, p. 483)

The distinction between the different levels of analysis can be made analytically, but when conducting empirical analysis, this distinction can be difficult to maintain since practical investigation of organizational structures implicitly deals with these different levels. For instance, when investigating boundary spanners, several analytical levels may be represented because boundary spanners in some situations act predominantly as organizational representatives (representing the organizational level); at other times they act as individuals pursuing their own interests (representing the individual level); and in other situations, they act according to common network goals (representing the network level). Correspondingly, they span the different analytical levels, making it challenging to maintain this division when analyzing their (inter)actions and behavior. The multifaceted identity of boundary spanners may also be the reason why a review of approaches to network studies finds inconsistency in the unit of analysis in most of the network studies, resulting in inconsistent findings (Jack, 2010).

In this study, the aim is to investigate *the network level*. However, to accomplish this goal, the other levels must also be included in the analysis, as network dynamics cannot be fully understood without taking into account the boundary spanners (and whatever level they represent). Furthermore it seems difficult to analyze the whole network and handle the complexity in network studies without dividing the network into dyadic relations. Indeed, this dissertation also struggles to handle the complexity of network analysis and move from analysis of dyadic relations to that of the whole network. Although the levels are analytically distinguished, it can be argued that the different levels are mutually constitutive each other, being closely interrelated. For instance, changes in one of the network organizations often leads to adjustment and adaption in the other network organizations, particularly in systemic networks, where the organizations are interdependent in relation to the joint tasks.

3.2. THE LONGITUDINAL QUALITATIVE CASE STUDY

Studying networks requires sensitivity towards the methodological challenges of defining and constructing the boundaries of the network, consistency in investigation at the network level, and the dimension of time. This section provides arguments for why the longitudinal case study, as a research design, accommodates network studies, as it addresses and handles these challenges.

Case studies have been used widely within different academic traditions, for example political science, sociology, psychology, and organization studies (Flyvbjerg, 2006; Gerring, 2007; Ragin & Becker, 1992). The understanding and usage of case studies differs significantly both across and within the different disciplines. Elucidating and defining how case studies are understood and applied in this dissertation is therefore crucial.

Following several scholars, the qualitative case study is in this dissertation perceived as a research design that enables an in-depth study of a phenomenon difficult to delimit from its context. Hence the case study facilitates investigation of phenomena with respect of their complexity and embeddedness in different contexts (Antoft & Salomonsen, 2007; Flyvbjerg, 2006; Gerring, 2004; Ragin, 1992; Thomas, 2011; Yin, 2013). Furthermore, this line of the case study literature argues strongly that cases are analytical constructions created by us as researchers; cases do not exist, *per se*, but evolve as a result of the research process. This recognition also implies that cases can be constructed rather differently, depending on the focus of the study and the lenses used to investigate a given phenomenon (Abbott, 1992; Antoft & Salomonsen, 2007; Flyvbjerg, 2006; Thomas, 2011).

According to Thomas (2011), case studies can be separated into two core elements; the *subject* and the *object*. The *subject* denotes the case that is being investigated, whereas the *object* refers to the broader phenomenon, population, or concept that the case represents. This distinction implies that case studies always represent cases of something beyond their immediate subject, whether it is a broader phenomenon, concept, or population. What this something else is can be tricky to determine, as it often first becomes evident during the late phases of a study. In other words, the object emerges during the research process; although though the researcher may have an idea about it initially, this idea may change as the study progress. As Ragin (1992) puts it:

> "What is this a case of?" The less sure that researchers are of their answers, the better their research may be. From this perspective no definitive answer to the question "What is a case?" can or should be given, especially not at the outset, because *it depends.*
>
> (Ragin, 1992, p. 6)

What the case is *a case of* crystalizes during the research process as the result of a constant dialogue between theoretical concepts and the empirical data (Ragin & Becker, 1992). In this dissertation, this processual development of the object is perceived as one of the strengths of the case study format and one of the main reasons to choose this research design: this flexibility recognizes the dynamic nature of research processes and fits well the nature of the case in the dissertation, recognizing that networks are dynamic and constantly evolving. Hence, the case study facilitates an open mindedness about research processes' dynamic nature and the contingencies of how cases may change as we dig deeper into them and reveal unforeseen aspects.

Even though the object cannot be fully defined at the beginning of the study, the researcher has an idea of what the object might be, and this anticipation guides the construction and selection of the case. The case must be selected to illuminate the object of this study, that is, network dynamics in systemic networks (Alter & Hage, 1993). Correspondingly, the selection of cases is a strategic choice, and different selection strategies can be used. The cases can be selected because they are perceived as *key cases* of a phenomenon (Thomas, 2011) that are expected to contain rich information that illuminates the object (Flyvbjerg, 2006). Another strategy is to select *outlier, deviant, or extreme cases*, from which information about unusual cases is gained (Flyvbjerg, 2006). Both of these strategies facilitate the attainment of "exemplary knowledge" (Thomas, 2011, p. 514). Other strategies include selection of cases that *maximize variation* in the cases, for example in terms of network types, or selection of a *critical case* that *"permits logical deduction of the type, 'If this is (not) valid for this case, then it applies to all (no) cases'"* (Flyvbjerg, 2006, p. 230). Additionally, other selection strategies are mentioned in the literature but are not included here (see Gerring, 2007, or Seawright & Gerring, 2008). The four different case-selection strategies and the logic underlying their inquiry are depicted in the Table 3.1.

Selection Strategy	Logic of Inquiry
Key Case	Contains rich information. Cases are selected because they are perceived to generate exemplary knowledge.
Outlier, Deviant, or Extreme Case	Contains information about unusual or unique cases.
Maximum Variation Case	Creates maximum variation in cases to compare cases and identify similarities and differences.
Critical Case	Applies logical deduction (or reverse deduction) to the case.

Made with inspiration from Flyvbjerg 2006, p. 230.

Table 3.1: Case selection strategies and their logic of inquiry.

The different strategies are not mutually exclusive, and two or more strategies can be used simultaneously. For instance, choosing and defining a network may reflect both a key-case and a critical-case selection strategy. Common to these different case selection strategies is that they represent a totally different logic of inquiry than the one used for statistical inference, where representativeness is sought. None of the above strategies intend to select cases representative of a larger population or a broader phenomenon, that is, the object. Instead, they are selected due to their distinctiveness, as this quality sheds light on the object and contributes to explaining and understanding it. Instead of using statistical methods for generalization, the ability to generalize on the basis of such qualitative case studies relies upon the connection between the case (subject) and the analytical or theoretical frame (the object) (Thomas, 2011). Reflections and arguments about the connection between these two elements must be transparent and clearly stated throughout the research process to assess whether and when the findings can be analytically or empirically generalized to the phenomenon that the case represents.

Depending on the purpose of the case study and the logic of interpretation, four different analytical approaches in case studies can be derived, as delineated in Table 3.2.

	Interpretation Based on Empirical Data	**Interpretation Based on Theory**
Purpose: Producing New Empirical Knowledge	A-theoretical approach	**Theory interpretation approach**
Purpose: Produce New Theoretical Knowledge	**Theory-producing approach**	Theory testing

Source: Antoft & Salomonsen, 2006, p. 34 (own interpretation).

Table 3.2. Four analytical approaches in case studies.

In the *first quadrant,* the a-theoretical approach, the purpose of the case study is to produce new empirical knowledge, and the analysis is grounded in the empirical data without the use of theory. Hence, this kind of ideal typical case study has an a-theoretical analytical approach. By contrast, the *fourth quadrant*, theory testing, denotes case studies that aim at producing new theoretical knowledge by interpreting empirical data with existing theory. This interpretation is done through a theory-testing approach on which the limits and validity of existing theoretical

concepts are tested (Antoft & Salomonsen, 2007; Thomas, 2011). However, the two quadrants of interest in this dissertation are the second and the third.

The *second quadrant* contains case studies that aim at producing new empirical knowledge and use a theoretical framework or established concepts as guiding tools to interpret and enhance understanding of the empirical data. This dissertation relies on the theory interpretation, where theoretical concepts guide the production of empirical data and constitute the analytical frame for interpreting that data. A constant dialogue between the empirical data and the theoretical concepts characterizes this approach. As a result, the theoretical framework is developed as the study evolves, enabling flexibility and sensitivity towards the empirical data and what it reveals as relevant, as the study progresses. The starting point in this case study is therefore neither determined by the theoretical framework nor completely inductive, as it is still guided by my initial understandings of networks. As this study evolves and bits of the empirical reality are revealed, though, theoretical perspectives and concepts are included (e.g. trust, translation, boundary objects) to organize and interpret the empirical data. This ongoing process results in the presented theoretical framework for the dissertation. Accordingly, this research process has been neither purely inductive nor purely deductive but has instead been an ongoing interaction between the two approaches.

Although the purpose is, foremost, to produce new empirical knowledge about network dynamics in systemic networks when developing and implementing innovations such as telemedicine by interpreting the empirical data with existing theoretical concepts, this study also relies partly on elaboration of existing theory and tentatively proposing new theoretical concepts or models to understand complex network dynamics. Correspondingly, this case study occasionally draws on a more theory-producing approach, as depicted in the *third quadrant* of Figure 3.2, where the purpose is to generate theory on the basis of the interpretation of empirical data. In its pure form, this approach is similar to grounded theory (Glaser & Strauss, 1967).

Beyond these distinctions between analytical approaches, the case studies can be divided according to other parameters. A common parameter used to distinguish between case studies is *time*. Does the case study reflect a *snapshot* in time where the case is studied in a defined (short) period of time, or is the case investigated *retrospectively* or over time, that is, *longitudinally*? Another common distinction is made between *single* case studies and *multiple* case studies, which allow comparison of cases. Finally, another distinction is made between *holistic* and *embedded* or *nested subcases*. Holistic case studies investigate the case as a whole unit, whereas the embedded or nested approach divides the case into subcases tied to certain aspects of the case, for example organizational units in an organization (the case) that together constitute the whole case (Gerring, 2004, 2007; Ragin & Becker, 1992; Thomas, 2011; Yin, 2013).

3.2.1. CONSTRUCTION OF THE CASE

Based on these different notions of case studies, the research strategy in this dissertation can be characterized as a *longitudinal case study* where the selected case is investigated over time in order to grasp the dynamics and changes in the case. The *telemedicine network* is selected as a case of interorganizational network dynamics (the object) because it is a *key case*, considered rich in information about network dynamics since this network reflects a highly complex and functionally differentiated systemic network in a settled institutional field (the Danish health care field); furthermore, in this field, interorganizational relations are reconfigured as a result of the development and implementation of an innovative health service, that is, telemedicine. The telemedicine network consists of a *single* case analyzed by interpreting the empirical data through the theoretical framework presented in Chapter 2. The case is divided into subunits that represent the different analytical levels in the network. The *first subunit* consists of the boundary spanners and their behavior and interactions. This subunit does not represent a fixed analytical unit, since the boundary spanners can represent an individual, organizational, or network level, depending on their orientation (e.g. towards own organizational domain or the network). The direction of the boundary spanners' orientation effects network dynamics, and explicit reflections about their orientation are presented during the analysis, which also contributes analytical clarification. However, the focus on the boundary spanners enables a micro-oriented analysis of network dynamics. The *second subunit* consists of the three different dyadic relations between the organizations in the network: municipalities-hospitals, municipalities-GPs, and hospitals-GPs. These dyads are analyzed separately and then aggregated and analyzed in relation to each other to identify the complex dynamics at the network level. However, the network is more than merely the sum of the dyads because of the dynamics in the network and those that arise from the interrelatedness of the dyads (see the earlier mentioned arguments of why network distinguish from dyads, Section 2.1.2). The *third subunit* is network characteristics in terms of its form of governance, size, and degree of centrality (from a qualitative perspective) which, obviously, reflects the network level.

This case study primarily aims to produce new empirical knowledge about telemedicine from an organizational perspective and, more generally, to foster a better understanding of dynamics in interorganizational networks; secondarily, this study aims to elaborate, synthesize, and extend existing theoretical concepts to enhance our understanding of network dynamics. As such the case study uses an approach of theory interpretation and, occasionally, of theory production.

As mentioned in Section 3.1, cases are perceived as analytically constructed with the purpose of elucidating a given phenomenon (the object) (Abbott, 1992; Antoft & Salomonsen, 2007; Thomas, 2011). The case becomes an analytical construct when the boundaries defining the case are set by the researcher. This awareness of

the analytically constructed boundaries of the case suits the challenges posed by the blurriness of the boundaries of networks (see Section 3.1) because this ontological premise in the case study seems to acknowledge how investigation of "reality," in this case, networks, always relies on constructed boundaries. Given this premise, choosing the case study as a research strategy to investigate network dynamics enables sensitivity towards the sometimes changing boundaries of networks. As a result, it should be evident that the boundaries of the case, that is, the boundaries of the network, are analytically constructed by me as a researcher. In this dissertation, the case is defined by the formally defined boundaries of the telemedicine network, which are themselves defined by the network organizations. The structure of the telemedicine network is illustrated in Figure 3.2.

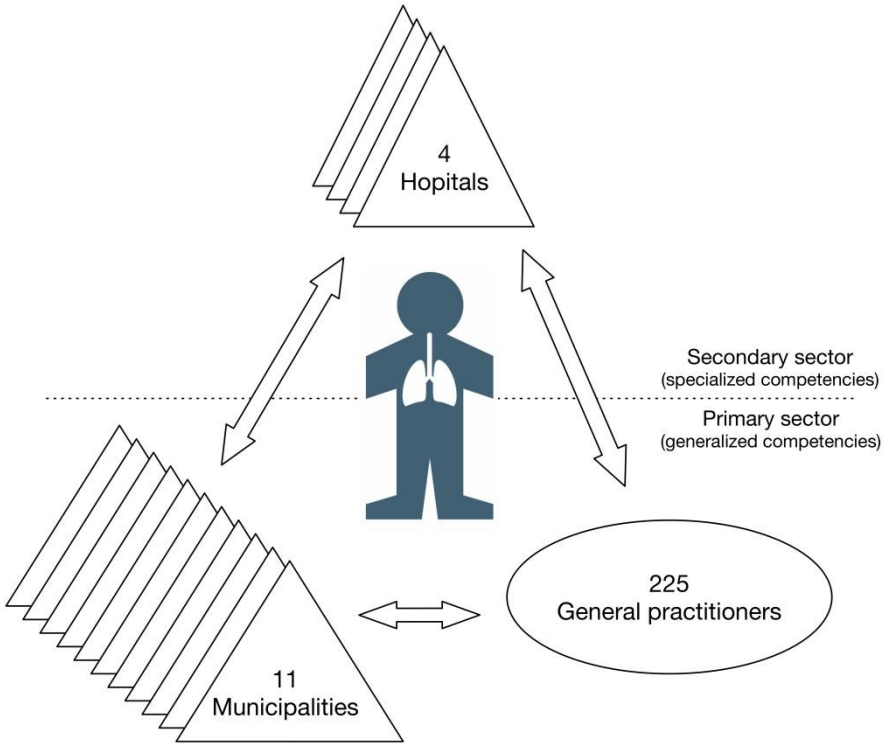


Figure 3.2: The telemedicine network.

The telemedicine network is a systemic network that consists of three core actors with complementary capabilities: the municipalities, the hospitals, and the GPs. More concretely, the telemedicine network consists of 11 municipalities, four hospitals, and 225 GPs, each interdependent on each other to solve the shared task of developing and operating a large-scale telemedicine program that covers the

entire region of North Denmark.[1] The network actors are all part of the same organizational field, that is the Danish health care field. A total of 1225 COPD patients were enrolled in the large-scale telemedicine program. The network is characterized by a high degree of complexity, differentiation, and mutual dependency. Collaboration in the network is partly mandated both through shared agreements, which concern general health agreements (Rudkjøbing, Strandberg-Larsen, Vrangbæk, Sahl Andersen, & Krasnik, 2014) and, specifically in relation to the telemedicine program, through commitment of the municipalities' city councils and the regional council. Even though the GPs' professional association, the Danish Medical Association (DMA), is committed to the program, each GP's participation depends on the GP's willingness (and payment) to join the program (see Section 6.3).

The program is governed and managed through a project organization in which a steering group is established as an independent unit outside the three core organizations; the governance also entails representation from other stakeholders (e.g. patient associations), a business group with the top managers from the three core organizations (i.e. municipalities, hospitals, and GPs), and a project secretariat. To develop the program, four different workgroups have been established: (1) the Information Technology group (IT group), (2) the health group, (3) the organization group, and (4) the implementation group. Each group contains actors from the municipalities, hospitals, and GPs, and each is led by a project manager from the project secretariat (see also Section 6.2). Figure 3.3 illustrates the organization of the telemedicine network (includes the core organizations).

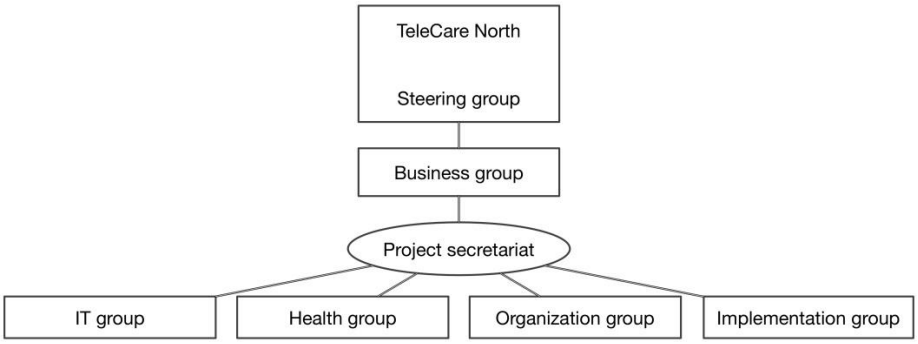


Figure 3.3: Organization of TeleCare North.

[1] See Section 4.2 for more about division of roles and functions among the network actors, and see "Does Telecare Improve Interorganisational Collaboration?" for more about their general responsibilities).

A more thorough presentation of the large-scale program TeleCare North is undertaken in Chapter 4.

In summary, the longitudinal case study is an appropriate research design when investigating network dynamics, as it allows sensitivity towards the blurriness of network boundaries and enables one to understand better the network in its complexity and its (institutional) context. Furthermore, this research strategy facilitates elucidation of dynamics and changes in the network as the network is studied over time. Based on these considerations, the longitudinal case study as selected as the research strategy for this dissertation.

3.3. ORGANIZATIONAL ETHNOGRAPHY

The case study as a research strategy does not dictate the use of a certain method for producing data. Instead, the use of multiple methods is encouraged in case studies, to illuminate various aspects of the case (Antoft & Salomonsen, 2007; Thomas, 2011; Yin, 2013). As opposed to the network studies that rely on quantitative measurements and mathematical models for analyzing network structures (see e.g., Kilduff & Tsai, 2003 and Powell et al., 2005), the methods for producing data in this dissertation are inspired by organizational ethnography (Neyland, 2008; Ybema, Yanow, Wels, & Kamsteeg, 2009) and rely on different qualitative methods utilized to explore the network dynamics and the process whereby the network evolves over time (Jack, 2010; Klijn, 2008). Organizational ethnography is not used as an explicit research strategy, since the overall research strategy relies on the case study; in combination with the case study, however, organizational ethnography is applied as a strategy to produce data and engage with the telemedicine network.

Organizational ethnography is rooted within anthropology and denotes an approach to generating data and engaging with the phenomenon being studied through multiple methods, such as participation, observation, (field) interviews, and document studies. Extensive participation and observation is often the dominant method to produce data in such studies (Eberle & Maeder, 2016; Neyland, 2008; Ybema et al., 2009). Often, rich descriptions of everyday organizational life are enabled by this approach, as well as the revelation of taken-for-granted ways of thinking and acting in organizations (Ybema et al., 2009). In this dissertation, an organizational ethnography-inspired approach enables in-depth understanding of how the telemedicine network evolves over time as a result of multiple activities and processes, which unfold on the micro-level at the different sites and in day-to-day activities. Seeking such an understanding, this approach corresponds with the overall research strategy, the longitudinal qualitative case study. This approach is furthermore sensitive to the emergent nature of networks, since organizational

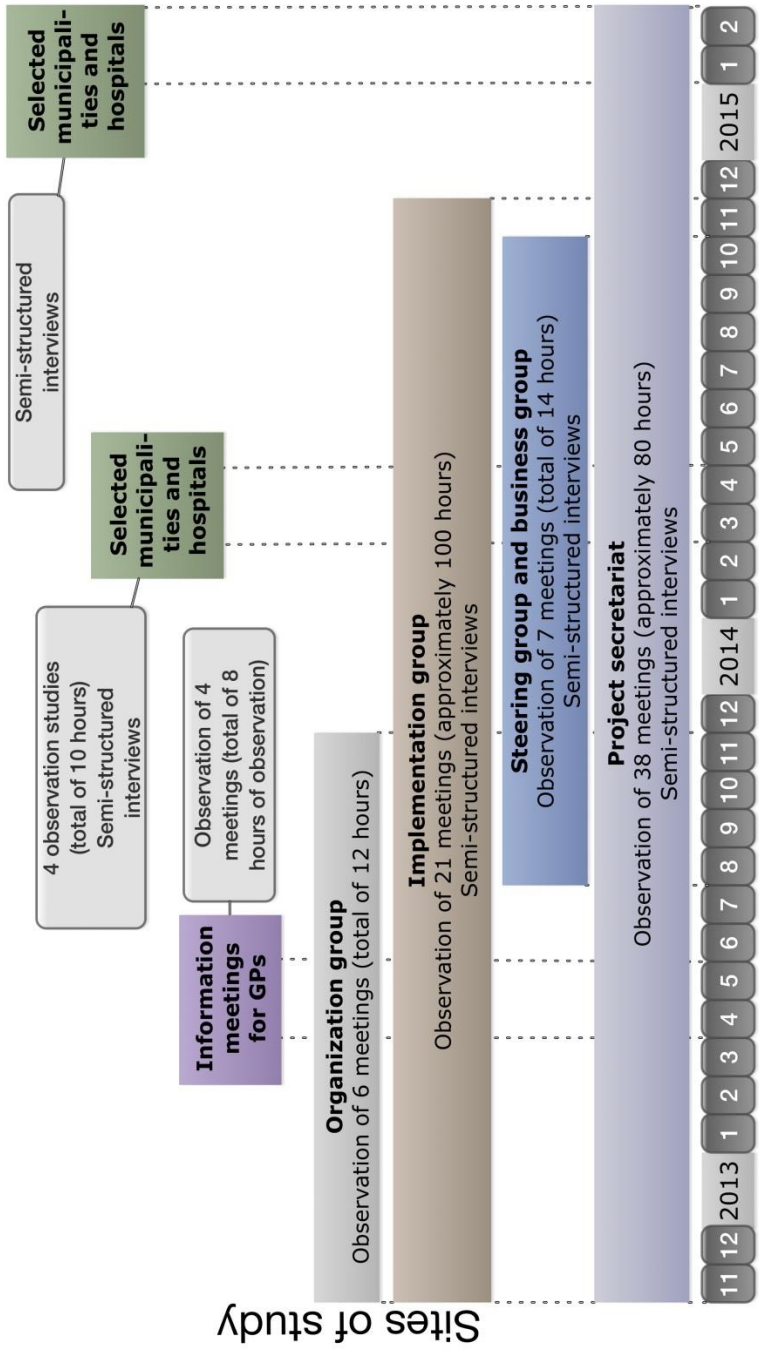
ethnography represents an iterative and participative process through which the researcher is able to adjust focus according to how reality unfolds and the network develops (Neyland, 2008). This approach makes it possible gain insight into "what *is* going on, rather than what *should* be going on, as resulting from formal documents and even interviews" (Czarniawska, 2007, p. 33). However, conducting an organizational ethnographic study can be difficult, as it requires a high degree of access to the field (i.e. the telemedicine network) along with a more participatory role for the researcher, as compared to other methodological approaches; this method can thus be time consuming. Moreover, it can be difficult to maintain a more distanced, reflective, and critical role as a researcher when relying on an organizational ethnographic approach (cf. the risk of going native, Neyland, 2008). The following sections aim to create transparency in the methods used to produce data in this dissertation, as well as to clarify my own role and involvement in the TeleCare North program. This clarification is particularly important, since data are to be understood as a result of my interaction with the different sites of study and not as purely objective subject of study (see also Ybema et al., 2009) for more about this understanding of ethnographic data). In relation to this understanding of the data, four different roles are described in the literature about (organizational) ethnography: full participant, participant as observer, observer as participant, and distant observer (Neyland, 2008). These roles reflect a continuum of proximity to the research subject. The outer positions are associated with certain risks: full participation increases the risk of *going native*, at which point critical distance is impossible to obtain, whereas distant observation increases the risk of misunderstanding the observations and missing the substance of the phenomena under study (Czarniawska, 2007; Neyland, 2008; Ybema et al., 2009). My role as a researcher was dynamic, moving between being a participant as observer and an observer as participant, depending on the site, situation, and what was considered appropriate behavior in the given context. Critical reflections on my own role in this study are presented Section 3.3.3.

3.3.1. SITES OF STUDY

Conducting organizational ethnography in an interorganizational network (as well as within a single organization) can be challenging, as the different processes, activities, and interactions occur in a myriad of places (both physical and virtual) through a complex web of actors. In recognition of this complexity, the pre-existing arenas for (physical) interorganizational interaction were selected as sites of study, along with other central sites in this dissertation. This varied site selection also reflected that the development of the program was not limited to one site (see Figure 3.4). Having multiple sites enabled deeper understanding of the complexity and interrelatedness each site in relation to the network's dynamics in terms of collaboration, trust, and conflicts occurring during the development and

implementation of the large-scale telemedicine program. Accessing these sites contributed to opening the "black box" of how the telemedicine program was developed and evolved over time, as these processes were followed in real-time (cf. Hoholm & Araujo, 2011, on real-time ethnography).

Figure 3.4: Sites of study over time.



Multiple sites and different activities were undertaken over a period of nearly three years to produce data for this dissertation. The rest of this section describes the sites, with a strong focus on the observation activities; the semi-structured interviews are explicitly described in Section 3.3.2.

Firstly, I participated in the project secretariat's meetings to share information, get updated, and coordinate activities. The first year of these meetings were held weekly, whereas afterward the frequency was reduced to biweekly meetings (see Figure 3.4). These meetings allowed access to insider knowledge of the program's activities and how it progressed, as well as "gossip" about the different network actors and the challenges, and rumors about telemedicine at a field level. Hence, these meetings characterized back-stage activities (Goffman, 1959), where the day-to-day activities in the development of the program were fully visible without disguising more problematic issues in this process, unlike in formal representations of the program's development (e.g. written documents and formal interviews). This special access contributed to a more thorough understanding of the network processes and the activities in the program, as well as contextual influences on the development of the program. Furthermore, the project secretariat represented a vital resource for me to clarify matters of doubt and issues about which I was puzzled. Moreover, the secretariat performed a crucial role as gate keeper, since my affiliation with the project secretariat enabled (almost unlimited) access to the workgroups, to the steering group, and to various internal documents (e.g. minutes from meetings, project progression reports, etc.). In relation to these meetings, I acted as participant observer, since I actively participated in the meetings by contributing with updates on the status of my PhD study, discussing issues of how to access relevant actors, and the like.

Moreover, I was present in the project secretariat once a week using desk space for PhD students. In practical terms, I spent that whole day on meetings with the project secretariat and socializing with other PhD students and members of the project secretariat. This time spent in the project secretariat resulted in familiarity with the day-to-day routines and activities of the project, as well as personal relations with the members of the project secretariat, although without becoming "real colleagues," since I was never perceived as an equal member of the project secretariat and since they never functioned as my research peers.

Secondly, I participated in the steering group meetings and the business group meetings (consisting of the core health care actors from the steering group) to observe the discussions and interactions at these meetings (see Figure 3.4). The meetings functioned as arenas in which the top managers from the divergent organizations interacted and met face to face. These meetings were held approximately once every third month and were highly formalized. They represented the top management level in the health care organizations and illuminated some of the strategic considerations, decision making, negotiations and

handling of conflicts between the different actors, for example through balancing of interests. The top managers in the steering group represented, respectively, the municipalities in general, the hospitals in general, and the GPs in general. Though I twice presented my PhD study and preliminary findings at the steering group, my role was as more that of an observer as participant. However, before and after the meetings I was able to ask clarifying questions about discussions and decisions to the different participants in the steering group.

Thirdly, I was a regular participant in the implementation group that met biweekly for day-long meetings or half-day meetings for more than six months, and then once a month over the next year (see Figure 3.4). Similar to the steering group and business group meetings, these meetings were occasions to gather representatives from across the organizations. Each municipality had a member in this group who represented their interests, goals, and standpoints, whereas the four hospitals were represented by one regional representative. Through these organizational representatives (i.e. boundary spanners) and their narratives about their organization, it was possible to get insight into each of the municipalities and their attitudes towards the program and the development process. As Neyland (2008) notices,

> Simply because further sites exist does not mean that the ethnographer necessarily has to study them. It may be that secondary ethnographic sites are talked about by members of the primary site and can be analysed on this basis. It may be that secondary sites have an important role to play in the study simply through the way they are talked about by the members already incorporated into the study.
>
> (Neyland, 2008, p. 15)

Following this logic, each of the municipalities were secondary ethnographic sites, and knowledge about them was obtained through the boundary spanners in the implementation group, as well as through the other actors with whom I was in contact, for example the project secretariat or others in the workgroups. The same sensibility towards each of the hospitals was not obtained through the implementation group, since the regional representative was more distanced from the hospitals and acted as a hospital representative more than a representative of one hospital or another.

In the Implementation-group, my role was mostly as an observer as participant, although I actively participated in terms recording minutes from the meetings and presenting my PhD study, as well as my preliminary findings. The meetings were often quite long (3–7 hours), and during the breaks, I had the opportunity to do more informal "field interviews," allowing me to ask more specifically about certain topics and issues under discussion or about the perspective of the

representative's municipality, its standpoint, its organization and so forth. Furthermore, the participants in this group functioned as gate keepers to their organization that, indeed, facilitated my access and legitimated my further studies of nurses and doctors from selected municipalities and hospitals.

Fourthly, I participated in the organization group, where representatives from municipalities, hospitals, and GPs developed the (inter)organizational interface in the telemedicine program (see Figure 3.4). This group established work instructions, work flows, principles for moving the responsibility for monitoring the patients between hospitals and municipalities, communication flow, telemedicine task description and the like. I was an observer as participant, but played a more active participant as observer role when we discussed the possibilities of integrating my research into their work. For instance, my preliminary findings were presented in this group, which led to consideration, discussion, and adjustment of some of the instructions, for example those for communicating across the hospitals, municipalities, and GPs. Nevertheless, many of these meetings were held before I started my PhD, and combined with the facts that the meetings in this group lasted 2 hours and were held less frequently than those of the implementation group, my first-hand insight into this group's activities was comparatively limited. I mitigated this limitation by collecting retrospective stories about the group's activities through informal interviews and meetings with the project manager, as well as by examining formal documents, for example meeting minutes.

Aside from my regular participation in the implementation group, I participated in the health group, as well as in internal meetings between the four hospitals and the regional representative and a meeting for a project group within a municipality. However, my participation in these groups was irregular.

Fifthly, I participated in four different information meetings for the GPs, in which the GPs were informed about the large-scale program and their role in it, especially in relation to identification and enrollment of patients to the program (see Figure 3.4). At these information meetings, a total of approximately 150 GPs participated from the entire region. During the meetings, several questions were asked about the program and particularly about the research setup. In the breaks, the GPs could see the telemedicine equipment (the TeleKit) and try it out from a patient's perspective (i.e. measure oxygen level in the blood, pulse, blood pressure, weight, and answer symptom-related questions). These breaks also enabled more direct interaction with the GPs as I could ask them questions about their opinions and how they received the information presented. Formally, I played the role of an observer as participant, functioning as a representative from the project secretariat in that I wrote summaries of the questions asked at meetings and assisted with practical matters in relation to the meetings. From my perspective, these meetings contributed to this study by lending it a broad impression of the GPs' perception of TeleCare North and their tasks in relation to the program, along with an impression of the project

secretariat's front stage appearance (Goffman, 1959). Yet, there was a significant bias in relation to these meetings, since participation was voluntary. GPs who were very critical or rejected participation in the program were less likely to be present at these meetings, and their opinions and perspectives were thus often missed in these observations.

Sixthly, nurses from selected municipalities and hospitals were observed when performing the different tasks related to the monitoring of patient data (see Figure 3.4).[2] These sites of study differed significantly from the other sites of study, since these located themselves at the operational level, with the frontline health professionals who performed the telemedicine tasks and delivered the telemedicine health service to the patients. At these sites of study, the nurses were both observed and interviewed (more on the interviews in Section 3.3.2), and this combination deepened my understanding of their activities and actions, along with their perceptions of telemedicine. For instance, more invisible activities (Oudshoorn, 2008) and unreflected actions in relation to telemedicine became visible during the observations and statements from the interviews (when the observation was carried out after the interviews). In most cases, the nurses explained the monitoring system quite thoroughly and "thought aloud" when assessing the patients' data. This practice created a natural space for me to ask follow-up questions and refer to the interviewee's previous responses (when the interviewed was already carried out) or ask some of the questions from my interview guide (when the interview was yet to be performed). These selected municipalities and hospitals were revisited a year after the initial visit, and this return to the sites created a sense of familiarity with the nurses, even though our relationship was rather superficial. My role during these observations was that of an observer as participant, although dialogue was, indeed, embedded and a major part of the observation studies.

Common to these observation sites was that each contributed to illuminating different corners of the telemedicine network and its dynamics, with a focus on horizontal collaboration processes; building, nurturing, and maintaining trust; and conflicts evolving and fluctuating in the network. My point of departure was guided by some theoretical concepts about interorganizational networks and by curiosity about interorganizational collaboration and conflicts. These theoretical concepts were not explicitly used, though, as a more exploratory approach was adopted to approach the different sites of study with an open mind, based on the principle of observing everything and treating the network from the perspective of a stranger

[2] GPs were not part of the observation studies since their telemedicine tasks were rather limited and impossible to plan around (e.g. it was impossible to know when they would receive messages from the municipal nurses in relation to telemedicine). Likewise, lung physicians were not part of the observation studies, since their telemedicine tasks also were rather limited.

acting as an *acceptable incompetent* (Lofland, Snow, Anderson, & Lofland, 2006). This perspective allowed me to ask numerous questions about things that were taken for granted by the actors. However, we never approached sites assuming *tabula rasa*, and the theoretical concepts functioned as guiding principles in my selection of sites to study, as well as in the subsequent organization and analysis of data.

Each of the sites, except for those involving the nurses in selected municipalities and hospitals, were meetings to which it was natural for me to bring my computer and to write extensive field notes. As such, detailed field notes along with citations or "transcripts" of passages from the verbal interactions were written during the observations. Similar non-verbal interactions, emotions, and mood were also recorded the field notes (e.g. sighing, rolling of the eyes, a tense atmosphere, etc.). In the observation of the nurses, different kinds of notes were taken to serve as mnemonics, and extensive field notes were written immediately after each session. These notes focused on both their verbal statements and stories and their non-verbal actions, as observed when they performed different tasks related to monitoring and assessing the patient data, for example use of IT systems (such as electronic patient records or electronic care records), use of paper notes, or use of a monitoring system.

Despite my easy and relatively free access to the different sites, there were still various sites and situations in which I was not invited to participate. Some of these activities were probably too sensitive for a researcher to participate without damaging the situation. For instance, the two top managers and the project chief had several meetings with the chairman of the DMA in North Jutland, meetings in which the challenges with enrollment of patients in the program were discussed (see Section 6.3). Collaboration between the regions and the GPs was already quite tense due national conflicts (see "Launching a Large-Scale Telemedicine Program"), making these meetings a sensitive arena for collaboration. Accordingly, my presence would have been constraining for these meetings. Furthermore, different activities occurred at various sites when I was not present, for example within each participating organization. However, the sites where data were produced were central for understanding the telemedicine network and it was transformed from a pilot initiative to a large-scale program and further translated into to practice.

3.3.2. INTERVIEWS

In addition to the various informal "field interviews" and conversations, semi-structured interviews were conducted with different actors in the program (see Table 3.3). These semi-structured interviews contributed deeper knowledge about the different actors' roles in the program, how they interpreted telemedicine

according to their organizational and professional logic, their experiences, and their "narrative" about the program (and its development). Knowledge obtained from the interviews represented the actors' reflections and understandings, as well as how they made sense of telemedicine, which supplemented my knowledge of their behavior, actions, interactions, and enactment of practices from the observation studies. Accordingly, the semi-structured interviews and observations presented complementary sources of knowledge.

Site of Study	Interviewee (Referred to in Text)	Position in the Telemedicine Network	Position in Own Organization
Project Secretariat	Project chief	Chief of the project secretariat	-
Steering Group	Regional top manager	Chairman of steering group	CEO director for health innovation, IT and digitalization, and health agreements in the North Denmark Region
	Municipal top manager	Vice chair of steering group	CEO director for health and culture in the Municipality of Aalborg
	Representative from Danish Medical Association (DMA) in North Jutland	Representative from DMA in North Jutland in the steering group	General practitioner (GP) in own general practice clinic
Implementation-Group	11 municipal project managers	Members of the implementation group	Administrative employees, none working at the operational level
	Regional project manager		Employed by the telemedicine program

Selected Municipalities, Hospitals, and GPs	2 district nurses, municipality	Frontline staff performing telemedicine tasks	District nurses designated to perform telemedicine tasks on certain days
	3 health center nurses, municipality*		Health center nurses designated to perform telemedicine tasks on certain days
	2 nurses, hospital		Specialized chronic obstructive pulmonary disease (COPD) nurses in the lung ward and the related outpatient clinic, designated to perform telemedicine tasks on certain days
	2 lung physicians, hospital		Managing physicians at the lung ward and related outpatient clinic
	6 GPs, general practice nurse (one GP was replaced by this general practice nurse at the second interview)		GPs in own general practice clinics

*Two of the health center nurses were interviewed in a double-interview, where they both participated since they were both performing the telemedicine tasks and wished to participate in the observation and interviews together.

Table 3.3: List of interviewees from the different sites of study.

Before the different interviews, I prepared an interview guide with different themes, constructed on the basis of theoretical guiding concepts and empirically derived themes. Different interview guides were made depending on the divergent actors and purpose of the interview. Common to the various interview guides was that they were organized in themes that were further divided into different "research questions" using theory-inspired conceptions of their topics (Kvale & Brinkmann, 2009). These research questions were further translated into an everyday (telemedicine) language so as to be easily comprehended by the interviewees (see appendix B for the different interview guides). Yet the interview guides were not followed blindly during the interviews. Instead, they created a frame for the

interview that secured coverage of important topics, but the interviews progressed more as focused conversations, following a natural trajectory.

More specifically, the interview guide for the two top managers focused on their entrepreneurial role, their "narrative" about how the large-scale vision came into being, strategic considerations, difficulties with working in an interorganizational field in relation to dispersed power and the lack of a common authority structure, and management in an interorganizational field. The same interview guide was used for the project chief, except from the theme about the entrepreneurial role, which was instead replaced by focus on specific challenges in the development of the program from the project secretariat's perspective. These interviews with the top managers and the project chief were conducted in December of 2013, shortly after the implementation of the program was initiated, and they lasted 90–120 minutes.

Along with the observation studies in the implementation group, each participant in the group was interviewed in the winter or spring of 2013, and half of them were re-interviewed six months later. The purpose of the interviews was to create insight into each municipality or hospitals' organization of the novel telemedicine tasks, in terms of the anchoring of the program and internal implementation preparations, their expectations for the program (both personal and organizational), their organizational and professional background, and their reflections about interorganizational collaboration. These themes were covered in the interview guide in combination with more individualized questions that emerged from the observation studies (and the first interviews). These interviews lasted 30–40 minutes.

In relation to the observation studies at selected municipalities and hospitals, interviews with 15 health professionals at the operational level, that is, the frontline staff, were conducted. These interviews also included GPs and lung physicians, even though they were not part of the observation studies. Based on the theoretical framework, an interview guide was constructed with themes about collaboration, interorganizational relations, dependency structure, interorganizational and inter-professional conflicts, and descriptive themes concerning the division of labor (roles and function), concerning task changes, and concerning the integration of telemedicine tasks in existing work practices (see "Does Telecare Improve Interorganisational Collaboration?"). Moreover, a real-case scenario of challenges in the interorganizational collaboration was read for the health professionals to stimulate sharing of their experiences and opinion in relation to the case. The main reason for including this case was to create a legitimate 'space' for the health professionals and me to talk about the more controversial things in relation to working across professions and organizations in relation to the telemedicine program. This was also in recognition of how trust and conflicts may be sensitive topics to discuss.

Interviews were conducted in March–April of 2014 (i.e. nearly half a year after the implementation process began), and they were repeated in January–February of 2015. The same interviewees participated in the two rounds of interview, aside from two nurses and one GP, who were replaced by other interviewees because they had left their position or been assigned to new tasks. The interviews varied in length from 20–30 minutes (the GPs) to 80–100 minutes (the nurses and lung physicians).

The health professionals were recruited from selected municipalities, hospitals, and GPs. Selection criteria were based on the three divergent municipal organizational setups that emerged in the development of the program. Since the municipalities were the main actors in the monitoring of the patients' data, it seemed most natural to use these differences in municipal organization as the main selection criteria (see Section 4.2 for presentation of the program). The three municipal organizational setups were represented in this study by one municipality each. These three municipalities were selected to represent both urban and rural areas, and they varied in size. Furthermore, the three municipalities were selected according to their willingness to participate; some municipalities declined to participate due to the health professionals' workloads. Within the three selected municipalities, hospitals were selected based on which hospitals the municipalities collaborated with most (the level of collaboration was dictated primarily by geography, although one of the hospitals was a university hospital with a high degree of specialization and hence admitted patients from the entire region). The result was the selection of two hospitals, as two of the municipalities collaborated with the same hospital. On the same principle, the GPs were selected; GPs in the three municipalities were recruited to participate in the interviews (see Figure 3.5). The health professionals were recruited through local project managers in the implementation group, except for the GPs, who were recruited through direct contact. As a result, five municipal nurses, two hospital nurses, two lung physicians, and six GPs participated in this study.

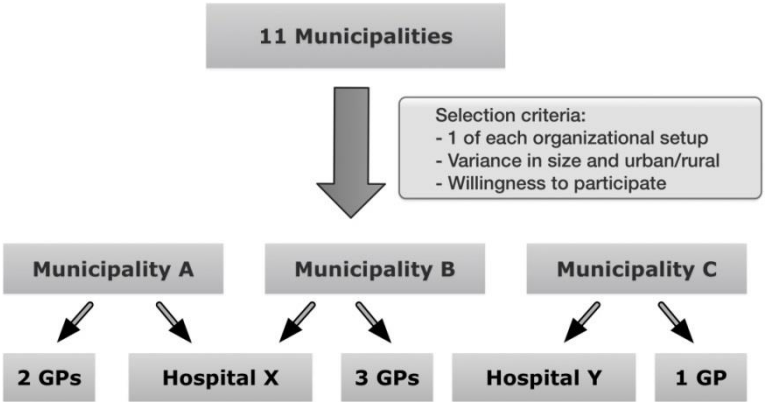


Figure 3.5: Illustration of the selection strategy.

This selection strategy may improve the credibility and validity of the statements from the interviewees, since issues about collaboration and interorganizational relations were represented and confirmed from multiple perspectives, thus bringing out intersubjectivity in the statements (Berger & Luckmann, 1967). For instance, all interview persons assessed the strength of the interorganizational relations in an equal manner: for example, the GPs stated that their relationships with the hospitals in relation to the program were nearly non-existent, and their collaborating partners, the hospital staff, confirmed this view. Such confirmation would have been more difficult and speculative if the GPs were talking about their collaborative relationships with staff from another hospital and vice versa. This selection strategy also has its disadvantages, however. The most obvious disadvantage is the risk of misunderstanding very local issues and topics as generalizable to other locations in the region. For instance, one of the selected municipalities was the largest in the region, and this characteristic may have influenced the interview data because there was a risk that the size of the municipality was more important than the organizational setup it was supposed to represent. However, the data across the selected municipalities, hospitals, and GPs were rather similar, and the same views were articulated in the interviews. Furthermore, the data were similar to the more general discussions in the implementation group, where every municipality was represented; the data from the implementation group thus validated the data from the interviews. The local project managers in this group also confirmed and validated my results, as they found them highly recognizable in their organizations.

Supplementary to the observation studies and the semi-structured interviews was collection of various archival materials, such as different documents.[3] These documents constituted the minutes, agendas, and appendixes from different meetings in the workgroups, in the steering group, and in the business group, along with all of the written output from the workgroups (e.g. work instructions, description of telemedicine tasks, description of roles and functions etc.) and other internal documents such as evaluations, e-mails (as I was on the e-mail list for the implementation group), project management documents, and the like. Access to these documents contributed a broad understanding of the development of the program and its multiple activities.

[3] In "Launching a Large-Scale Telemedicine Program," this collection of archival materials is extended to encompass all published material about the pilot study, TELEKAT, and the large-scale program, TeleCare North, as well as national strategies about the health care system and the digitization of it (see the article for more).

3.3.3. CRITICAL REFLECTION ON MY OWN ROLE

Using an organizational ethnography-inspired approach requires that the researcher at to varying degrees becomes involved in the sites under study. Often, these sites are influenced by the presence of the researcher, either through direct feedback from the researcher (e.g. presentation of results) or through increased awareness and reflexivity concerning the phenomenon: for example, collaboration or interorganizational relations. Reflections about own role in producing data are used as a mean to increase transparency in this dissertation, as well as a means to create critical distance from the sites I have been studying for nearly three years (for more about reflexivity and the role of the researcher, see Neyland, 2008, on reflexive ethnography; or see Czarniawska, 2007).

My role as an organizational ethnographer was dynamic; depending on the site of study, it oscillated between that of a participant as observer to that of a more distant observer as participant (Neyland, 2008). A balance of closeness to and distance from the telemedicine network was struck through continuing reflection on my role, conversations with my supervisor, and different events that forced me into closeness or distance. For instance, in relation to the meetings in the project secretariat, I was given status updates and perceived as a legitimate full participant in the meetings, which enforced my closeness to the program and my legitimate role as an insider, whereas a four-month research stay at UC Berkeley and a maternity leave, indeed, distanced me from the program. Furthermore, the program (as a project) ended in the summer of 2015, which naturally terminated my engagement with the network and supported the critical distance needed to perform the analysis.

Pressure, demands, and expectations

However, it was not only my own reflections and vigilance that allowed me to maintain an appropriate balance between closeness and distance—this balancing was also highly dependent on the actors from the different sites, our ongoing subtle negotiations about my role, and our relationships. An example of such external influence was the divergent approaches the different actors had to me and my presence. For some of them, particularly in the project secretariat, I was invited into the meetings and given an active role, whereas the (unarticulated) expectations of me in the steering group were to observe the meetings, and these expectations were not up for negotiation. More ambiguous and negotiable was my role in the implementation group. From the beginning, I assumed the role of an observer as participant, since it seemed most appropriate. However, this role was negotiable, since the local project managers in the group sometimes invited me into the discussions by asking my advice, whether or not my research confirmed their suggestions, or whether a certain topic would be included in my dissertation. For instance, several of the local project managers confided frustrations about the implementation process and the implementation group in the semi-structured

interviews and in relation to meetings in the implementation group. They wanted me to shed light on their frustrations and address them as a feedback for the project secretariat or steering group. One example of such frustration appears in my observation notes from a meeting in the implementation group:

> After the meeting I talk with some the local project managers. They are frustrated about the meeting and how it is managed and facilitated. They ask me if project management in the program is going to be part of my dissertation because they want to shed light on it and create a space for their frustrations—and most importantly I sense that they want my research to be "spokesperson" for their frustrations and dissatisfaction. I kindly tell them that this is not going to be part of my PhD study but maybe they should address their frustrations at a meeting and set some rules for a better "meeting culture."
>
> Observation notes, implementation group

This example demonstrates how we negotiated my role in the implementation group. Furthermore, it illustrates how the actors also tried to impose certain agendas on my research. This strategic use of my results to support their own agenda was furthermore visible in relation to the collaboration between the municipalities and the GPs. As demonstrated in Section 6.3, the GPs were perceived as difficult to collaborate with, and this perceived difficulty caused frustration for the local municipal project managers. They felt that they were constantly reaching out and conforming to the GPs' demands; still, the GPs created obstacles for interorganizational collaboration in the health care system. This attitude was highly controversial and was unsuitable for them to articulate in an open forum; instead, they wanted to make sure that my research results confirmed this attitude because such confirmation would, presumably, make such a claim more legitimate. The following passage from my observation notes on one of the meetings in the implementation group demonstrates these (direct and indirect) hints from the local project managers, which occurred repeatedly:

> The local project managers are frustrated about the GPs (…). By the end of the discussion they say—clearly addressing me: "This must be the insight and conclusion of the TeleCare North—the GPs are difficult to collaborate with and they may create constraints for collaboration."
>
> Observation notes, implementation group

Similar statements were also made by some of the interviewed GPs, some of whom reported that local project managers were difficult to collaborate with. A couple of the interviewed GPs explicitly stated that their motivation for participating in the interview was to illuminate some of the dysfunctions they saw in the program and

to "shed light on the flipside of the coin" (interviewed GP). As these examples demonstrate, the actors sometimes tried to impose their own agendas on my research. Nevertheless, the independence of my research from any actors' agendas was also highly respected and widely acknowledged. However, such instances as the above reminded me of the importance of keeping critical distance and of critical reflections on the actors' statements (whether in interviews, informal conversations, or discussions with others)—they represented and were influenced by particular interests and logics. Keeping this caution in mind was important to ensure a nuanced and balanced description and analysis of the development and operation of TeleCare North.

However, it was not only in the implementation group that negotiation of my research occurred. As a part of my affiliation with the program, I presented my preliminary findings about telemedicine from the operational level in terms of how it was translated in to practice and effected collaboration among health professionals from municipalities, hospitals, and GPs (see "Does Telecare Improve Interorganisational Collaboration?"). These initial findings were not in line with expectations concerning the program's outcomes in regard to improving cross-sector collaboration. Hence, the steering group and project secretariat were very critical of the results and suggested a follow-up study. Their expectations were that the health professionals would be more experienced and that the telemedicine service would be better implemented later on. For them, this program was a high-status program with massive attention from (inter)national and political actors; failure of the program was not an option, and this political pressure, indeed, effected how they received the rather negative preliminary findings. After some negotiations concerning practical matters (e.g. support for transcribing interviews), I complied and designed a follow-up interview study that was conducted almost a year after the first. Based on the first study, different initiatives and adjustments were supposed to have been made in the organizations. However, the findings from the follow-up study still revealed significant challenges and re-confirmed previously found collaboration tensions—although changes were also illuminated.

The researcher as a strategic tool

Based on these different examples, it was evident that my role was negotiable and that my research would presumably be used strategically to promote different agendas in an already tense collaboration environment in the health care sector. Although we negotiated about my role and the extent of my research, negotiation about the results was not a possibility. Furthermore, the examples demonstrate how my presence at the different sites could not be characterized as akin to the neutral observer, the "fly on the wall". Instead, my presence influenced the actors' behavior and self-representation. However, this sort of influence is unavoidable when doing this kind of research—actors are always presenting them self in certain ways (cf. Goffman, 1959), and this awareness of self-representation may be exaggerated in situations where important things (e.g. organizational interests and power) are at

stake, as it was in the different sites I observed. Still, impression management (Goffman, 1959), where a certain "fake" self-representation is performed due to the presence of a researcher, is impossible to maintain for a long period (difficult even for a day):

> Impression management requires effort and concentration, which is difficult to maintain for days or weeks in a row, unless it is a truly presentation of self in everyday life—which must be included in the study (…). It has been my experience that after the initial curiosity had died off (a matter of few minutes) people began to ignore me, as they usually had more important agendas on their minds.
>
> (Czarniawska, 2007, p. 28)

It is reasonable to believe that the different actors acted *and* interacted the same independent of my presence, even though they sometimes exaggerated their statements or made sure to say or do something in my presence to *"add weight to their utterances"* (Czarniawska, 2007, p. 28). Furthermore, such exaggerated or "strategic" statements and impression management also had the potential, upon critical reflection, to illuminate what impressions the actors were trying to produce and why (Czarniawska, 2007).

Trust between researcher and the field

This dissertation focuses on interorganizational network dynamics in terms of collaboration, trust, and conflicts. However, these topics are rather sensitive and may be difficult to gain data about, especially in a development process and the implementation of a program that garners much attention from key national and political actors. By using an organizational ethnography-inspired approach by which I spent time with the project secretariat and in the different workgroups (particularly the implementation group), however, I built relationships and trust with the actors, which benefitted the amount and quality of the data. In retrospect, I am not sure that the same honesty, openness, and access to sites would have been possible without these relationships and the trust that accompanied them. Reflecting more about trust in these relations, it is evident that I was not starting from scratch. First, there was an institution-based trust connected to my role as a researcher that was enforced and further legitimated by the project secretariat's (and steering group's) approval of my participation in the different workgroups. Second, former positive experiences of working together with people at Aalborg University, and specifically with my supervisor, contributed to building trust in my research agenda and in me as a PhD student.

For instance, in relation to the implementation group, trust was pre-established via a vis the legitimation of my presence by the project secretariat (and steering group); this recognition was particularly evident in relation to the workgroups and the

studies of the health professionals at the operational level. Over time, furthermore, I was able to build more personal relationships and trust with the members of the project secretariat and in the implementation group. More sensitive and complex information and knowledge exchange was enabled due to our more personal and trusting relationships. One example of this ability to collect sensitive and complex data was that I presented the above-mentioned rather controversial preliminary empirical results from my first study of health professionals at the operational level for the implementation group and the organization group. Although these results were discouraging, "a slap in the face," as the members of the implementation group expressed it, the results were respected, supported, and considered when (continually) adjusting the organizational setup in the program, and my findings did not damage our relationship. Reflecting about this situation in hindsight, I believe that our relationships and the interpersonal trust among us enabled constructive dialogue about these discouraging results. Other examples of this trust in our relationships arose several times in relation to the meetings in the project secretariat, where the project chief or other members of the project secretariat explicitly told me that the following information was mentioned off the record because it was too sensitive for further distribution. However, due to our relationship and to my role as an insider in the program, they were comfortable talking about such things in my presence. The trust between us also created some moral obligations of reciprocity and to respect their trust (see Section 2.2). Accordingly, I perceived it as important to "give something back" through my research, in terms of knowledge and results that were easy to translate into practice, which resulted in two written empirical reports about collaboration at the operational level in relation to telemedicine and various presentations internally within the program and externally at conferences.

Lastly, the (rather critical) focus of my study also created an ethical dilemma for me as a researcher. Prior studies and experiences have shown that collaboration across professional, organizational, sectorial, and political levels is challenging, fraught with tensions (for comparable Danish studies, see, for instance, Seemann, 1996; Seemann & Antoft, 2002). In relation to my study, these tensions reflected historically inherited challenges related to working across municipalities, hospitals, and GPs, and they were in some instances amplified by conflicts at the institutional level. However, the intention of my study was *not* to enforce these tensions, deliver ammunition to ongoing (or continuing) struggles, or designate any actor as scapegoat for mistaking collaborative endeavors. On the other hand, the elimination, censoring, or manipulation of discouraging results (from the perspective of the network actors) was certainly not a possibility either. So, what to do with controversial results that might put some of the actors in more vulnerable positions or influence the existing collaboration negatively? The answer is, nothing other than what I have done with the other findings: nuancing, involving and balancing the "voices" of multiple actors without taking sides or sympathizing with any one actor or group of actors over the others.

3.4. SUMMARY

The longitudinal qualitative case study is used as a research strategy to investigate network dynamics in the telemedicine network over a three-year period. This research strategy is sensitive to the methodological challenges in network studies in terms of delimiting the network, investigating change over time, and the distinction between analytical levels. The telemedicine network constitutes the case being studied, and this case exhibits network dynamics in terms of interorganizational collaboration, trust in networks, and conflicts in networks. An organizational ethnography-inspired approach is used to produce data at multiple sites and through various qualitative methods such as observation, semi-structured interviews, and document studies.

CHAPTER 4. TELEMEDICINE AND THE TELECARE NORTH PROGRAM

Although telemedicine has existed for decades (Singh et al., 2010), it still represents a rather new research field with multiple definitions and terms used interchangeably (Barlow et al., 2006). In a literature review by Sood et al., 2007, 104 different peer-reviewed definitions of telemedicine are identified. Aside from these various peer-reviewed definitions, the World Health Organization (WHO) further distinguishes between synchronous and asynchronous telemedicine health services. In synchronous telemedicine health services, the interaction between the health professionals and patients occurs in real-time (e.g. video consultations), whereas the asynchronous services rely on store-and-forward technology, where the data are stored for later transmission (as in the TeleCare North program). In the asynchronous services, the co-presence of the health professional and the patient is not necessary, and transmission of data often occurs as a one-way transmission from the patients to the health professionals (World Health Organization, 2010). Moreover, recent European studies distinguish between *telehealth* and *telecare* (e.g., Barlow et al., 2006; Greenhalgh, Procter, Wherton, Sugarhood, & Shaw, 2012; May & Finch, 2009). The former refers to technological solutions used for diagnostic processes and communication *between health professionals*, for example video conferences between peers, teleradiology and teledermatology (Barlow et al., 2006). Such technology is widespread and has already been institutionalized in several countries, especially high-income countries (World Health Organization, 2010); this technology is not covered in this dissertation. In contrast, *telecare* refers to technology that is applied in the *patients' home*, for instance home monitoring or safety and security monitoring (Barlow et al., 2006).[4] These divergent definitions of telemedicine make the research field, as well as empirical telemedicine health services, highly heterogeneous and difficult to compare without specifying which telemedicine health services are under study. Specifying the understanding of telemedicine in this dissertation, a definition by Bashshur, Reardon, & Shannon, 2000 is instructive:

> Telemedicine is a system of care composed of six elements: (a) geographical separation between provider and recipient of information, (b) use of information technology as a substitute for personal face-to-face interaction, (c) staffing to perform necessary functions (including physicians, assistants, and technicians), (d) an

[4] The term "telehealthcare" is also used as a term that encompasses digital monitoring of patients at a distance (see for instance McLean & McLean, 2011).

> organizational structure suitable for system or network development and implementation, (e) clinical protocols for treating and triaging patients, and (f) normative standards of behavior in terms of physician and administrator regard for quality of care, confidentiality, and the like.
>
> (Bashshur et al., 2000, p. 614)

This definition makes it evident that telemedicine is more than a technological innovation or a communication technology. Rather, telemedicine is a *system of care* and requires actors who perform necessary functions in order to make it work (Nicolini, 2006), as well as requiring organizational change, the reconfiguration of existing relations, and institutional change that supports the uptake and broader legitimation of telemedicine (see "Launching a Large-Scale Telemedicine Program"). Hence, this definition emphasizes how telemedicine is also an (inter)organizational phenomenon.

The use of the terms "telemedicine" and "telecare" in this dissertation follows the above descriptions. The definition of telemedicine does not distinguish between synchronous and asynchronous or peer-to-peer and health professional-to-patient health services, but rather recognizes telemedicine as a system of care—and following that definition, telemedicine can both encompass telehealth and telecare. The term "telemedicine" is predominantly used in the monograph and article "Launching a Large-Scale Telemedicine Program," whereas the "telecare" is used in the article "Does Telecare Improve Interorganisational Collaboration?" to emphasize the patient-oriented dimension of the TeleCare North program.

Section 4.1 presents a short overview of the telemedicine literature, outlining research about telemedicine, and particularly telecare, from an (inter)organizational perspective. This condensed overview is used to clarify this dissertation's contribution to the telemedicine literature, along with positioning the TeleCare North program in the context of telemedicine.

4.1. TELEMEDICINE: A SELECTION OF LITERATURE

To obtain an overview of the extensive and rather diverse telemedicine literature, various reviews and meta-reviews about comparable telemedicine health services (i.e. telecare) were read. These reviews and meta-reviews revealed that various telemedicine initiatives and programs have been conducted in previous years, but few of them have survived beyond their project period and have been integrated in the conventional health care system (Barlow et al., 2006; Bower et al., 2011; Darkins et al., 2008; Singh et al., 2010). Accordingly, research on telemedicine is predominantly based on pilot projects or restricted contexts. Most telemedicine

programs rely on a mono-organizational setting in which hospitals are often the main actors (Ballegaard et al., 2012; Hendy et al., 2012). Hence, interorganizational telemedicine programs are limited, as are studies with an explicit focus on organizational issues (Bøg et al., 2015; Ekeland, Bowes, & Flottorp, 2012; Fasterholdt et al., 2011; Hendy et al., 2012; S. Koch, 2006). Thus, comparable telemedicine health services seem difficult to find in the research literature, even though some telemedicine studies were similar in some aspects. For instance, the Oula Arc Subregion Telehealth Project included health centers and hospitals and aimed at connecting patients, hospital specialists and health professionals in primary care (i.e. health centers) through video consultation (Vuononvirta et al., 2009), or consider the Whole System Demonstrator, perceived to be the largest randomized controlled trial (RCT) in telemedicine (Bower et al., 2011; Hendy et al., 2012).

Moreover, the reviews and meta-reviews demonstrated how studies of economic, clinical, or patient-related (e.g. life quality) effects have dominated the telemedicine literature (Ekeland et al., 2010, 2012; Kitsiou, Paré, & Jaana, 2013). Additionally, the literature can be divided into three different streams, presented in the following with special attention to the third stream, concerning organizational issues. The *first stream* of the literature covers effect studies and other summative evaluation studies. This literature investigates economic, health-economic, and clinical effects (Bolton, Waters, Peirce, & Elwyn, 2011; Dinesen et al., 2012; Ekeland et al., 2010; Henderson et al., 2013; Udsen, Hejlesen, & Ehlers, 2014; Wootton, 2012). These effect studies rely mostly upon the RCT as a research design (Ekeland et al., 2010) and constitute the majority of research on telemedicine. Although the conclusions of various reviews and meta-reviews of the effects of telemedicine reveal inconclusive economic, health-economic, and clinical effects (e.g., Ekeland et al., 2010; Udsen, Hejlesen, et al., 2014; Wootton, 2012), most of the arguments that justify telemedicine draw on this literature (see Danish Regions' Health IT, 2011 and The Danish Government, Local Government Denmark, & Danish Regions, 2013a).

The *second stream* of literature concerns the patient-oriented dimension and includes research about patient satisfaction and quality of life (e.g., Gregersen et al., 2016; Lilholt, 2016), the involvement and "activation" of patients (e.g., Ballegaard, 2011; Oudshoorn, 2008; Pols, 2012), and the empowerment of patients to enable them to manage and take control of their own diseases (e.g., Haesum, Ehlers, & Hejlesen, 2016; Huniche, Dinesen, Grann, Toft, & Nielsen, 2010; Lettieri et al., 2015). A variety of approaches and methods are used in this stream of literature, covering a broad spectrum from RCTs to ethnographic studies. Similar to the former stream of literature, the patient-oriented dimension is also often used to legitimate telemedicine and can be perceived as a part of a broader trend in (Danish) health care systems, according to which the involvement of patients is emphasized and prioritized, for example by enabling patients to see their own

health data on digital health platforms (in Denmark this platform is termed www.sundhed.dk [www.health.dk]) (Høstrup, 2012).

The *third stream* of the literature, and of particular interest for this dissertation, concerns organizational issues. This research stream is not as voluminous as the other two, but it includes a variety of different studies that focus on different organizational issues. From various perspectives, it investigates issues related to the implementation of telemedicine technology with regard to barriers and facilitators. For instance (mis)alignment between professional practices and logics, the organizational context, and the technology has been investigated to understand the implementation of telemedicine (see, e.g., Broens et al., 2007; Hendy et al., 2012; Hibbert et al., 2004; Hueppmeier et al., 2010; May et al., 2001; Murray et al., 2011; Vuononvirta et al., 2009). These studies have focused on how new technology, such as telemedicine, is implemented and, hence, integrated into routine clinical practices. Correspondingly, they have found that the technology must be aligned with the professionals' norms and the organizational context, along with the broader policy and legislative context and explicit management of the innovation's implementation and early operation process.

Moreover, studies of organizational issues in the Whole System Demonstrator illuminate how difficult it is to align the logic of a RCT with a more iterative implementation process in which organizational learning and adaption to local organizational structure are important. The RCT research design constrained these local adaption processes and complicated the uptake of telemedicine (Hendy et al., 2012). In line with these studies, some other studies have investigated long-term innovation processes, in particular how telemedicine pilots are scaled up and sustained beyond the pilot phase. Accordingly, Nicolini (2010) has investigated how a telemedicine innovation was diffused through translations in a network of heterogeneous actors in Italy, and Singh et al. (2010) has studied how remote monitoring in rural areas in the USA has become a sustainable innovation. The article "Launching a Large-Scale Telemedicine Program" furthers insights from these studies.

Other studies in this research stream have investigated how telemedicine reconfigures work practices within an actor-network-theory or science-technology-study framework (see e.g., Nicolini, 2006, 2007, 2011, Oudshoorn, 2008, 2012; Pols, 2012). These studies elucidate how telemedicine is not a neutral technology but supposes different "scripts" that influence and change health professionals' work practices, that redistribute work among professionals (and patients), and that reconfigure interpersonal relations.

Lastly, this stream of research covers studies about (co-)innovation processes in relation to developing a novel telemedicine health service (Barlow et al., 2006; Dinesen et al., 2011; Seemann et al., 2013), along with studies about the potential

of telemedicine as an integrating tool across health care providers (Dinesen, 2012; Dinesen et al., 2007, 2011; Lluch & Abadie, 2013). The studies concerning co-innovation demonstrate how telemedicine is a complex innovation that often unfolds in a multi-stakeholder environment where multiple discourses, logics, and interests interact (see Greenhalgh et al., 2012, for more about different dominating discourses upon which telemedicine draws). Of particular interest to this dissertation are the studies about telemedicine in an interorganizational (network) setting. Correspondingly, the pilot study TELEKAT, which preceded TeleCare North, also relied on an interorganizational setting where municipalities, hospitals, and GPs were involved. The findings from the pilot study demonstrated how health professionals experienced shared decision-making processes, mutual learning, and improved interface organization, for example in terms of coordination of activities (Dinesen, 2012; Dinesen et al., 2011; Seemann et al., 2013) (see further "Launching a Large-Scale Telemedicine Program"). However, results from other studies show how telemedicine reconfigures existing power relations among the divergent health professionals and thus challenges inter-professional and organizational collaboration (Ballegaard et al., 2012; Nicolini, 2007).

These three streams of literature illustrate the diversity in the research of telemedicine. These different findings contribute a more nuanced understanding of how telemedicine is more than a technological tool with certain economic or clinical effects or implications for patients. Telemedicine is also a phenomenon that encompasses a variety of organizational issues: from invention to implementation to reconfiguration of work, practices, and inter-professional and interorganizational relations. Furthermore, the presented literature demonstrates how our knowledge of organizational issues in relation to telemedicine in an interorganizational, large-scale context remains rather limited. Most importantly, these various studies create an informed background against which my case study and the empirical data can be better understood.

4.2. THE TELECARE NORTH PROGRAM

Before presenting the TeleCare North program itself, this section contextualizes the program, introducing the Danish health care system and the Danish telemedicine field. The Danish health care system is characterized by strong regulation from the state, since the state determines legislation, regulations, financing structures, and other formalized structures in the health care sector and since it has been characterized as a mature and settled organizational field (Jespersen, 2005; Wadmann, Strandberg-Larsen, & Vrangbæk, 2009). The health care system is mainly publicly financed, based on general taxation, so citizens have equal access to health services (Wadmann et al., 2009). The health care system is organized across a primary and secondary sector; primary health care services are provided by

the municipalities (local political level) and self-employed GPs (family doctors) who function as gate keepers to the health system, whereas secondary health care services are provided by the hospitals that are led by the regions (at the regional political level) (see "Does Telecare Improve Interorganisational Collaboration?" for more on their designated tasks and domains). In relation to COPD patients, the municipalities are responsible for home care, nursing homes (when necessary), district nurse services, and rehabilitation activities, whereas the GPs have the overall clinical (and diagnostic) responsibility for the COPD patients, for prescription of medicine, and for regular check-ups on the patient (often once a year). Moreover, the GPs continue to formally perform the role of "case managers," since they know the patients' medical histories and are the main access points to the health care system (Ministry of Health and Prevention, 2008). The hospitals are responsible for specialized health care services and treatment, which often concerns patients with severe or very severe COPD (cf. the Global Initiative for Chronic Obstructive Lung Disease [GOLD] four classifications of severity of COPD) (Global Initiative for Chronic Obstructive Lung Disease, 2016)). The hospitals perform tasks in relation to hospitalizations of COPD patients, outpatient clinic visits, specialized treatment (e.g. oxygen treatment), and specialized diagnostic methods (e.g. arterial puncture for blood gas analysis). Correspondingly, the municipalities, GPs, and hospitals are mandated to collaborate concerning COPD patients according to national legislation and the health agreements between the municipalities and regions (Rudkjøbing et al., 2014; Wadmann et al., 2009). Fragmentation and lack of collaboration among the municipalities, GPs, and hospitals about patient with chronic conditions are still perceived to be challenges in the contemporary Danish health care system, however (Seemann & Gustafsson, 2016).

In Denmark numerous telemedicine pilot studies have been initiated over the past decade. Findings common to these studies include that[5]

- telemedicine technologies are used in isolation, without integration into the other electronic systems in the health care system;
- telemedicine health services are developed to address a single disease without the possibility of broader use, for example other diseases;
- telemedicine health services rely on a mono-organizational structure; and
- pilot studies are not designed for routine clinical practice, and broader implementation is impossible without various implications for the existing structure of the health care system (Danish Regions' Health IT, 2011).

[5] These characteristics are valid for the period around the initiation of the large-scale program *TeleCare North*, that is around 2011, but were no longer valid by 2016.

These different studies represent a more experimental mono-organizational approach to telemedicine and have contained limited outreach (see Ballegaard et al., 2012, for more about telemedicine pilots for COPD patients, and MedCom, 2010 for a more general description of the current state of telemedicine pilots in the initiation phase of TeleCare North). Relatedly, deploying telemedicine on large scale signals a new phase in the development of telemedicine in a Danish context, where the TeleCare North program is one of five Danish telemedicine programs to test the potential of telemedicine on a large scale (The Danish Fund of Welfare Technology, 2012). The results of the program are used to make future political decisions about national standards for telemedicine for COPD patients (The Danish Government, Local Government Denmark, & Danish Regions, 2013b).[6] The core actors in the TeleCare North program are The North Denmark Region with its four hospitals, the 11 municipalities in the region, and the approximately 225 GPs in the region. The formal time frame for the program was three years, starting in 2012 and ending in 2015. One thousand two hundred and twenty-five COPD patients participated in the randomized controlled study in the program.

In a Danish context,[7] telemedicine is believed to be a viable solution to the various challenges that face the Danish health care system (and most Western health care systems) in terms of changing demographic composition with an increased population of elderly people with chronic conditions, higher demands for patient-centeredness and quality of care, and restricted resources (Danish Regions' Health IT, 2011). This situation is further exemplified by Ballegaard (2012):

> Telemedicine to patients with chronic diseases is increasingly introduced as a contribution to a solution to the health care system's economic and workforce challenges and is perceived to be one of the convincing answers to the demographic changes that are expected in Denmark and the Western world.
>
> ((Ballegaard et al., 2012, p. 9), own translation)

[6] Current state in 2017 is that telemedicine to COPD patients is to be implemented at a national scale by 2019 following the model in TeleCare North.

[7] In other contexts, telemedicine is articulated as a solution to long distances between patients health care providers and to unequal geographical distribution of health care providers (see for instance Singh et al., 2010; or World Health Organization, 2010). Accordingly, telemedicine health services in such contexts address other challenges than those represented in the Danish case, as reflected in the theorization of telemedicine (see "Launching a Large-Scale Telemedicine Program" for more about theorization).

Based on this public framing of telemedicine and the problems it is supposed to resolve, the (selected) goals of the TeleCare North program are as follows:

- to enhance the quality and efficiency in collaboration among municipalities, hospitals, and GPs by enabling shared access to telemedicine data;
- to integrate activities—in collaboration with the patient—for COPD patients courses across municipalities, hospitals, and GPs;
- to empower patients;
- to improve the quality of life for COPD patients;
- to reduce hospitalization by 70% through prevention;
- to reducing re-admission by 70% through prevention; and
- to reducing length of hospitalizations by 70% by monitoring patients at a distance through telemedicine (TeleCare North, 2012).

These (selected) goals represent the various dimensions of telemedicine and are evaluated through an extensive research configuration in which four different PhD studies cover (1) the (inter)organizational perspectives of telemedicine, (2) the health-economic effects, (3) the health- and patient-related effects, and (4) health literacy and telemedicine (TeleCare Nord, 2015). The overall research design is a randomized controlled study (see Udsen, Lilholt, et al., 2014) with a nested longitudinal, qualitative case study, constituting the research design for this dissertation.

The target group for the TeleCare North program is patients in the North Denmark Region with severe or very severe COPD (cf. GOLD classification). Based on an asynchronous remote home-monitoring concept, the patients measure vital signs (blood pressure, oxygen level in their blood, pulse, and weight) from their homes and answer questions about their symptoms every week (typically once or twice a week). To measure these vital signs, the patients are equipped with a TeleKit that consists of a tablet, a blood pressure monitor, a fingertip pulse oximeter, and a scale (connected via Bluetooth), as depicted in Figure 4.1.

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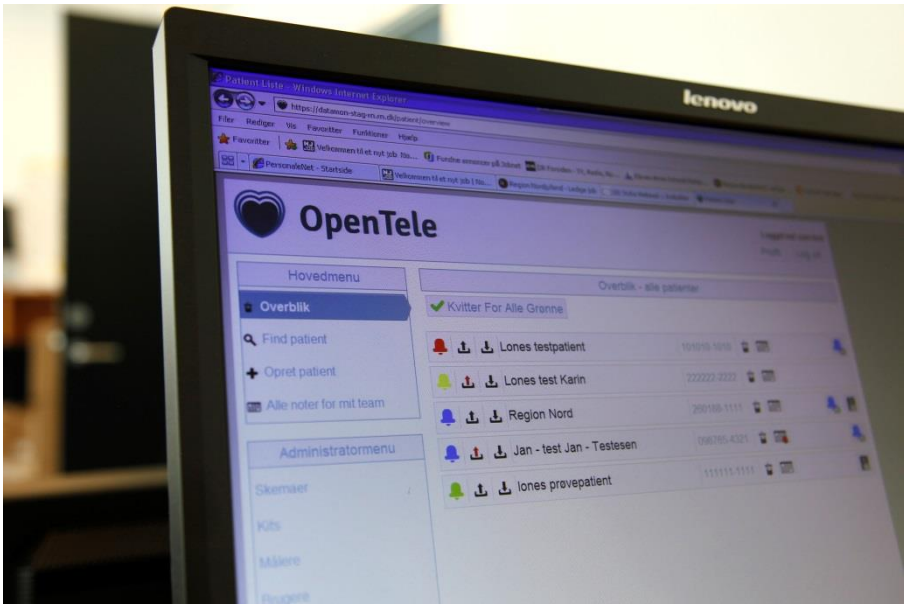
Figure 4.1: TeleKit.

The data are sent to a home-monitoring database termed "OpenTele," where the health professionals from municipalities, hospitals and general practice can access the telemedicine data (see Figure 4.2). Shared access to the data differs from conventional practice, where each health provider has their own electronic system in which they register patient data, including electronic health records at the hospitals or at the GPs, and electronic care records at the municipalities.



Copyright: Lene Pedersen Foto/AV, Aalborg University Hospital.

Figure 4.2: OpenTele monitoring system.

Municipalities are the main actors in operating the program and monitoring the patients, since they monitor the patients with a stable COPD course denoting the majority of enrolled patients.[8] The TeleCare North program materializes differently within the various participating organizations, a difference most visible in relation to municipalities and how they organize the telemedicine program. As such, three different municipal organizational setups have emerged in the course of the program:

A. The telemedicine tasks were performed by the district nurse units *and* the health centers.
B. The telemedicine tasks were performed by the district nurse units.
C. The telemedicine tasks were performed by the health centers.

In the *first setup*, the telemedicine tasks are performed by the district nurse units by nurses. Six of the 11 municipalities rely on this organizational setup, whereas one

[8] Their pronounced role in the telemedicine program can also be perceived as a consequence of the Danish structural reform in 2007, where municipalities became responsible for more health services, including rehabilitation activities.

municipality uses the *second setup*, where the telemedicine tasks are performed by the health center. The last four municipalities employ the *third setup*, where the telemedicine tasks are performed by the district nurse units *and* the health centers (Christensen, 2016b).

In sum, TeleCare North is characterized as a rather paradigmatic telemedicine program in both a national and international context in that it, to my knowledge, is one of the largest randomized controlled studies of telemedicine for COPD patients, has the status of national forerunner for a national telemedicine health service, and operates in a cross-sectorial setting where both primary and secondary health care are involved.

CHAPTER 5. STRATEGY OF ANALYSIS

The purpose of this chapter is to create transparency about the analysis of the data and how the theoretical framework is utilized to understand and explain empirical patterns. Performing a qualitative network analysis is difficult, due the multiple analytic levels and the challenges of maintaining focus on one level of analysis (see Chapter 3). A more pragmatic approach to the analytical level is used in this dissertation in acknowledgement of the various challenges. An argument for this pragmatic approach is that the network dynamics in the telemedicine network are not limited to one analytical level. Therefore, it would be constraining for the analysis to stick rigidly to one analytical level. Another argument is that I follow different activities related to telemedicine innovation, which unfolds at a myriad of places and analytical levels, for example in the dyadic relations or at the individual level. This multifaceted focus is also an explanation of the shift in the actors that are followed, for example managers and administrative actors or health professionals. Moreover, these actors, that is boundary spanners, represent different analytical levels, for example the network organization, the network, the dyadic relation, or the individual level, which change over time and according to the specific context. Hence, the boundary-spanning roles are not static, and whether they are predominantly oriented towards the network or their own organization is dynamic. Consequently, a rigid distinction between analytical levels cannot be maintained in this dissertation. Instead, the analytical tools of "zooming in" and "zooming out" (inspired by Nicolini, 2010b) is utilized to create analytical awareness about the multiple analytical levels in network studies. Accordingly, the analytical lens of zooming in is mostly used to magnify the boundary spanners' interactions, the dyadic relations among the boundary spanners (and their organizations), and the network organizations connections to how telemedicine is materialized and enacted. To contextualize this focus and to apply it to network dynamics in terms of trust, horizontal collaboration patterns, and conflicts in the network, the analytical lenses of zooming out is used. When zooming out, the focus falls on the whole network and its characteristics (e.g. structure and governance form), trust dynamics, collaboration patterns, and types of conflicts, as well as the broader contextual environment in which the telemedicine network is embedded (i.e. institutional and historical context). Moreover, the lens of zooming out is used in the article "Launching a Large-Scale Telemedicine Program" to explore the interrelatedness of institution-level activities in terms of translation and theorization activities.

5.1. DATA ANALYSIS

The data analysis was performed in several steps (see also the two enclosed articles for a more detailed description of the data analysis). Since the dissertation covers a time period of three years (extended to 7 years in the article "Launching a Large-Scale Telemedicine Program"), the *first step* of the analysis was to read through all the empirical data (i.e. transcribed interviews, field notes, and various documents) to create a chronology in the data and a time line, which resulted in two empirically derived main phases; the "transformation phase" and the "large-scale phase." In the article "Launching a Large-Scale Telemedicine Program," one more phase is added, the "pilot phase," to analyze the upscaling process; the other article "Does Telecare Improve Interorganisational Collaboration?" closely examines the "large-scale phase" to investigate how implementation of the large-scale telemedicine program influences interorganizational collaboration at the operational level. Lastly, the monograph explores the "transformation phase" and the "large-scale phase" in greater detail (see Table 5.1).

	Launching a Large-Scale Telemedicine Program	**Does Telecare Improve Interorganisational Collaboration?**	**Monograph**
Pilot Phase	**X**		
Transformation Phase	**X**		**X**
Large-Scale Phase	**X**	**X**	**X**

Table 5.1: Analysis of the three phases.

The *second step* of the analysis was to code the data in NVivo 10, a program for organizing qualitative data. Various codes were constructed on the basis of the theoretical framework for the dissertation: for example, information flow; knowledge exchange; interorganizational relations (the interactions, strengths, and reciprocity between relationships); dependence structures; interorganizational and inter-professional conflicts; forms of trust, distrust and negative stereotypes; level of trust (interpersonal or interorganizational); the building of trust; and descriptive themes concerning the division of labor (roles and function), task changes, and the integration of telemedicine tasks in existing work practices. Moreover, more inductively derived codes emerged, for example trust in objects and collaboration strategies.

In the *third step*, the data were coded to identify changes over time with particular attention to trust in the network, types of conflicts, interorganizational collaboration, materialization and utilization of telemedicine, and network characteristics. More specifically, the empirical data from the two phases was read and coded in a comparative perspective to identify changes in the network structure, processes, and dynamics. The *fourth step* of the analysis focused on the aggregate level of the network, focusing on changes of the network actors' positions within the network, network outcomes, interorganizational dynamics, interrelatedness between dyadic relations, and interorganizational collaboration patterns (see also "Does Telecare Improve Interorganisational Collaboration?"). At this step in the analysis, the findings from the previous steps were combined, and connections between the findings were sought. For instance, the previous steps of the analysis made obvious that the municipal actors had a central position in the network, which combined with changes in the dyadic relations between the municipal actors and the GPs, influencing the dyadic relations between the municipal actors and hospital staff. These changes and interrelatedness between the dyadic relations in the network were connected to the various collaboration strategies (see Section 7.1) that emerged in the telemedicine network. Such analytical findings were made on the basis of the extensive previous steps in the analysis, since these findings (and their explanations) could not be directly observed from the empirical data but were the result of numerous analytical iterations and elaborations on the findings.

The tentative empirical findings were presented from the "large-scale phase," as mentioned in Section 3.3.1, for the steering group and the implementation group, and they were discussed with the project secretariat as well. During these presentations, the tentative empirical findings were validated, since they were widely recognized by the actors and corresponded in broad terms with their experiences of the telemedicine program's utilization, horizontal collaboration challenges, and conflicts. Further validation was obtained by the use of multiple data collection methods, where actors' statements and my observations were confirmed (or contrasted) through multiple data sources. Overall, intersubjectivity among the various actors at the different sites was found, confirming the validity of the study data.

Even though these steps in the data analysis can be neatly organized and presented, the analysis was also iterative, messy, and it followed its own logic, with me shifting between an inductive and deductive approach. My point of departure was informed by a loose theoretical framework that consisted of some broad concepts about interorganizational networks. During the production and collection of data, the focus for this dissertation (and hence the theoretical framework) became more clear. Therefore, the theoretical framework for the dissertation was developed as a result of the continuous movement between data and theoretical concepts.

Finally, in the presentation of the analysis, the concepts from the theoretical framework are used as flexible tools to interpret empirical patterns, but are not used rigorously to test the theories (see the theoretical interpretative logic of inquiry that is used, section 3.2). Additional theoretical concepts are included when they add explanatory power to the identified empirical patterns. Moreover, it should be noted that the various quotations and extracts from the observation notes in the analysis are used to illustrate the different arguments and points. Hence, quotations and extracts are used as examples that typify broader themes and patterns in the data. However, there may be exceptions to this categorical quality, and where the quotations or extracts are not representative, these exceptions are clearly explicated.

The following chapters are organized around the two empirical phases of the study: the transformation phase and the large-scale phase. Chapter 6 explains the progression of the program from the early (re)mobilization of a telemedicine network through the development of the large-scale program to the end of its development. Chapter 7, centering on the large-scale phase, is organized differently, around its central themes rather than around the development of the program over time. One of the major reasons for this structural choice is that progress over time was less pronounced in the empirical data for this phase. Thus, while the temporal dimension of the analysis is emphasized when relevant to illustrate changes over time and the unfolding of network dynamics, it is not the central organizing principle of the chapter. In both chapters, references to the two enclosed articles are made when they supplement the analysis in the monograph or when the analysis elaborates on insights from the articles.

CHAPTER 6. TRANSFORMATION (2011–2012)

The transformation phase entails the numerous activities related to the development of a large-scale telemedicine program. These activities (and the related tensions and dynamics) are invisible in the official stories and presentation of the TeleCare North program (see e.g., TeleCare Nord, 2015), and the purpose of this chapter is to elucidate some of these hidden activities, tensions, and dynamics in the transformation process, through this study's lens of the interorganizational theoretical framework, especially the activities that concerned network processes, interorganizational collaboration, trust building, and conflict typologies in transforming the pilot innovation and preparing implementation of the large-scale program. This process is also investigated in the article "Launching a Large-Scale Program*,"* although with special attention to the political dynamics involved in scaling up innovations and with more attention to the external dynamics of the health care field. The transformation phase in this chapter is further divided into three sub-phases: re-mobilizing the network (Section 6.1), concretization and translation into objects (Section 6.2), and unmanageable GPs (Section 6.3), which together detail the progression of the development process in this phase.

6.1. RE-MOBILIZING THE NETWORK

The telemedicine network, at the beginning of this phase, was still emerging and needed to be re-mobilized from the telemedicine network in the pilot phase. The motivation to form and engage in such a network was predominantly characterized by co-exploration (Parmigiani & Rivera-Santos, 2011) of telemedicine as a viable health service. As demonstrated in "Launching a Large-Scale Telemedicine Program," top managers from the region and the municipality were leading the process of mobilizing a network, respectively, to support and materialize the vision of a large-scale telemedicine program. These top managers, one from the region and one from the municipality, functioned as the main boundary spanners in this early phase. Both of them envisioned an unfulfilled potential in telemedicine based on the pilot study and *"were both lit by the holy fire"* (interview, top municipal manager) to develop and realize a large-scale program; more importantly, both boundary spanners possessed formal power within their organizations, as well as status and legitimacy among the other local health care providers (such as other municipalities, hospitals, and organizations for GPs), which was emphasized as important when mobilizing the network and facilitating collaboration in this early phase:

> I've been met with, "Isn't it overkill to have you as chair of the steering group? Does it have to be a top manager?" (…) I say: "Yes, it certainly does." We are touching so many other things with this telemedicine program, for example division of work, finance, prior experiences and relations. So you have to engage the right persons who have enough stars and power [to allocate resources] but also know how to work the relations and collaborate."
>
> Regional top manager

Furthermore, they both had the competencies and experience to navigate and act in a politically tense environment to build a network of heterogeneous actors. Correspondingly, these top managers had the formal power, legitimacy, and the more informal personal and strategic competencies, as well as experience, to initiate such a network re-mobilization.

Already in the early transformation phase, the future large-scale program was anchored at the top of the involved organizations. This anchoring was done in recognition of the difficulties of working across organizational, sectorial, and political levels. Particularly, uncertainty was high and multi-dimensional concerning the processes and outcomes of transforming the pilot into an innovative large-scale program. It was uncertain how the telemedicine service could be operated and delivered in an interorganizational context with municipalities, hospitals, and GPs; how the (inter)organizational setup was to be designed; how financing and reimbursement of telemedicine activities would be accomplished; and how a technological platform for home-monitoring data and telemedicine technology could be implemented. Transforming the pilot innovation was more than merely expanding the pilot and it was certainly much more complex than development of a new technology; it was a multifaceted innovation process that concerned (inter)organizational issues, division of work, inter- and intra-professional aspects, re-organization of care for COPD patients, financial matters, invention of technology, and new roles and practices for both health providers and patients. This corresponds with Bashshur et al.'s (2000) definition of telemedicine as a *system of care* rather than merely a novel technology (cf. Chapter 4 about telemedicine). Initiating and participating in such a complex innovation process required acknowledgement of the uncertainties, willingness learn and courage to take risks. Both the regional and municipal top manager was aware of this which is exemplified by the quote from the regional top manager:

> In reality this large-scale program is an innovation project both in regard of the organizational, financial, technology, and the collaboration aspect. None of the things have been done before. So we must be willing to say that we probably won't get it right the first time and then we have to adjust it because we cannot plan everything beforehand [in this innovation process].

Regional top manager

These uncertainties were amplified by the ambition of a cross-sectorial setting where divergent goals, interests, and logics collided. Such interorganizational innovation processes are complex and demand political savvy, ongoing negotiation, and (re)mobilization of networks and coalitions to succeed in managing political dynamics, tensions, and conflicts that inevitably occur during the process (see also "Launching a Large-Scale Telemedicine Program").

6.1.1. MANAGING UNCERTAINTIES AND BUILDING TRUST

Several strategies were undertaken to manage the uncertainties and the complexity. One important strategy was to establish a project secretariat on "neutral ground" (interview, top regional manager) to acknowledge the competing logics, interests, and goals between the municipalities and the region (see also "Launching a Large-Scale Telemedicine Program"). Formally, the project secretariat was responsible for managing the project and securing progress in the transformation process. The project secretariat was also responsible for managing and governing the development and implementation of a large-scale program, together with an interorganizational steering group with representatives from the region, municipalities, hospitals, the DMA, the Quality Unit for General Practice in North Denmark Region (Quality Unit for GPs), Aalborg University, the Patient Association for patients with lung diseases, and the Danish Agency for Digitisation. This governance form represented a mixture of NAO and shared governance (Provan & Kenis, 2008) with a high degree of joint decision-making in the steering group and frequent communication between the involved actors. However, the governance structure was rather centralized in that the project secretariat coordinated the information flow, communication, and tasks related to developing and implementing the large-scale program. This governance form contributed to building trust in the network because decision-making was made transparent and included the different interests. Due to the high degree of uncertainty, trust between the three core health care providers was essential to unite the actors in the shared innovation project of developing the large-scale program. Particularly, there was a major uncertainty in regard to how the expenses and gains would be distributed among the municipalities and the region. Even though the business estimated an equal distribution of expenses and gains (TeleCare North, 2012), the uncertainties were still high due to the financial structures in the Danish health care system. These financial structures are designed so that the municipalities finance 20% of hospitalization costs (Seemann & Gustafsson, 2016), which gives them financial incentive to prevent hospitalization. In the large-scale program, one of the aims was to reduce hospitalization, which would reduce the municipalities' costs. These savings were, however, conditioned on the hospitals' change in behavior in terms of

reducing the number of "beds" instead of just hospitalizing other patients, since this would make municipal savings impossible, although this reduction of beds would also result in less income for the hospitals. Accordingly, the economic incentives created an obstacle and, conversely, economic interest in collaboration between municipalities and hospitals. To overcome this obstacle, trust was necessary, as the project chief explains:

> [Municipal savings] are conditional on the hospitals removing their "beds." This was a discussion in the beginning, and they [top managers from municipalities and the region] had to trust each other even though the incentive structures are an obstacle (…). These decisions required a whole lot of trust between the actors.
>
> Project chief

As exemplified by the quote, trust was fundamental for establishing the large-scale program as an interorganizational health service. In this matter, the business case was important in building trust between municipalities and the region because it explicated the rather equal distribution of expenses and gains by telemedicine (see "launching a Large-Scale Telemedicine Program" for a more detailed analysis about the legitimating role of the business case). These calculations were perceived as trustworthy, since they were carried out by external consultants and based on prior experiences from the TELEKAT pilot study, as well as other studies. Correspondingly, the business case was a source of calculative trust which decreased some of the uncertainty related to financing the telemedicine program and to the distribution of investments and gains. However, calculative trust was not the only source or form of trust involved in the early transformation phase. Another important source of trust was the prior positive experiences with collaborating, the actors' more personal knowledge of each other, and the more informal processes.

In the interviews with the top management and the observations of the steering group and project secretariat, it was most visible that the actors perceived the North Denmark Region and the municipalities as exemplary in regard to collaborating across sectors and political levels. Due to their long history of working together in the health care field, interorganizational trust between the region and the municipalities was built over time, creating a fertile climate for an ambitious large-scale program. The project chief exemplifies this self-perception and prior history of collaboration across the region and the municipalities:

> These [prior and other types of] networks and traditions of collaboration have been fundamental for this large-scale program (…). Here in North Jutland there is a special tradition for collaborating.
>
> Project chief

This tradition of working together resembled the process-based trust that enabled the initiation of the joint development process. Furthermore, this process-based trust was supported by the more personal and companion-like trust between the regional and municipal top managers. This interpersonal trust was mentioned by both top managers and is here expressed by the municipal top manager:

> We [the municipalities and region in North Jutland] have been good at negotiating the health agreements and structuring them. It also means that we know each other pretty well which makes it easier when we start such projects as this large-scale program. We [the regional top manager and I] are not unfamiliar with each other—now the context is just different and our task is another, but we want to do it together. We focus on the task and not all the other mudslinging [between the region and the municipalities] (…). And we know each other as people (…) and are used to collaborating closely on other projects as well.
>
> Municipal top manager

Based on prior experiences, interpersonal trust between the two top managers was built. Though, it was not only the interpersonal trust *between* the two top managers but also trust *in* the two top managers from the other health care providers that enabled re-mobilization of the network. The two top managers were aware of this support and used it strategically to commit the top managers from the other municipalities through more informal processes, when they met them for other reasons. This informal recruitment is exemplified by the regional top manager:

> I was going to talk with the different municipal city managers for another reason (…) and then I also mentioned that we had a good chance on succeeding in this telemedicine field (…). I knew that others perceived me as trustworthy and of course I used this trust in me to create commitment to this large-scale program when I talked with the different municipal city managers.
>
> Regional top manager

Correspondingly, the trust in the early transformation phase was multidimensional, both in regard to the form, the level, and the source of trust; some of it was already present in the form of the "traditions of collaboration" and the personal relationship between the two top managers, while others needed to be built by reducing (financial) uncertainty in the form of a business case or by creating full transparency in decision-making processes through a shared governance form.

6.1.2. RELUCTANT PARTICIPATION

Although this early transformation phase was characterized by trust among the actors, it was not a straight forward process to get all actors on board. In this early phase, it was crucial to engage the core health care providers in North Jutland to promote the program as large scale. The large-scale aspect was pivotal when trying to connect to national strategies and calls for large-scale programs. Accordingly, it was critical when one of the 11 municipalities declined the invitation to participate in the large-scale program:

> The Social and Health Department [in the municipality] recommends that the municipality does not participate in [TeleCare North] because of lack of economical and staff resources. Furthermore, issues about deficient GPs in the municipality allegedly decrease the rate of success and the municipality's efforts in the program.
>
> Minutes from political committee Social and Health, Morsø Municipality, May 2012

As the above passage from the minutes of a meeting in the political committee "Social and Health" in a municipality demonstrates, participation in the large-scale program was initially declined due to a lack of resources in terms of finance, staff, and GPs. This reluctant participation illustrates the premises of the systemic network and interorganizational collaboration; willingness to work together is essential because of the absence of common authority structures or a mandate to force organizations to collaborate or engage in the network—and this municipality was not willing to collaborate and participate in the network. The top managers, especially the municipal top manager, continued to negotiate their involvement by emphasizing the gains from telemedicine and by promoting the program as a ground-breaking, high-status project as well as the mimetic pressure (DiMaggio & Powell, 1983) arising from participation of all of the other municipalities in the region. Finally this municipality agreed on participation in the large-scale program. However, this participation was a political decision to participate, as the recommendation from the "Social and Health Department" and their political committee was against participation:

> Because of a professional assessment, we were reluctant about participation in TeleCare North, but our politicians decided to participate anyways. It's like the decision was made regardless of our assessment. This hasn't generated any local resistance towards the program, but our commitment is still challenged by scarce resources: finance, staff and shortage of GPs, as well as problematic collaboration with GPs.
>
> Conversation with municipal project manager during observation studies

This instance of reluctant participation elucidates how the large-scale vision also met resistance and how telemedicine was not only praised and perceived as a solution to demographic challenges, as depicted in various strategies (e.g., The Danish Government et al., 2013a) and articles in Danish media on the subject (see "Launching a Large-Scale Telemedicine Program" for more about the theorization activities at the national level in this phase). However, this was the only actor who declined participation in this early phase.

The above example furthermore illustrates how telemedicine network actors (the municipalities, hospitals, and GPs) differed internally. The municipalities and hospitals were not a uniform group; they diverged in several ways: size, internal organization, economic capacity, resources and so forth. Moreover, there was an individual political and administrative management of each of the municipalities, whereas the hospitals were led by the same regional council and top management. The approximately 225 GPs who participated in the did also represented individual organizations with their own management. The telemedicine network hence consisted of 240 individual organizations, which indeed created a high level of complexity that became more and more visible as idea of telemedicine was concretized and translated into practice.

6.2. CONCRETIZATION AND TRANSLATION INTO OBJECTS

After this initial period, where the core actors were committed to the large-scale program, a long period followed in which the vision was made more concrete and translated into tangible objects (Czarniawska & Sevón, 2005), such as standards for division of work, work flow descriptions, a database for the home-monitoring data, and a hardware solution termed "TeleKit." These translation activities were facilitated and managed by the project secretariat. Four different workgroups were formed: (1) the IT group that collaborated with a private IT firm to develop the technological solution, (2) the health group that developed health content in the telemedicine program and the clinical guidelines, (3) the organization group that developed the interorganizational setup in terms of division of work and responsibilities, new roles, work flow descriptions, and instructions for solving the novel telemedicine tasks, and finally (4) the implementation group that was responsible for implementation in each organization and development of an educational programs for the health professionals to enhance their competencies with COPD, telemedicine, and, more broadly, welfare technology. The four groups were composed of actors representing the municipalities, the hospitals, and the GPs, although some groups also had representatives from other organizations, for example a private IT firm and patient associations. Each group was led by a project manager from the project secretariat, and they were responsible for coordinating the activities between the groups. Characteristic for the process of concretizing the

large-scale program was that the main actors in this period represented the administrative and operational level rather than the top management level; as well, the number of boundary spanners increased significantly. Furthermore, concretization of the large-scale program was like opening a black box of details that were necessary to develop the content in the program. However, the detail required to develop the content and concretize the large-scale program was demanding:

> The more you open the work packages in the four workgroups, the more details arise. It is extreme how many details there are, but it also contributes to clarification of what needs to be done before this can be implemented in the ordinary operation [in the municipalities, hospitals, and at the GPs].
>
> Project chief

Dealing with these numerous details demanded extensive collaboration and spanning of boundaries, tensions and conflicts, and involved several decisions. In Sections 6.2.1 and 6.2.2, these different dimensions are unpackaged to elaborate on the network processes and dynamics in the process of translating telemedicine into tangible objects.

6.2.1. DECISION-MAKING PROCESSES

The four workgroups differed in size and in relation to which actors participated from the core health care organizations. The participants functioned as boundary spanners and were both administrative staff and health care professionals. Their positions within their own organizations differed, though. For instance, the "implementation group" consisted of local project managers from the municipalities and the region (representing the four hospitals). None of them had formal power within their organization to make decisions on behalf of their organization, so it was necessary to seek approval from their organization. The following passage from the observation notes of the implementation group is illustrative of this requirement:

> The municipal project managers are not managers for the staff [that are to perform the telemedicine tasks and to be educated in the new tasks], so they have to ask the staff's managers about who the designated health professionals to perform the telemedicine tasks are and how the educational activities should be planned.
>
> Observation notes, implementation group

This lack of formal power and discretion to make decisions prolonged the process of concretizing the content of the large-scale program. Moreover, the decision-

making processes were extended by the way the program was organized and how it was anchored at the political and top administrative level. This organization of the program also recognized the lack of a common authority structure and mandate to make decisions in an interorganizational setting. The project chief explained this strategic move of using existing cross-sectorial administrative collaboration forums to create a form of common authority structure for the program:

> We constructed the program to be anchored at the very top of each organization, both administratively and politically, in order to succeed with the program. But that also means that the decision-making processes can be quite long because the program and the workgroups somehow need to get their work validated by the existing collaboration forums. These collaboration forums serve as guarantors for the decisions and that each municipality and the region comply with the decisions (…). So when we, for instance, have a proposal of a division of work and responsibilities, then we have to get approval from the Administrative Steering Group for Health Agreements in North Jutland. And this is how decisions are made in the program because they have the mandate to make such decisions on behalf of the municipalities and the hospitals.
>
> Project chief

As the quote illustrates, the organizational setup and decision-making in the program was quite complex, as power was distributed and not centered around one single actor. Even though it was a strategically wise move to anchor the decisions at the top management and political level, it also created challenges for the boundary spanners in the workgroups because of the rather long decision-making processes. One example of such a challenge concerned the logistic matters related to delivery of the telemedicine equipment at the patients' homes. This was a novel task, and numerous discussions were had among the boundary spanners in the workgroups about who should be responsible for this task. In the beginning, a detailed proposal was made in the organization group, where the municipalities were responsible for delivering the equipment to the patients and, generally, for handling and delivering other equipment that supports patients living in their homes (e.g. wheelchairs). The largest municipality suggested that they could solve this logistical task on the behalf of all 11 municipalities. However, the second-largest municipality wanted to solve this task by themselves, independently of the other municipalities. The tensions between these two municipalities illustrate power struggles between actors who have similar capabilities in the network. These power struggles were not settled before new challenges arose because disagreements between different departments in the largest municipality emerged. These disagreements concerned whether the municipality would operate the new logistical task. The logistical task was now "a political matter that [was] lifted out of the workgroups and project secretariat," explained the project manager for the organization group. Alternative scenarios

now needed to be presented to the steering group, and the Administrative Steering Group for Health Agreements in North Jutland. In the meantime, the organization group and implementation group could not make any progress related to how to handle or plan delivery of the equipment; they were paralyzed and frustrated about the lengthy process. This frustration features in the following passage from the observation notes on the implementation group:

> The project managers are frustrated because of the lacking decision about the logistics of bringing the equipment to the patients' homes. It prohibits planning of future tasks related to implementation of the large-scale program.
>
> Observation notes, implementation group

Finally, after five months of discussions and waiting time, the final decision was made by the steering group; the logistic task was outsourced to a private company. This example illustrates the lengthiness of some of the decision-making processes and how they slowed the development of the large-scale program.

However, this decision-making structure not only created obstacles and frustration; it also created a sense of legitimacy in the decisions and a broad commitment from the actors who actually had the power to allocate resources to realize the decisions. One of the municipal project managers reflected upon the effect of this hierarchical structure of the program:

> I think it is fantastic that there are top managers from some of the different municipalities and from the region in the steering group, and that we have support from that level and from the politicians as well—we feel that support, and it works really well (…). This also increases my legitimacy to say to other units and departments in our municipality, "Well, we have to do this and we cannot deselect it because we don't feel we have the resources. We have to do it [because our top management decided to].
>
> Municipal project manager

For the boundary spanners in the workgroups, this top anchoring of the program gave them legitimacy within their own organizations to initiate change at the operational level and was a source of the formal power they lacked.

Altogether, this section demonstrates how the program was based on a rather hierarchical structure, even though it still took the form of an interorganizational network. In this sense, the authority structure in the network was highly complex, as it represented a blend of a network structure with distributed power among the different network actors *and* a more classical hierarchical structure.

6.2.2. COLLISION OF LOGICS

Translation of the large-scale telemedicine vision into a program with concrete content elucidated the competing logics, interests, and goals of the network actors. These tensions were fully evident in each of the four workgroups, where the boundary spanners negotiated about the content and tried to unite the competing logics in compromises.

As expected, collaboration among the boundary spanners on concretizing and filling the details in the large-scale program was challenged by competing logics (see "Launching a Large-Scale Telemedicine Program" for an analysis of these competing logics at the institutional level). As defined by Scott et al., 2000, institutional logics *"refer to the belief systems and related practices that predominate in an organizational field"* (p. 139). Such logics function as guiding principles for actions and taken-for-granted rules by the actors in the field (Reay & Hinings, 2009). Thornton and Ocasio (2008) further specify how logics develop not only at organizational field levels but at a variety of levels, for example in organizations, interorganizational networks, and sectors. Inspired by these notions, the concept *logic* in this section is used to understand how the actors behave and represent different practices, values, and norms, depending on their organizational and professional affiliation.

Most visible were the competing logics of the municipalities and the hospitals. Affirming the findings of other studies (e.g., Antoft, 2005; Seemann & Antoft, 2002), health care from a hospital perspective focused on (acute) treatment and other medical issues, and concerned a limited dimension of the patient, that is, the patient's sickness, whereas the municipal perspective on health care was more concerned about prevention, daily living, and rehabilitation, and they had a more holistic view of the patients (or the "citizens," as the municipalities termed the individuals with COPD in the program). A municipal project manager exemplifies how different meanings were inscribed in the program:

> [Our work in the workgroups reveals] that this is where the acute world [the hospitals] meets the non-acute world [the municipalities]. We say that the program isn't an acute service; however, it seems like the hospitals sometimes want to use it like that. So I think we have a challenge in aligning our expectations to the program, and what the hospitals can expect from us, and what we can expect from the hospitals.
>
> Municipal project manager

These competing logics reflected fundamental differences between specialized health care (i.e. the hospitals) and generalized health care (i.e. municipalities and GPs). As the health-related content in the large-scale program was developed by the

health group that consisted of mostly COPD specialists, that is, lung physicians and specialized COPD nurses, the content indeed reflected specialized knowledge about COPD. Similar to the pilot study and other telemedicine pilot interventions for COPD patients, the health group selected some core vital signs to be monitored by the telemedicine equipment. As these prior telemedicine interventions relied heavily on a hospital logic (see Ballegaard et al., 2012) this kind of logic was continued in the large-scale program. An example of this logic is reflected in the formal instructions for the monitoring task:

> Data is concrete measurements [performed by the patients], that is oxygen saturation in the blood, pulse, blood pressure, and weight, as well as the patients' answers from a questionnaire about disease specific symptoms.
>
> Passage from formal instructions for the monitoring task

This form of patient information reflects the data that is used in clinical work, as opposed to "softer" data about such issues as general health status and performance of daily-living activities, as used in the municipalities. There were, however, several attempts by the municipal actors to have some rehabilitation activities included in the program, for example physical training instructions. These attempts were not successful, though, and the result was a telemedicine program that was influenced predominantly by a hospital logic with a strong focus on core vital signs. As the municipalities were the designated main actors in the program, this reliance on hospital logic in the program created challenges. Firstly, the municipalities were challenged in regard of competencies. The 11 municipalities differed in how many nurses, and particularly how many nurses with specialized COPD competencies, they had. The largest municipality in the region had several specialized nurses available for the telemedicine tasks, whereas the smallest municipality had only nurses with general competencies. At this stage in the transformation process, some of the municipal project managers expressed concerns about this issue. However, it was initially solved by designing an extensive training of the municipal nurses that would increase their knowledge about COPD and telemedicine. Consequences of these competence issues are elaborated in the article "Does Telecare Improve Interorganisational Collaboration?"

Secondly, the hospital logic collided with the organization of health care in the municipalities. This collision was particularly evident in relation to the health group's recommendation to monitor the patients' data every third day, which was based on hospital logic whereby patients are treated no matter the time of the day or whether it is a weekday, weekend, or holiday. However, the municipalities' activities occur mostly during the dayshift on weekdays (except daily home care activities or activities at the nursing homes). As a result, the organization of their activities made it difficult to comply with these recommendations. The municipal project managers advocated for another solution and declined to follow the

recommendations. As the municipal project managers stated at a meeting in the implementation group,

> The program is not an acute service, so there is no checking of data on the weekends or outside the daytime shifts—data is monitored on selected days. It is not surveillance. In acute situations, then the normal acute channels should be used, that is, 911 [in Danish: 112]. The program should not substitute that function.
>
> Observation notes, implementation group

Similarly, an illustrative discussion between the regional project manager and the municipal project managers in the implementation group reflected this collision of logics:

> The project managers discuss the time frame for the initial training of a patient [that is performed by the municipalities] when the hospitals refer a new patient to the program. The municipalities want to extend the time frame to 15 days [from 14 days], whereas the hospitals want to shorten it. Experiences from prior projects emphasize that patients often forget what happens during hospitalization. Accordingly, the project managers find it more suitable if the patients are trained at home after their hospitalization. However, as the regional project manager argues, prior studies also show that re-admissions often occur within the first 14 days after discharge. This is an argument to shorten down the time frame, but the municipalities "reject being the hospitals' slaves and working faster to fulfil the hospitals' wishes" [municipal project manager's expression]. The result of this discussion is that the instruction for inclusion of patients in the program is altered, and the municipalities now have 15 days to react and train the patients on the equipment.
>
> Observation notes, implementation group

These examples demonstrate the competing logics and how they collided in the workgroups. Such conflicting logics led to numerous discussions in which consensus about the details in the program was sought. Through this extensive collaboration and face-to-face meetings, the tensions were handled. The result was several compromises and an increased understanding of each other. One of the most noticeable compromises was the mix of logics embedded in the large-scale program. As the above examples demonstrate, the content in the program is based predominantly on a hospital logic, with a strong focus on vital signs. The municipalities, however, also influenced the content to some degree by adding to the monitoring program a physical test (and training exercise) that is used in the rehabilitation programs in the municipalities, and, most importantly, the

organization of the activities (such as monitoring of data, training of new patients in the program, etc.) in the program was dominated by a municipal logic. Accordingly, the program appeared to be a mix of a municipal and hospital logic.

Furthermore, the extensive collaboration in the workgroups resulted in a better understanding of each other's logics and work methods. This mutual understanding is exemplified in observation notes from a meeting between the four hospitals:

> One of the hospital nurses says that it doesn't make sense that they monitor the patients' data three times a week when the municipalities monitor them only once a week. The regional project manager explains that the municipalities work according to another logic because they focus more on rehabilitation and that they monitor the patient with a stable COPD course.
>
> Observation notes, meeting between the four hospitals

The extensive collaboration in these groups contributed to *"management of meanings"* (Hardy et al., 1998, p. 81), where mutual understanding, shared solutions, and compromises were reached because the level of conflict was appropriate. In that sense, the workgroups created an arena for discussion, conflict, and negotiation among the network actors (represented by the boundary spanners), which enabled acknowledgement of differences in terms of logics and work methods. This recognition of difference facilitated the building of trusting relationships between the boundary spanners in the different workgroups, as well as common acceptance of solutions. However, the relationships and the collaboration among the boundary spanners were characterized not only as trusting relationships; as the discussion of patient-training time frames demonstrates, the relations were also characterized by power struggles and attempts to dominate the other actors to and make them comply with each organization's own logic and goals. Again, this power struggle was most visible in relation to how to organize the monitoring of the data. The following passage from my observation notes in the implementation group illustrates how the municipal logic (represented by the organizing of data-monitoring tasks) and the hospital logic (represented by the clinical considerations and health-related content in the program) continued to collide:

> In most of the municipalities, the patients' home monitoring data are not going to be assessed during the Christmas holiday because only the most important tasks are solved during holidays. According to the municipal project managers, this also corresponds to the fact that the program is not an acute service. The regional project manager, however, reminds them about the instructions from the health group regarding the monitoring task because these instructions explicitly state that data should be monitored on a regularly basis and on certain days. The discussion is long, but in

> the end the project manager from the project secretariat ends the discussion by saying that they have to be pragmatic and that data are not monitored during holidays.
>
> Observation notes, implementation group

One of the reasons to adopt this more pragmatic approach to monitoring the data was that the municipal project managers were dominating the implementation group, where most of the details were translated into practice. Each of the 11 municipalities was represented by a project manager in the group, whereas the four hospitals were represented only by one project manager. The discussions in the group were effected by this asymmetrical representation, because the municipalities could set the agenda and form coalitions against the regional project manager, who in some cases, as the above, was resigned to complying with the municipalities' agenda. Another way in which asymmetrical representation had an impact was through external pressure from the organizational field in terms of national agendas to strengthen the primary health care sector (municipalities and GPs) by moving some tasks from the secondary sector (hospitals and specialized treatment) to the primary sector, as well as to create savings in health budgets (see for instance Local Government Denmark, 2012). This pressure generated a strong incentive to place the municipalities as main actors in operating the telemedicine program, removing this task from the hospitals. However, it also created pressure to comply with the municipal logic in developing the program in relation to the organization of monitoring and daily operation of the program.

Overall, these internal and external dynamics created complex network relations that were neither purely trust-based nor exclusively power-based. Instead, the relations changed according to network and externally infused dynamics, and they changed as the program developed. Furthermore, the extensive collaboration and the relatively dense network that emerged as a result of the frequent interactions in the workgroup nurtured the development of a more process-based and interpersonal trust among the boundary spanners.

Setting aside the tensions between municipal and hospital logics, another dominant logic was present during this concretizing phase. Concerns about financial issues were visible in the numerous discussions and decisions made in the workgroups and the steering group. From the estimations in the business case, substantial savings were an expected outcome of the implementation of a large-scale telemedicine program (TeleCare North, 2012) and this expectation influenced the work of filling in the details of the large-scale program. Every municipal project manager expressed this expectation during the interviews, and it shaped their opinions in the implementation group. An example of the impact of this financial expectation, a municipal project manager explains how the municipality expected savings and that they had already calculated these savings in the budget:

> We [in the municipality] have the goals from the business case and the resulting rationalizations and savings, and this is already calculated in this year's budget. So that's what we expect from the large-scale program. It's not like we talked a lot about it in our municipality. It's more like a fact [the savings], and that is a goal we have to reach.
>
> Municipal project manager

These expectations about savings in their own organization created challenges and constrains in relation to the other network goals. These constraints were particularly evident in relation to discussions about how health professionals should react to their patients' data. For example, one discussion among the participants in the implementation group about how to follow-up on the patients' data and the purpose of this data had the following characteristics:

> The project managers disagree on how extensive the task of checking data and following up on them should be: "If the patients' data are deviating from their normal area how should we react in the municipalities? Should we call the patient and request the patient to call their GP, or should we also talk about the patient's symptoms and how they are related to how they feel?" one of the municipal project managers asks. "If we do the latter, then we also educate the patients and empower them to understand what triggered their exacerbation," the municipal project manager continues. Another municipal project manager asks, "But does it generate extra services [and extra costs] from the district nurses to empower them, versus requesting them to call their GP?" The discussion continues to revolve around empowerment issues and concerns about extra costs.
>
> Observation notes, implementation group

In this discussion, the program's goals about savings and patient empowerment are made mutually exclusive, since the solution where the district nurses educate the patients about the relationship between behavior, symptoms, and exacerbations is perceived as more expensive for the municipalities. This tension between savings and empowerment could also be seen as reflecting a tension between a more administrative logic and a health professional logic. This interpretation is supported by the fact that the workgroups, and particularly the implementation group, consisted of boundary spanners with different organizational positions and educations. In the above passage, the first statement about whether to request that the patients call their GP or to empower them is raised by a nurse, namely the manager for the district nurse unit in a municipality, whereas the latter statement about concerns for economic issues is raised by an administrative employee with an education in economics. In general, these differences in the boundary spanners

organizational positions and educations were reflected in discussions and how they represented their organization. Based on this trend, it can be argued that boundary spanners are influenced by their own logic in terms of organizational position and education when representing their organization in an interorganizational field. This argument may be particularly applicable when the boundary spanners do not have the authority and mandate to make decisions or when they act according to discretion in the network, as is the case for the boundary spanners in the workgroups. In these cases the boundary spanners act as representatives for their organization and act according to their organization's goals instead of a representative for the telemedicine network, who act primarily according to the network goals. One implication of this mindset of the boundary spanners was that their own organizational goals, structures, and processes were prioritized over the network goals of developing an interorganizational telemedicine service that would improve collaboration among municipalities, hospitals, and GPs. This order of importance was especially evident the organization group's discussion and that of the implementation group in relation to compiling formal descriptions of work flow and descriptions of collaboration at the operational level across municipalities, hospitals, and GPs. These descriptions were based on existing collaboration structures and regulations (e.g. communication channels and regulations regarding response times), despite some well-known challenges in these existing structures. One instance of this was the compilation of work flow descriptions in relation to the inclusion of new patients at hospitals. Traditionally, when the hospitals refer patients to health services in the municipalities, this referral is mediated through the GP. Accordingly, the hospital writes a discharge summary to the GP with a recommendation for a health service (e.g. home care), and based on this summary the GP writes a referral to the municipality. This process is lengthy, taking about 14 days. The hospitals wanted to accelerate this process by inventing some new forms of collaboration, and one of the municipal project managers elaborated on this idea at a meeting in the implementation group:

> Let me think outside of the box and be innovative; maybe the hospital can call the GP directly during hospitalization to initiate the referral to telemedicine faster? the municipal project manager says.
> Even though, they [the local project managers] just spent the last 15 minutes discussing how the discharge summary was the slowest document to get through the system [from hospitals through GPs to municipalities], the other municipal project managers disagree and decline to invent new forms of collaboration.
>
> Observation notes, implementation group

The above passage is an example of how existing formal collaboration structures remained, including challenges, barriers, and conflicts, even though they were perceived as problematic and not in line with the program's goal of improving

cross-sector collaboration. Correspondingly, there was a risk of reproducing existing collaboration challenges at the operational level in the new telemedicine setting.

Overall, this phase of concretizing the content of the telemedicine program and translating the vision into tangible objects reveals how multiple logics compete and collide in the different workgroups. This interaction of logics led to extensive discussions and tensions, but it also enabled compromises, co-existence and representation of different logics, as well as broad legitimation of the program, by involving a wide range of actors. The workgroups, in this sense, created an arena for negotiations and discussions and facilitated interorganizational bargaining and problem-solving (Brown, 1983), as well building trust between the boundary spanners. The result was a large-scale program that consisted of a blend of hospital and municipal logics, as well as a mixture of administrative and health professional logics. Furthermore, this phase reveals the rather hierarchical governance structure that co-existed with the less hierarchical network structure.

6.3. UNMANAGEABLE GENERAL PRACTITIONERS

In the last phase of transforming the telemedicine innovation into a large-scale program, obstacles emerged that threatened the large-scale vision. As described in "Launching a Large-Scale Telemedicine Program," a national conflict between the DMA (for GPs) and the "Danish Regions" influenced GPs participation in the large-scale program. The GPs had a crucial role in the program, as one of their tasks was to identify and refer patients to the program. Due to the overall organization of the Danish health care system, a formal agreement (a so called §2 agreement) that clarified the task and payment to the GPs between the North Denmark Region and the Danish Medical Association North Jutland (DMAN) was necessary before the GPs could identify and refer patients to the program. However, these external dynamics challenged the local negotiation process about the §2 agreement, as the local representative from DMAN explained:

> [The infertile climate for collaboration between the GPs and the regions at the national level] certainly effected that the §2 agreement was made in the last minute. Of course, we could have gotten it cleared earlier if they wanted to [but they didn't]. So, in my opinion, it is problematic that the collaboration climate is so bad because it influences how we reach agreements and most likely also the motivation to participate [in the program].
>
> GP and representative from DMAN

More specifically, the negotiations were prolonged, as the will to reach compromises was challenged by the national conflict. The §2 agreement was signed less than two weeks before the planned implementation of the large-scale program. With this time frame, it was impossible for the GPs to get information and learn about the program and the criteria for patient inclusion, identify relevant patients, and refer them to the program. Accordingly, implementation was initially postponed by a month, creating frustrations among the municipal actors, as they were to include the patients and train them in the use of the TeleKit during the summer holiday. This timing created the sense that the training would be a difficult task. The municipal project managers wrote a letter of concern to the top municipal manager that initiated a program through which they expressed their concerns and recommended further delay of implementation. The following passage from their letter exemplifies their overall concerns and frustrations related to reaching a formal agreement with the GPs:

> If the implementation is postponed a month, it will have some serious implications in relation to resources spent in the municipalities, the quality of the program, and our ability to gain patient empowerment [through training and educating the patients]. (…) To be honest, we do not find the implementation plan realistic. (…) In the implementation group, we are deeply concerned that a too hasty implementation creates resistance among the clinical staff.
>
> Passage from letter to the top municipal manager

The steering group decided whether or not implementation should be further postponed to follow the recommendations from the implementation group; their decision was to follow the recommendation, and implementation delayed another two months. However, the tensions were not yet dissolved, as identification and referral of patients was more difficult than anticipated.

As an extensive research setup was connected to the large-scale program, it was mandatory to get enough patients included to realize a large-scale RCT (see Udsen, Lilholt, et al., 2014, for details about the RCT). Identification and referral of patients was a lengthy process, a result of lacking motivation from the GPs to participate in the program, as the §2 agreement rested upon the GPs' willingness to participate in the program. Accordingly, participation in the program was voluntary and not mandatory. Some of the GPs declined to participate in the program and "threw out the material from the program when it arrived with the deliveryman because the North Denmark Region logo was on the box" (Project chief), whereas others declined to participate due to a lack of resources to engage in the tasks. As the GP and representative from the DMAN illustrated in the above remarks on the §2 agreement, motivation for participation was relatively low among GPs due to the

national conflict. Furthermore, the task of identifying and referring the patients was more time consuming than estimated, as explained by the same GP:

> The GPs that I've been in touch with told me that the task of identifying and referring the patients took a lot longer than what they expected. So, actually, it was a quite comprehensive task and they spent a lot of hours on it. That also explains why so many declined to participate (…). Furthermore, there is a steady stream of new projects and initiatives that the GPs are mandated or offered to participate in. So a program like this drowns in this [list of selections] and if it can be deselected, then a lot of us would do that because we have so little time and lack resources to engage in such projects.
>
> GP and representative of DMAN

The GPs had limited resources to prioritize participation in such a program, especially when participation was not mandatory. Unlike the hospitals and the municipalities, they did not have dedicated project managers or administrative employers to handle participation in such projects. Furthermore, they are self-employed and (partly) financed by the activities they perform. Accordingly, the conditions for participation diverged significantly between the hospitals and municipalities. However, their lacking participation had different implications.

6.3.1. LACKING PATIENTS

The most obvious implication of the lacking motivation and possibilities to participate (in terms of resources and organizational issues) was the difficulty enrolling enough patients in the program to satisfy the demands from the RCT study and the estimations from the business case. Two weeks before the (adjusted) scheduled implementation, the deadline for enrolling patients and implementation was further postponed by the steering group; more than 900 patients were enrolled by the GPs at that point, but there was 300–500-patient shortfall with respect to fulfilling the demands of the RCT and the business case estimations. The municipal top managers wrote a letter to the other municipal top managers in the 10 other municipalities, which described the situation and in which the top manager asked the other municipalities to support and allocate resources for alternative enrollment in the municipalities:

> The implementation of the program must be postponed until October 2013 [2 months] to secure enrollment of enough patients to accomplish the research activities and to realize the business case. The chairmen [regional and municipal top managers] have been in

> close dialogue with the DMA, and they cannot guarantee that the GPs will enroll the remaining patients. To secure enough patients, the GPs enrollment is supplemented by enrollment in the region through the hospitals and in the municipalities. However, this model necessitates that the Region and the municipalities support this and allocate resources to it (…). Accordingly, we need to know if your municipality supports this.
>
> Passage from letter from municipal top manager

As the above passage demonstrates, top management was deeply involved in handling this shortfall of patients. This challenge was handled through more formal channels, and the steering group also discussed the issue and the reasons for some of the GPs declining to participate. In these discussions, municipal and regional members in the steering group (including the two top managers) fully acknowledged the conditions the GPs faced in performing this task and their challenges with scarcity of resources, both time and staff, as well as the politically tense collaborative environment resulting from the national conflict. However, these formal activities were supplemented by more informal conversations and activities. Most importantly were the informal meetings that the two top managers, the project chief, and the chairman of DMAN arranged to discuss the situation and how it could be handled. It was emphasized that handling of this situation should appreciate the GPs' positions as gate keepers to the health care system and respect the hospitals and municipalities in regard to asking them for extra resources to support the GPs in solving the enrollment task. This emphasis also recognized the mutual dependency between the GPs, hospitals, and the municipalities. Through these formal and informal activities, a strong coalition was (re)mobilized with the top managers from the core organizations—GPs, municipalities, and hospitals—that collaborated about handling this challenge. Due to their powerful positions within their own organizations, as well as their status and legitimacy within the health care system in North Jutland, they were able to mobilize support and resources across organizations for their alternative enrollment scenario. Despite support from the municipalities, it was decided that the remaining patients should be enrolled by the GPs and the hospitals, as they had the competencies and equipment to perform this task. During this process, a counter-point concerning the enrollment of patients also emerged. The DMAN representative emphasized at the steering group meetings that several GPs saw patients who rejected participation in the program. This resistance was slowly enforced, as the hospitals started to enroll patients in the program, also experiencing this form of rejection from the patients.

Another implication of the lack of GP participation was related to one of the core values of equality and access to health care in the Danish health care system. Nearly

40% of the GPs[9] did not refer patients to the program, creating inequality in access to the program across North Jutland. One of the most illustrative examples of this inequality was related to the smallest municipality in the North Jutland, having only one general practice clinic. This general practice clinic declined participation due to capacity challenges and lack of resources. Correspondingly, none of the COPD patients from that municipality could participate in the program. Such inability to participate also ensued in the other municipalities, although the consequences were not so notable since some of the other GPs in the municipality referred patients to the program. This emerging challenge was discussed in the steering group, project secretariat, and the workgroups, since patients were contacting the municipalities and the project secretariat to enroll in the program, having been rejected by their GPs. A municipal project manager explained this situation in a meeting of the implementation group:

> I've been contacted by a COPD patient who wanted to participate in the program but was rejected by the GP. The GP didn't want anything to do with the program.
>
> Observation notes, implementation group

As the program was widely promoted in national media (see "Launching a Large-Scale Telemedicine Program"), as well as by the Danish Lung Association and in local network groups for COPD patients, the patients generally knew of this novel telemedicine program. This knowledge created a form of bottom-up pressure on the GPs, as their own patients were demanding this service. Some of the patients even handled rejection from their GP by changing to another GP. For instance, one of the top managers from another municipality explained at a meeting of the steering group how he *"was aware of a patient with severe COPD who changed her GP because her former GP didn't want to enroll her in the program"* (extract from observation notes, steering group). In that sense, the patients (re)acted and created access to the program through other strategies, that is, pressuring and negotiating with their GP or changing GP. However, the formal actors (i.e. steering group, project secretariat, and DMAN) also actively urged the GPs and to participate in the program.

As a result of the different efforts of engaging the GPs and enrolling patients through alternative strategies, 1225 patients in total were admitted to the program.

[9] Own estimations based on lists of numbers of COPD patients and enrolled patients per GP provided by the project secretariat.

6.3.2. NEGATIVE STEREOTYPES AND DISTRUST

This process of engaging the GPs in the program at an operational level influenced the emergence and consolidation of existing negative stereotypes, as well as trust in the network.

In general the GPs were perceived as difficult to collaborate with, both in relation to projects and in the course of daily routines. This perception formed partly out of their organization as self-employed general practices without a single authority with the mandate to make decisions on their behalf (except from government regulations, laws, etc.). Accordingly, collaboration was voluntary for the GPs, and collaborative relations had to be established with each of the approximately 225 GPs in the region, especially since DMAN and their quality unit recommended participation. As a result, collaboration with GPs varied depending on each GP's willingness to collaborate.

Moreover, payment for activities was often a fundamental part of collaboration with the GPs, a result of their organization as a liberal profession, in contrast to the region and municipalities, which are financed through general taxation. However, these differences in organizational and financial structures created tensions in relation to collaboration with the GPs. One of the municipal project managers expressed this general tension:

> From a municipal perspective it's no secret that we often find it difficult to get GPs to participate in projects without payment. The GPs complain every time they get a new task—and maybe their complaints are valid—but the municipalities and hospitals, they just keep getting new tasks—we solve them to the best of our ability according to our conditions, and then afterwards we think about the financial aspect and how to make the ends meet. But the GPs immediately oppose: "Economy first and then we can decide afterwards if we want to solve the task or be part of the project." And sometimes this is frustrating when we collaborate. But again, it is difficult to solve because the GPs are self-employed and of course they also have a business to take care of.
>
> Municipal project manager

The project manager's view of the situation illustrates the general negative perception of the GPs and their willingness to collaborate, which was held among the boundary spanners in the workgroups. As a result, the discussion of the GPs and prior experiences collaboration with them was not positive, particularly at the project management level in the workgroups.

The existing collaboration with the GPs was furthermore characterized as fragile by the municipal actors. Accordingly, the GPs were referred to as a difficult group to collaborate with and a possible obstacle for the program. Collaborative efforts should comply with their work conditions and wishes to garner support for collaboration from the GPs. For instance, a municipal project manager explained how meetings with the GPs were organized according to their work schedules. Similarly, another municipal project manager explained how *"collaboration with the GPs [in the program] is like getting a sparrow to eat from your hand. It must be done with the same carefulness and tenderness."* In that sense, the municipal actors in the implementation group perceived themselves as the weaker partner in the relationship because they had to persuade the GPs to participate and comply with their organizational structures and processes. This understanding was also a consequence of the municipalities' and program's dependence on the GPs (see "Does Telecare Improve Interorganisational Collaboration?" for more about dependence structures at the operational level in the network).

From the GPs' perspective, however, the possibilities for influencing the large-scale program were limited. The representative of DMAN explains this limited influence:

> Yes, it is [the region and the municipalities that dominate the steering group]—it is their project [to develop and implement the large-scale program]. We [the DMAN] are more like the figurehead.
>
> GP and representative from DMAN

This restricted influence was further limited by the fact that the GPs were not represented in the implementation group. Initially it was recommended that GPs be part of this group; however, no GP was ever appointed to the group. The result was that the GPs did not participate in the numerous discussions and conflicts that emerged in this group. Accordingly, the more detailed planning of tasks, solutions, and the activities related to implementation did not include the GPs' logic. Moreover, and most importantly, the lacking representation in this group resulted in excessive conflict between, on the one side, the municipal and regional actors, and on the other side, the GPs. The workgroups functioned as physical spaces or arenas, as mentioned earlier in Section 6.2.2, where the different boundary spanners met face-to-face to discuss and negotiate the content and the different details of the program. This shared collaborative space facilitated an appropriate conflict level where patterns of behavior could be characterized as a mix of interorganizational bargaining and problem-solving. Through these regular meetings, interpersonal trust was built, along with increased awareness and acknowledgement of interdependencies and each other's differences, work methods, and different conditions for participating in the program and performing the different tasks. Since the GPs were not part of the implementation group, there was no arena for handling the tensions with the GPs. Therefore, the tensions escalated, and negative

stereotypes about the GPs emerged, supported by prior negative experiences with GP collaboration. The stereotype about the GPs characterized them as greedy, as unwilling to collaborate and as obstacles to the program, and this stereotype emerged at this late stage of the transformation phase.

Related to the emergence of a negative stereotype was the mutual distrust and suspicion of each other's motives, which was evident among the different actors. This attitude was also influenced by the national conflict between the regions and the GPs that enforced mutual suspicion about each others' motives. The regional top manager reflected on the GPs' hesitation and suspicion toward the program, particularly toward the region:

> I don't know whether we met real resistance from the GPs but there has been a lot of skepticism, like "Is the region screwing us?" because there was this general distrust towards regional actors [due to the national conflict]—that was not related to this task [of enrolling the patients]—so they were suspicious about us and whether we had a hidden agenda with the program.
>
> Top regional manager

Similarly, the GP and representative of DMAN explained how "the regions basically wanted to control the GPs work" when they collaborated with them. As these statements demonstrate, the relations between the region and the GPs at the organizational level (see Table 2.3: Conceptualizations of levels of trust, Section 2.2.3) were characterized by a low degree of trust. More specifically, distrust between the region and the GPs grew most visible at a more abstract level, where the region was referred to as constitutive of the Danish regions in general or the GPs were considered as a profession. Municipal actors expressed their distrust at both a more generalized and abstracted level towards the GPs as a profession *and* at a more interpersonal level, at which concrete negative experiences with specific GPs fostered the distrust. Such statements about concrete negative experiences in the region were not visible in this phase, however. An explanation of this invisibility might include that the regional actors mostly represented a more administrative level without any direct interaction with GPs or hospital staff, where interaction with the GPs was scarce (see "Does Telecare Improve Interorganisational Collaboration?" for more about collaboration among GPs and hospital staff).

Overall, hesitation about participating among some of the GPs enforced prior negative experiences, and a negative stereotypical perception of GPs emerged, particularly among the municipal project managers in the implementation group. This negative stereotype had a negative effect on development of trust among the network actors, as distrust towards the GPs as a profession grew stronger due to some of the GPs lacking participation in the program. Moreover, external dynamics

in the health care field negatively influenced trust between the network actors, as national conflict at the institutional level between the Danish Regions and the DMA nurtured mutual distrust and suspicion about each other's motives with the program.

6.4. NETWORK DYNAMICS IN THE TRANSFORMATION PHASE

Altogether, this phase of transforming the large-scale vision into a concrete telemedicine program elucidates the challenges of innovating in an interorganizational network where network actors' goals, interests, and logics diverge. Prior collaboration and existing tensions and conflicts constituted the context for this process. Hence, the TeleCare North program was embedded in an institutional field and inherited the successes and failures of prior cross-sectorial programs and collaborative efforts. For instance, former challenges and tensions collaboration with GPs, along with conflicts at the national level between the regions and the GPs, influenced GP participation in the program and enforced suspicion about motives behind the program and incentive to engage in it. The influence of past interactions demonstrated how former collaborative efforts and external dynamics effected the network processes in relation to developing the large-scale program. Beside these dynamics, different internal dynamics were visible in the transformation phase. Sections 6.4.1–6.4.3 explain the internal dynamics concerning actor composition and innovation logics, as well as contract frames for collaboration and their implications.

6.4.1. CHANGE IN BOUNDARY SPANNERS AND SIZE

In the process of transforming the pilot innovation into a large-scale program, the telemedicine network changed dramatically in size. In the early phase, where the network was re-mobilized, the network consisted primarily of the two top managers and those whom they enlisted: the core health care providers along with fundamental collaborators, for example the university, patient associations, and national actors. As the contours of the telemedicine network emerged, it was mostly (top) managers and the project secretariat that were part of the network. The governance form was characterized as a blend between the NAO (project secretariat) and shared governance with joint decision-making and frequent communication among the network participants, which supported the building of trust in the network. However, as the transformation phase progressed and the large-scale vision was concretized, new boundary spanners entered the network through the four workgroups. These boundary spanners represented the administrative and operational levels among the municipalities, hospitals, and GPs,

which denoted a change in actor composition in the network (Majchrzak et al., 2015). The result of this internal dynamic was the expansion of the network size, precipitating some implications. The *first implication* concerned coordination of activities, communication, and information flow in the network. Formal information about the program and how it progressed was still centralized and distributed by the steering group and the project secretariat to the different network actors and associated collaborators. Furthermore, the project secretariat was responsible for the internal information flow and coordination of activities between the four different workgroups. However, as the development of the program was in constant flux and was in some periods rapidly evolving, it was difficult maintain a satisfactory information flow and timely coordination of activities in the network. As one of the municipal project managers explained,

> There have been a lot of unresolved issues [from the other workgroups] that we have discussed in the implementation group but couldn't make any decisions about before the other workgroups finished their discussions. So I think the workgroups [and the activities] have sometimes been too separated. We have lacked some coherence and coordination [across the activities], which has resulted in parallel work processes and discussions about things that were already decided in the other workgroups. So, there have been a lot of activities in the other workgroups that we would have benefitted from knowing and that would have saved us for a lot of work.
>
> Municipal project manager

The increasing network size and the internal complexity of developing the program along with the interrelatedness between the workgroups created difficulties in coordinating the activities and getting the information to travel fast enough within the network. Along with these formal communication channels, more informal channels emerged among the boundary spanners from the different workgroups. Several of the municipalities had representatives in more than one workgroup, and these boundary spanners exchanged information and knowledge about issues, discussions, and decisions in the workgroups. However, some of the municipalities were represented only in the implementation group, which afforded them a less advantageous position in regard to receiving information quickly.

The second implication of the network expansion was related to network complexity. As the network size increased, it became clear that the network could be characterized as a systemic network with separate organizations having complementary capabilities (i.e. hospitals, municipalities, and GPs), but it also consisted of embedded isomorphic networks of individual organizations with similar capabilities (i.e. the 11 municipalities, the four hospitals, and the 225 GPs). This similarity enabled the formation of coalitions internally in the network to

promote constituents' own interests and logic. For instance, the municipalities formed a coalition to oppose the hospital logic that initially dominated the program. The outcome, as earlier mentioned in Section 6.2.2, was that the program reflected a municipality logic in regard to how the different telemedicine tasks were organized. Furthermore, the isomorphic organizations collaborated more extensive than formally prescribed in the development of the program. For instance, the municipalities formed their own networks where they exchanged knowledge and experiences and discussed professional issues concerning the program from a municipal perspective. The isomorphic networks emerged as more informal supplements to the formal activities and workgroups in the development of the program. Similarly, the hospitals formed a network in which experience, knowledge, and clinical issues related to the program were discussed. However, the embedded isomorphic networks also revealed significant differences in the isomorphic organizations (e.g. hospitals that differed in size and in the organization of sub-domains). Moreover, it became more visible how the relations between the isomorphic organizations in the network were sometimes characterized predominantly by competition instead of collaboration. The example of the logistic task of delivering the telemedicine equipment illuminates how the two largest municipalities initially competed concerning the logistic task. Other examples of competing behavior among the isomorphic organizations were observed in the transformation phase, particularly in relation to the dominating organizations (respectively, the largest municipality and the largest university hospital) that were trying to maintain their dominating position. The network and the power balances within the network were in constant flux, though, as none of the actors had mandate or power enough to dictate the development of the program. As such, the behavior of the boundary spanners shifted between more collaborative or competitive behavior depending on the power balance and the interests at stake.

Overall, in the transformation phase the main boundary spanners changed from top managers to administrative and health professionals who represented the different organizations in the workgroups. In relation to this change in boundary spanners, the network rapidly expanded in size, and this expansion influenced the flow of information and knowledge, as well as coordination of activities in the network, became more complex and difficult. Informal channels of communication and knowledge exchange emerged to compensate for the sluggish speed at which information traveled through official channels. Furthermore, the network became more complex as differences between the municipalities, hospitals, and GPs were fully illuminated in the process of translating the vision into tangible objects and as internal differences became clear among the isomorphic organizations.

6.4.2. FLUCTUATING INNOVATION LOGICS

The transformation of the pilot innovation into a large-scale program can be characterized as an interorganizational innovation process in which telemedicine was (re)translated as a viable health service in a network of municipalities, hospitals, and GPs. According to Seemann et al. (2013), four different innovation logics can be used to describe innovation in interorganizational networks, depending on the actors' mental models and the perceived pressure applied by their own organizations. "The actors' mental models" describes whether the actors have a mono-professional or interdisciplinary orientation, whereas "perceived pressure applied by their own organizations" refers to whether the actors focus on protecting turfs and delivering on own the bottom line or focus on horizontal processes combined with delivering on their own bottom line. These possibilities create four distinct types of innovation logics: (1) *fragmented innovation*, where the actors innovate with a mono-professional orientation and with focus on protecting turfs and delivering on their own bottom line. The outcome of this innovation logic is innovation within one's own organization, but insignificant innovation at the network level; (2) *interface innovation*, where the actors have a mono-professional orientation but also focus on horizontal processes. The outcomes of this innovation logic relate to innovations that structure the interface between the organizations, along with interorganizational relations and coordination of activities. However, no substantial innovations at the network level are the outcome of this innovation logic; (3) *competing innovation*, where the actors have an interdisciplinary orientation but focus on defending their own turf and delivering on their own bottom line. The outcomes of this innovation logic are competing innovations at the network level, where actors are trying to dominate the innovations and promote their own logic to make the other network actors buy into that logic; (4) *systemic innovation*, where actors have an interdisciplinary orientation and focus on horizontal processes, as well as delivering on their own bottom-line. The outcomes are innovations at the network level, where focus is on collaboration and integration of knowledge and development of shared treatment concepts among the network actors (Seemann et al., 2013). The four different innovation logics may coexist and change according to a specific situation and over time. Correspondingly, the innovation logic is dynamic.

In the transformation process, the balance of the four different innovation logics fluctuated. The early transformation phase was characterized by an interdisciplinary orientation and focus on horizontal processes, since the two top managers' vision was to develop a telemedicine service in an interorganizational setting. Accordingly, said the project chief, the large-scale program was "created in a cross-sectorial setting and not as a project that one actor defined and got the other actors to buy in on." Their vision about development of a shared telemedicine service reflected a systemic innovation logic. However, this logic changed as the transformation process progressed. The boundary spanners in the workgroups

represented a mindset with a strong focus on delivering on their own bottom line and defending their domain, either by focusing on translating telemedicine according to their organizational logic and innovating within their organizational silo or by fostering their logic in the other network actors. Consequently, the innovation logic changed from a systemic innovation logic to a mix of a fragmented innovation logic and competing innovation logic. As a result of this change, the boundaries between the municipalities, hospitals, and GPs were predominantly reinforced instead of being remodeled. An explanation of the changing innovation logic may be related to the boundary spanners' formal position in their organization and their ability and power to act in the network. The two top managers had the formal and informal power to initiate change and to set the agenda within their own organizations, as well as in the organizational field. They could legitimate focus on interorganizational goals and allocate resources to pursue their vision of the telemedicine project, whereas the boundary spanners in the workgroups did not have formal or informal power within their organizations. Their mandate to act in the network stemmed from a strong focus on delivering on their own bottom lines. This focus was most visible in relation to the discussion of the economy, where the boundary spanners in the workgroups were pressured by demands from their own organization to minimize costs. Some of the municipal project managers in the implementation group expressed "frustrations about the competing demands from their organization and the program" (extract from observation notes, implementation group). However, due to their lacking formal power, they were not able to prioritize the goals of the program over their own organizational goals, which created the strong focus on own organizational demands and hence a fragmented or competing innovation logic.

6.4.3. FORMALIZING AND REGULATING COLLABORATION

During the transformation phase, the frames for collaboration became more and more formalized. Formalization of collaboration concerned the organization of the large-scale program's development, where an entire project organization was established. The project organization consisted of the steering group, the project secretariat, the four workgroups, and the associated existing formal cross-sectorial decision forums used to create legitimacy and commitment to the decisions concerning the program. The result of this formalization was a rather hierarchical structure in the program (cf. the dotted triangle in Figure 6.1) that coexisted with the non-hierarchical network structure.

As Figure 6.1 illustrates, a formalized structure for interorganizational collaboration characterized the organization of the program, which was supplemented by informal collaboration activities by which personal relationships between the different actors eased some of the collaboration processes. For instance, more

informal meetings between the two top managers, the project chief, and the chair of DMAN were used to discuss and negotiate alternative strategies for enrolling the final patients in the program. Similarly, informal, personal relations emerged among the boundary spanners in the workgroups, supplementing the formal activities of the workgroups.

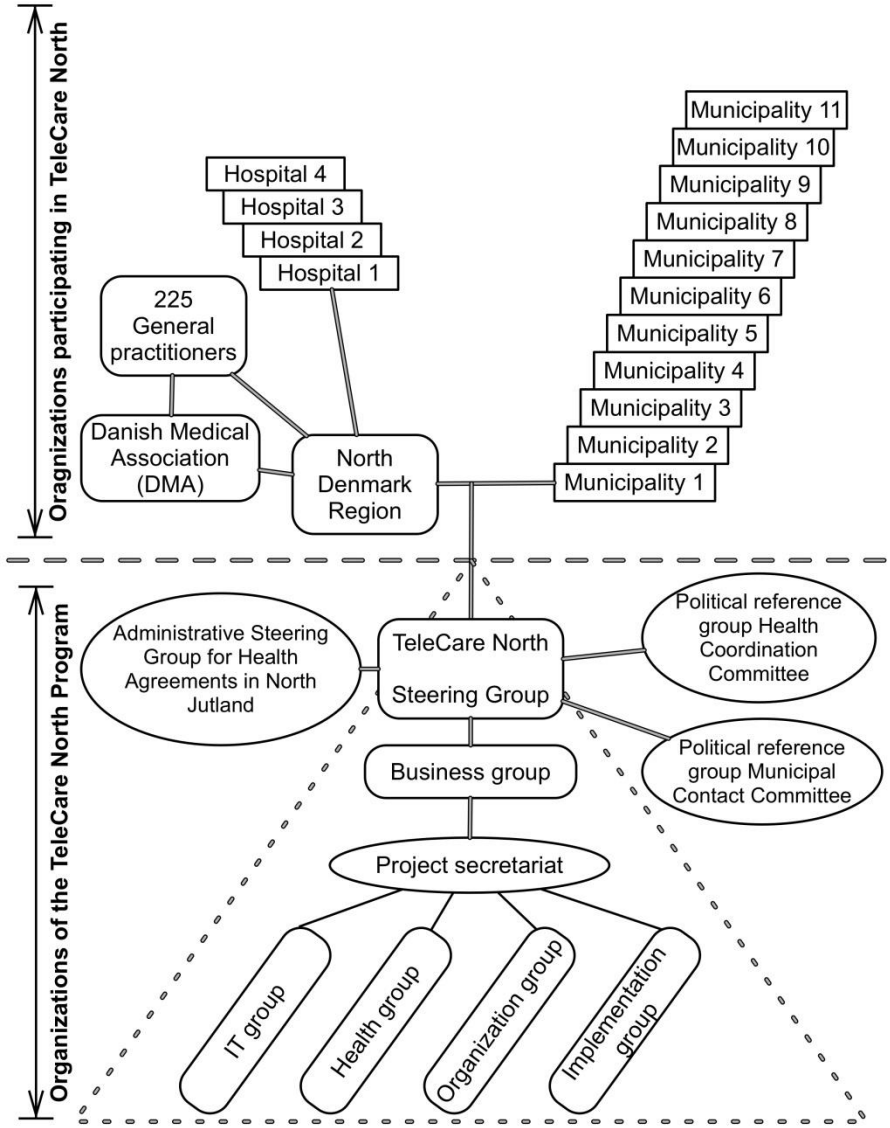


Figure 6.1: Formal organization of TeleCare North.

Another important indicator of the formalization in the program was related to the collaboration structures with the GPs. In the early transformation phase, the GPs were represented in the program through their quality unit and DMAN. Their participation relied on willingness to collaborate, and they lacked formal power to commit every GP in the region to participate in the program. Their strategies to ensure the GPs participation relied both on a formalized agreement that established payment to the GPs' for solving patient enrollment-related problems *and* on more informal activities where GPs were encouraged to participate (e.g. through newsletters, information meetings, etc.). However, the national conflict between the Danish Regions and the GPs created a difficult environment for collaboration. Formalization of the collaboration with the GPs was a challenging and lengthy process, but it was crucial to establishing a more formal collaboration agreement to get them engaged in the program. Despite the formal agreement, collaboration with the GPs was still difficult, as the agreement relied on the GPs' willingness to participate in the program participation was encouraged but voluntary. The result was a formal collaboration structure that was based on willingness to collaborate but without an obligation to collaborate.

Lastly, the outcomes of the workgroups included a high degree of formalization and regulation of the telemedicine tasks and collaboration at the operational level in the program. As a part of concretizing and filling in the details in the program, the workgroups produced instructions for solving the telemedicine tasks (e.g. monitoring of patient data), work flow descriptions, procedures for collaboration among the health professionals from the different organizations, scenarios for change in responsibility for monitoring the patient, and descriptions of new telemedicine roles (e.g., telemedicine health actor, telemedicine system administrator, etc.). This ordering of activities created a highly regulated interface (Brown, 1983) at the operational level among the network actors.

6.5. SUMMARY

The process of transforming the pilot innovation into a large-scale program contributes with different insights into the black box of the innovation process, which is often invisible in the official reports and stories about the large-scale program, TeleCare North. Unboxing this transformation phase demonstrates the *multiplicity of trust* and how it is built, maintained, and nurtured, but also how it can be malnourished and create suspicion and negative stereotypes. The sources of trust in the transformation phase were multiple, and constituted a mix of interpersonal and interorganizational trust among the network actors (both individuals and organizations) who were building on former positive experiences with collaboration and knowledge of each other. The trustworthiness of the two top managers and the trust between them, along trust in the business case, contributed to reducing

uncertainty related to the large-scale vision. This trust was maintained and nurtured by the NAO and the shared governance form, which created transparency in the network processes and in the decision-making. Trust building was further supported in the workgroups as they created arenas for boundary-spanning activities such as negotiations and for extensive interactions among the boundary spanners. This support facilitated the handling of the tensions and conflicts associated with the collision of different logics in the network. The outcomes of this extensive collaboration and negotiation included the involvement of the diverse actors and shared solutions, along with increased knowledge and recognition of each other's work methods, logics, and the conditions for participation in the program. In that sense, the workgroups arrived at an appropriate level of conflict that led to interorganizational bargaining and problem-solving. However, increasing distrust and the enforcement of negative stereotypes about the GPs was also part of this phase. A combination of external and internal dynamics facilitated the emergence of mutual distrust among the actors, along with the development of negative stereotypes. The GPs were perceived as a difficult—but necessary—professional agents to collaborate with, and this negative perception was enforced in this phase.

A second insight pertains to the *colliding logics* and how the associated tensions and conflicts were handled through extensive collaboration and negotiation. The boundary spanners represented different logics both in regard to their organizational affiliation (e.g. municipality or regional logic) and to their organizational position and educational background (e.g. health professional or administrative logic). The vision of telemedicine and the business case functioned to some extent as boundary objects that enabled collaboration across professional and organizational boundaries. However, when the vision was translated into more tangible objects, the interpretative flexibility of the vision as a boundary object significantly decreased. The novel telemedicine tasks and the associated telemedicine practice were rigorously defined, which left little interpretative flexibility. Without this flexibility, the differences among the logics and the connected work practices were fully illuminated, resulting in tensions and conflicts. Still, these strains on the actors' relationships were handled through extensive collaboration and negotiation in the steering group, project secretariat, and workgroups that facilitated arenas for interaction. The results of this collaboration were numerous compromises and truces, along with a shared acceptance of the solutions and increased knowledge of each other. Conflicts and tensions were not a hindrance but ensured the representation of divergent interests, goals, and logics, and the overall outcome was a program that merged the logics of the core actors.

Additionally, the innovation logic in the transformation phase was changing as a result of a stronger orientation towards the boundary spanners' own organizational domains, as compared to the initial orientation towards horizontal processes and development of shared telemedicine concepts. By the end of the transformation phase, the innovation logic was mostly characterized as a mix of fragmented

innovations and competing innovations, as the main boundary spanners in the workgroups mostly functioned as organizational representatives, with a focus on their own organizational goals and pressure for them to deliver on own their bottom lines.

Finally, the transformation phase demonstrated how the *network continuously evolved* as a result of internal and external dynamics. The structural characteristics of the network, such as of size and density, changed significantly in the transformation process as more boundary spanners became involved. Efficiently conveying information in the network became more difficult as the size of the network increased and its density decreased. This shift was enforced by the remaining centrality of the network, where the project secretariat controlled the flow of information, slowing it. Besides these changes in some of the structural properties in the network, other changes concerning the processes in the network also occurred in the transformation phase. These changes were initiated by the formalization of the program's organization, which created a hierarchical decision-making structure that coexisted with the non-hierarchical network structure, where willingness to collaborate and negotiations functioned as integrative mechanisms. Consequently, a complex and lengthy decision-making processes characterized the transformation phase, as exemplified by the decision about who should be responsible for the logistics of delivering the equipment to the patients' homes.

CHAPTER 7. LARGE SCALE (2013–2015)

The large-scale phase covers the period during which the TeleCare North program was implemented and translated into practice. The outcome of the efforts to translate the vision for the program into tangible objects, in the prior phase, was a "ready-to-implement" telemedicine concept for COPD patients termed TeleCare North (see Section 4.2), with the municipalities as the main actors. Yet, this "ready-to-implement" concept did not stabilize the network in any sense; the network continued to evolve according to different internal and external dynamics. Continuing struggles over domain and collision of logics remained evident in the network, as did (dis)trust among the network actors continue to influence collaborative practice at the operational level. Moreover, the orientation towards one's own organizational domain was enforced in this phase. After a phase with a strong focus on co-innovation, a substantial shift in orientation towards co-exploitation in the telemedicine network marked the transition to a new phase deemed "large scale." This shift included further expansion of the telemedicine network, decentralization of activities and (to some extent) decision-making, and a stronger orientation towards efficiency and towards return of costs in members' own organizational domains.

More concretely, the frontline staff, that is the nurses and doctors who performed the telemedicine tasks (e.g. monitoring patients' data, reacting to the data, and adjusting care and treatment based on the data), became the main actors in operating the program. Correspondingly, the activities were *decentralized* and decisions were made in the day-to-day routines of the health care organizations (see also "Does Telecare Improve Interorganisational Collaboration?"). Nevertheless, the steering group still governed the program, and the project secretariat still coordinated joint activities and controlled the overall information flow. The workgroups were still active in relation to adjustment of the program, although their role was relatively subdued. Lastly, focus on "exploiting" the novel telemedicine program to harvest the expected savings was more pronounced in this phase. This change of orientation in the network also effected collaboration patterns, trust among the actors, and conflicts in the network, though, as further elaborated in Section 7.1 that elucidate how telemedicine effected the work practices of the various health professionals in the network.

7.1. CHANGE OF PRACTICES AND EMERGENCE OF A TELEMEDICINE LOGIC

As Nicolini (2006) notes, technologies such as telemedicine carry *"with (and within) them traces of their history. Accordingly, all technologies embody the intentions, desires, and views of those who created them; by the same token, they reflect a particular way of understanding the world and formulating and solving problems"* (p. 2755). Since the content of the telemedicine program relied on a hospital logic and the main actors who operated the program were the municipal actors, different challenges arouse when translating the program into practice. Telemedicine required another way (i.e. a hospital-oriented way) of understanding assessment, care, and treatment of the COPD patients. Interpreting and assessing the patients' data from the telemedicine monitoring database required that the nurses had more specialized knowledge about COPD and symptoms, and commonly involved the exercise of professional discretion. Reacting properly to the patients' data was perceived as a difficult task, since it relied only on the core data and not on a holistic assessment of the patient, based on for example the patient's appearance, as would be visible in face-to-face interaction (see Nicolini, 2007, Oudshoorn, 2008, or Pols, 2012, for more about implications of care at a distance). The regional project manager who was a specialized COPD and telemedicine nurse explained how telemedicine required new competencies in regard to assessing the patient's condition from a distance:

> Communication with the patients is different when it is through telemedicine since we communicate with them on the phone; we can only rely on our auditory sense and not our other non-verbal senses.
>
> Regional project manager

This requirement of specialized competencies and another form of assessing the patients' condition challenged the municipal nurses without special training in COPD (cf. "Does Telecare Improve Interorganisational Collaboration?") even though they received education and training in this domain.[10] Moreover, as the project manager indicates, telemedicine reconfigured the involved health professionals' practices by disembedding care and interaction with the patient in

[10] Educational and training activities were developed as a part of the large-scale program. The implementation group was responsibility for developing these activities and carrying them out. Different educational activities targeted health professionals assigned to the telemedicine tasks to upgrade their knowledge of COPD, of the vital signs being measured, and of the TeleKit equipment. Other educational activities targeted health professionals more broadly to enhance their knowledge of welfare technology (including telemedicine) and the TeleCare North program (TeleCare Nord, 2015).

time and space. Surprisingly, reconfiguration of these practices did not consist of alignment or adoption of a hospital logic. Instead, a tentative *telemedicine logic*[11] was emerging, with focus on empowerment, involvement, and activation of the patients at its core, along with emphasis on vital signs. The focus on empowerment, involvement, and activation of the patients actually reflected a health center logic, since the health centers' core tasks in relation to COPD were rehabilitation programs where the patients exercised and gained knowledge about their disease, symptoms and how to live with it. This approach corresponded with the program's aim to empower patients through telemedicine. A health center nurse in a municipality explained how the telemedicine program corresponded to the rehabilitation programs:

> We (in the health center) talked about how great it would be if every one of our patients in our COPD rehabilitation programs also got the TeleKit because this [the TeleCare North program] could be a part of the education [about COPD, symptoms, and how to live with their disease] in our rehabilitation programs. Yeah, actually our rehabilitation program and the TeleCare North program fit perfectly together.
>
> Health center nurse, municipality C

Similar statements were made by the other health center nurses who were interviewed or observed at the operational level. Therefore, the novel telemedicine program reflected to a large degree a health center logic and was easy to integrate as a meaningful supplement to their rehabilitation programs, as evidenced by another health center nurse:

> We use the patients' monitoring data in our conversations with the patients at our rehabilitation programs. We use it as a tool to talk with the patients [about their current condition] and use it as an integrated part of our rehabilitation work with these patients.
>
> Health center nurse, municipality A

This health center logic differed from the district nurse logic that reflected a more traditional and paternal nurse logic (Cody, 2003), where "nurses are good at giving answers but not as good at letting the patients reflect themselves and come to the

[11] As mentioned, the concept "logic" is used with inspiration from Scott et al., 2000; Thornton & Ocasio, 2008. However, it goes beyond the scope of this dissertation to examine this "emerging telemedicine logic" rigorously (e.g. including meaning systems) from an institutional theoretical perspective (Thornton & Ocasio, 2008). Instead the term 'emerging telemedicine logic' is used in a more pragmatic way, similar to the way the term "logic" is used in the Chapter 6.

answers—you know to create patient empowerment," as the regional project manager explained. This change of logic and approach to the patients was recognized as a challenge for the district nurse units in the workgroups (particularly the organization group and implementation group); it was also recognized by the frontline nurses, as could be observed in a meeting of the implementation group:

> The local project managers discuss how the district nurses have to learn to let go of the patients. Traditionally the district nurses solve the problems for the patients and take care for them but now they have to let the patient do it themselves and facilitate patient empowerment. This is something they are used to do in the health centers in the municipalities but not at the district nurse units.
>
> Observation notes, implementation group

As these different examples demonstrate that the telemedicine program corresponded with a health center logic combined with explicit focus on vital signs, that is, a hospital logic. In that sense, the emerging telemedicine logic in relation to the program was a hybridization between a hospital and health center logic. Paradoxically, the majority of health centers in the municipalities declined to participate in the program (see Section 4.2), as they perceived telemedicine to be a health service that belonged to the district nurse unit. Presenting an example of this perception, one of the municipal project managers explains why their health center was not part of the program:

> Our health center declined to be part of this program. They don't think that the program concerns their citizens [patients] (…). Maybe we can get some advice or professional feedback from their COPD nurse, but they won't be a part of the program and monitor data or perform any of the other telemedicine tasks.
>
> Municipal project manager

Accordingly, the health centers that represented this viewpoint conceived telemedicine as something outside their domain; instead, telemedicine was understood as home care services that belonged to the district nurse units, even though telemedicine was more easily aligned with a health center logic and practice. The result was that telemedicine was translated rather differently in the municipalities, a result that manifested in the three different municipal organizational setups (see Section 4.2) of which the district nurses units of all municipalities (except one) were part.

7.1.1. MISALIGNMENT WITH THE GPS' PRACTICE

The GPs expressed how the telemedicine program was misaligned with their existing practices and logic. One of the GPs explained how the telemedicine program collided with their more individual-centered approach to the patients:

> We kind of move away from our more individual-centered approach where we know each patient personally and how the patient reacts on his or her symptoms. And now in the telemedicine program you have these threshold values [for the different vital signs] that define when to intervene instead of looking at the patient's overall condition and using our knowledge about how this patient normally reacts. Some patients are quick to react to changes, whereas others wait until the last minute, and then when they call, well, then we know that something is really wrong.
>
> GP

The telemedicine concept in the program gave instruction for actions visible in relation to the threshold values. General threshold values were set with default values for the patients,[12] but the GPs or lung physicians were able to change these values and individualize them to each patient if necessary. Whenever a measurement of the vital signs was below or above the threshold values, a yellow or red alarm would be visible in the monitoring database, signaling that assessment of the patient's condition and whether to intervene or not was required. This task was performed by the municipal nurses in most cases, but it still effected the GPs, as GP quoted above demonstrates, since the municipal nurses contacted the GPs in relation to a yellow or red alarm or requested the patient to contact his or her GP. However, this emphasis on threshold values and vital signs collided with the GPs' individualized approach, where prior knowledge about the patient's reaction patterns and the personal relationship with the patient were more important when assessing the patient and deciding upon the right intervention. Further to this narrow focus on vital signs, the expectations enforced by the concept of telemedicine collided with the GPs' logic in another matter. The GPs were used to the patients coming to them when experiencing worsening in symptoms, seeking medical advice, adjustment of treatment and so forth. However, telemedicine was designed so that the health professionals could monitor the patients and react if the patients' condition worsened or promised to worsen. This approach was completely different from the GPs' usual, more passive and reactive approach to patients; telemedicine required that the health professionals be proactive, reaching out to the

[12] The threshold values were defined by the health group and reflected "normal" values for COPD patients. Accordingly, these threshold values were not similar to "normal" values for healthy individuals.

patients, rather than the other way around. This passive and reactive approach is described by one of the GPs:

> So I expect and trust that the patients contact me if they need help—both in relation to the TeleCare North program and more generally in relation to how we GPs work; we don't do outreach work. We sit here [at the clinic] and then the patients come to us (...) So I am not checking their monitoring data myself, but the patients can tell me about them, if they like.
>
> GP

This expectation to execute proactive outreach did not correspond with how the GPs worked. Similarly, the movement away from a more individualistic approach was misaligned the GPs' practice. Correspondingly, none of the GPs changed how they treated the patients or their other work in relation to these patients. Says one GP,

> There have been no changes at all in my work [after implementation of telemedicine] (…). The way the telemedicine program is designed [in regard of the division of labor] the nurses in the municipalities monitor the patients' data (…) No, I actually don't think it makes any difference [if we see the patients' data] because we know our patients with very severe COPD quite well—we know who calls immediately when they have any symptoms and who calls when it is deadly necessary and who we need to see in the clinic before they start medical treatment and who start the treatment themselves. Yeah, and often you can hear it in the phone how bad they are. So no I don't think telemedicine makes a difference in that sense.
>
> GP

An explanation of this resistance to telemedicine-oriented change in work practice was the GPs' highly autonomous profession (Abbott, 1988; Freidson, 1988), combined with the division of labor in the program; the GPs still had the power and position to continue their work as usual, uneffected by the telemedicine program, and since the program neither directly benefitted the GPs nor aided in any of their tasks, their motivation to use the program was rather low.

7.1.2. LACKING UTILIZATION IN A HOSPITAL SETTING

Similarly, the hospital staff was relatively uneffected by telemedicine. The most obvious explanation of this minimized impact was that the hospitals monitored only

few patients. From the perspective of the hospitals, the enrolled patients were either too well to be monitored by the hospitals or too ill for the hospitals to have any role.[13] One of the lung physicians explained how the enrolled patients did not resemble the patients that were normally hospitalized or receiving oxygen treatment:

> In my opinion most of the patients [in the program] are not hospitalized, so actually the program doesn't really effect the hospitals (…). We lack participation of the patients with very severe COPD who actually may be the ones who would benefit most from the program.
>
> Lung physician, hospital X

As a consequence, the hospitals played a marginal role in the program at the operational level (Christensen, 2016a, 2016b), and telemedicine was "not at all integrated in [their] work," according to one hospital nurse (from hospital Y). Another interpretation of this lack of impact was that the developed telemedicine concept was difficult to utilize according to the goals of the TeleCare North program at the hospitals, despite the fact that the content in the program reflected a hospital logic. The goals for the hospitals were to reduce hospitalization (through the municipalities' and GPs' proactive behavior, which presumably would prevent hospitalizations); reduce the length of hospitalizations by discharging the patients earlier and monitoring them at their home through telemedicine; reduce re-admissions through monitoring the discharged patients to prevent relapses; and, finally, reduce control visits at the outpatient clinic (TeleCare North, 2012). However, telemedicine was not utilized to reach these goals; that is, telemedicine did not replace any of the existing activities at the hospital, which prohibited realization of the shared network goals. This failure was reflected in the health-economic effects, where the findings revealed extra costs related to telemedicine compared to conventional treatment, except for one patient subgroup (patients with severe COPD, group III according to the GOLD guidelines) (see also Udsen, 2015, for more about the health-economics effects). One of the reasons for this lack of utilization of telemedicine was that the concept of telemedicine was not designed to establish substitutes for existing activities. For instance, telemedicine was unable to replace control visits according to the regulations from the Danish Health Authority, as one of the lung physician explained:

[13] Although hospital staff perceived the enrolled patients to be too well, the baseline measurements from the RCT reveal that 56% of the enrolled patients have severe or very severe COPD (Groups III and IV, according to the GOLD classification of severity) (Christensen, 2016b; TeleCare Nord, 2015)

> The Danish Health Authority has some guidelines for control visits which, for instance, involve control of the patients' inhalation technique (…) so you have all these different requirements to a control visit telemedicine cannot replace.
>
> Lung physician, hospital Y

This example also demonstrates how the telemedicine program was embedded in a highly institutionalized and regulated field which constrained how much could be changed without violating national regulations and requirements for treatment. In another example, one of the hospital nurses explained how the patients' telemedicine data were misaligned with the knowledge needed in the outpatient clinics:

> The way we work here at the outpatient clinic, well the decisions are based on a current measurement of the patient's vital signs—for example decisions about oxygen treatment—and not based on prior measurements [conducted by the patients at home with their TeleKit].
>
> Hospital nurse, hospital Y

Thus, although hospital staff was involved in developing the telemedicine program, the program was not useful in replacing activities in the outpatient clinics. This limitation led to an unsuccessful translation of telemedicine at the hospitals, where it was *"silently ignored"* (Nicolini, 2006, p. 2757).

Another and more subtle reason may also explain the hospitals' lacking utilization of telemedicine as a replacement of some of their activities: a lack of trust in telemedicine. Although none of the interviewed hospital staff directly articulated this lack of trust in the technology, more subtle uncertainties and doubts about telemedicine as a substitute for some of the activities (particularly in relation to control visits at the outpatient clinics) were expressed in the various interviews and observations, as well as at a meeting between the four hospitals. In that sense, telemedicine resembled a rather novel technology that was yet to be translated into practice to replace activities. The novelty of the technology also meant that trust in it still needed to be established, even though telemedicine as a concept, and the TeleCare North program as an instantiation of this concept, was justified and legitimated through various activities (see "Launching a Large-Scale Telemedicine Program" for more about legitimation of the program). Building trust in the technology seemed particularly important at the hospitals, since telemedicine was supposed to replace some of their existing activities, whereas, in contrast, it was more like a supplementary health service in the municipalities. The regional project manager indicated this lack of trust in telemedicine in the following passage from an informal interview in relation to a meeting between the four hospitals:

> The regional project manager says that the lung physicians at the different hospitals disagree about what is perceived as sound professional practice in relation to telemedicine. For instance, they disagree about whether oxygen treatment can be terminated by relying on telemedicine or not. Some of the lung physicians fully support termination of oxygen treatment by the use of telemedicine, whereas others totally reject that telemedicine can replace physical controls.
>
> Observation notes, meeting between the four hospitals

This disagreement was also reflected in the interviews with the two lung physicians, where one perceived telemedicine an alternative to physical visits in relation to the termination of oxygen treatment, whereas the other still believed that a physical visit was necessary, since "you know, there is a reason to be treated with oxygen—and that is the disease that causes it [COPD] and that [the disease] still needs to be checked properly [at a physical visit]" (lung physician, hospital Y). Another example of how telemedicine was perceived as insufficient to replace the existing activities was expressed by one of the hospital nurses, who expressed a slightly different focus:

> No, I don't think [we are replacing control visits with telemedicine]. A lot of the patients are happy to come here—even though we don't change anything with their treatment—but, you know, that they come here and are checked, and are told that nothing has worsened since the last time—that means a lot for them. So no, I don't think we should start to cancel their visits [even though the telemedicine shows that they are on a stable course].
>
> Hospital nurse, hospital X

This nurse did not regard telemedicine as a suitable substitute for physical visits in the outpatient clinics, since telemedicine did not, in her opinion, reassure and comfort the patients as a physical visit would. Correspondingly, it can be argued that her trust in telemedicine as a substitute for control visits was yet to be established. Interestingly, the same nurse actually changed her mind when she was re-interviewed a year afterward:

> If the patients have oxygenated really well and their vital signs have been good over a longer period, well then we might replace the physical visit with a short phone call. A lot of them struggle with shortness of breath and coming here can be a real challenge, so if we could replace it [based on the patient's measurement] by a phone call it would make it easier for the patients.

Hospital nurse, hospital X (re-interview)

This change of mind could be the result of positive experiences with the technology over time, and hence a process-based building of trust in telemedicine. Yet the nurse had no actual experiences with replacement of the physical visits based on the telemedicine data. Although telemedicine was a technology (and a concept), minimal use of telemedicine could be interpreted as lacking "competence trust" in the technology (Newell & Swan, 2000). The interpretation indicates that trust in technologies presents an important dimension of trust to investigate in seeking to understand the uptake of technologies.

In summary, this section demonstrates, by zooming in on each network organization, how a telemedicine logic was emerging as a hybridization between a health center logic and hospital logic, with a strong orientation towards empowerment and rehabilitation along with focus on the patients' vital signs. Still, telemedicine and hence the emerging telemedicine logic effected the health professionals to varying degrees, depending on the role of the health professional in the program and the extent to which these professionals could align telemedicine with their own practices. At one pole, the municipal nurses were highly effected by telemedicine, as they were the main actors in regard to the monitoring of the patients' vital signs. In particular, the district nurses in the municipalities were challenged as telemedicine (and the emerging logic) collided with their usual practice and approach to the patients, whereas it was easier to align practice with telemedicine at the health centers, since telemedicine corresponded and supplemented their existing work with this patient group. At the other pole, the GPs and the hospital staff were relatively uneffected by telemedicine. Since telemedicine was perceived as a movement away from the GPs' more individual-centered approach to the patients, nearly no change in the GPs' practices or approach to the patients was detected. The GPs continued "business as usual" uneffected by telemedicine, as enabled by their relatively withdrawn role in the program and their dominant position as a medical profession with a high degree of autonomy. Similarly, hospital staff was largely uneffected by telemedicine, partly because of their marginalized role in the program. According to the hospitals, the enrolled patients were too healthy for the hospitals to have a role in their telemedicine treatment; however, more thorough analysis of the data suggests that telemedicine was not designed to substitute the activities performed at the hospitals. Additionally, it appeared as if telemedicine had yet to prove its worth in practice, and trust needed to built into the technology before it could function as a replacement for activities in the hospitals. Overall, these findings demonstrate how a telemedicine logic was emerging even though it was not fully crystalized. Correspondingly, telemedicine was translated differently into practice: from modification of existing practice to non-use. These findings represent an organizational level from the perspective of each network actor (i.e. respectively the municipalities, hospitals, and GPs), and in this phase these perspectives create a

context for understanding collaboration at the operational level, as well as network dynamics.

7.2. FORMALIZING COLLABORATION

Telemedicine partly reconfigured the interorganizational relations and collaboration among the different health professionals from the municipalities, hospitals, and GPs. In "Does Telecare Improve Interorganisational Collaboration?" changes in interorganizational collaboration are analyzed by investigating changes in dependence structures in the telemedicine network. As the article demonstrates, the municipal nurses are more dependent on medical expertise, hence on the GPs and hospital staff, than the other way around, which forces them to initiate and maintain collaboration. Changes in collaboration within the telemedicine network were not limited to the changes identified in that article, though. The next section explores how collaboration at the operational level within the network was reconfigured due to telemedicine, specifically in terms of formalization of collaboration at the operational level.

An outcome of the prior work in developing the program was detailed descriptions of division of functions and roles among the divergent health professionals (and their respective organizations), along with instructions for communication between the different health professionals. These descriptions and instructions presented a continuation of how functions and roles were normally divided among the municipalities, hospitals, and GPs. Correspondingly, the GPs were the gatekeepers, the "case managers," and had the medical responsibility for patients (except for when they are hospitalized); the hospitals were (medically) responsible for the patients in case of hospitalizations or specialized treatment (e.g. oxygen treatment) and monitoring of the most complex patients; and the municipalities were responsible for monitoring patients in a stable COPD course, which characterized most of the enrolled patients. Furthermore, communication channels and information flow reflected how the municipal actors, hospital staff, and GPs normally communicated on technical interfaces used to communicate (e.g. the electronic communication system termed "Edifact"), through procedures for communication (e.g. using the discharge summary), and down the "lines of communication." By following the "lines of communication," most correspondence between municipalities and hospitals travelled through the GPs, except when the patients were hospitalized, in which cases the hospitals and municipalities could communicate directly. A consequence of these pre-existing "lines of communication" were that the GPs functioned as intermediaries and thus had central positions in mediating communication between hospitals and municipalities, and the municipalities were particularly highly dependent on the GPs due to this organization of the "lines of communication." One of the lung physicians described

this formalized way of communicating among the health professionals at the operational level in the telemedicine network:

> We don't get a direct communication line with the municipality [in the telemedicine program] so we do as we normally do when we discharge a patient; we send a message to the municipality that the patient is being discharged to his or her home and is starting up telemedicine—and that suits us well. But the other way around, the municipality is not given direct access to us. Their information is mediated by the GP (…). The municipal district nurse has to communicate with the GP and not the hospital, and we have to continue with this hierarchical system of communicating—otherwise we will get too much useless input [from municipal nurses].
>
> Lung physician, hospital X

This physician's explanation demonstrates the highly formalized and regulated forms of communication among the different health professionals and how these remained rather unchanged despite implementation of telemedicine.[14] It was thus no surprise that the health professionals still complained about the same challenges of interorganizational collaboration as before telemedicine, for example lacking information flow among the health professionals (see "Does Telecare Improve Interorganisational Collaboration?"). This consistency in complaints was also a consequence of the sequential flow of activities among the different health professionals in the network (Alter, 1990; Thompson, 1967). One of the municipal nurses described how this formalized sequential collaboration structure prolonged the decision-making process when responding to changes in the patient's condition:

> The procedure is long—from when we discover a decreasing oxygen level to when we contact the GP and the GP assesses the patient and sends a referral to the hospital (…). Well, it often takes 14 days.
>
> Health center nurse, municipality A

[14] Moreover, the above quotation illustrates the well-known boundaries among the different health professionals, which was visible in relation both to intra-professional divisions between generalists and specialists (among both nurses and doctors) and to inter-professional differences between nurses and doctors (Abbott, 1988; Antoft, 2005). Such demarcations within and between the different professionals in the telemedicine network were most visible between hospital nurses and municipal nurses and between GPs and municipal nurses (for more on these divisions, see "Does Telecare Improve Interorganisational Collaboration").

However, the time-factor was often important when preventing hospitalizations and exacerbations for COPD patients, and the formalized collaboration structures prohibited fast response and more flexibility in working across the organizations in relation to this patient group. So, although these formal descriptions clarified the division of functions, roles, and responsibilities and "lines of communication" in the network, they also constrained collaboration among the health professionals, as the interface and arena for collaboration became too regulated and formalized (Brown, 1983), constraining flexibility in problem solving and shared decision-making. The result of these highly formalized horizontal collaboration structures was that decisions were made individually by the actors and relied on a "silo" mentality, with each individual focusing strongly on their own organizational domain. Joint decision-making and focus on the shared telemedicine tasks were limited, resulting in a mono-organizational utilization of telemedicine where the day-to-day operation of the program happened independently of the other network organizations and according to a sequential collaboration logic.

Moreover, the emergence of informal collaboration activities was constrained due to the (over)formalized collaboration structures. Yet, in some instances, informal collaboration activities co-existed with the highly formalized structures, one hospital nurse attests:

> Many of the district nurses in the municipality—at least in the [municipality we collaborate most with]—have been working here at the lung ward (…). Our contact with the district nurses is great—if we are uncertain about something, we just call them, and if they are uncertain about something with a patient who recently has been discharged, they call us (…), and often we find a solution much easier this way, when we call each other instead of going through the GPs or the electronic message system."
>
> Hospital nurse, hospital X

Informal collaboration activities (i.e. boundary-spanning activities), such as phone calls, functioned as a supplement to the formalized collaboration structures in the program and smoothed collaboration. These informal collaboration activities relied mostly on pre-existing relationships among the actors, though. Through these pre-existing relationships, interpersonal trust was established, which seemed particularly important since no arenas were available for (physical) interaction and the building of relationships and mutual knowledge about each other's competencies and functions in the program. This lack of a physical venue influenced the building of interpersonal trust among the health professionals, as is elaborated in Section 7.4.

Although the horizontal collaboration structures at the operational level in the network were highly formalized, the vertical collaboration structures between the

strategic and administrative level and the operational level in the network were limited. As demonstrated in the prior phase, the telemedicine network relied on a comprehensive network organization and a rather hierarchical structure. However, collaboration between the strategic and administrative level and the operational level in the network seemed restricted, and vertical collaboration structures in the network were non-existent. Consequently, the two levels in the network were rather disconnected, and it was difficult to govern the day-to-day telemedicine activities and secure a network orientation among the boundary spanners at the operational level from the strategic and administrative level. Instead adjustment of activities and daily operation of the telemedicine program were managed and governed predominantly within each network organization, according to a mono-organizational logic. Accordingly, feedback mechanisms between the strategic and administrative level and the operational level in the network remained absent, and it was difficult for the steering group and project secretariat to adjust the use of telemedicine in the network organizations to follow a more network-oriented approach.

7.3. CONFLICTS AT THE OPERATIONAL LEVEL

According to Alter and Hage (1993), conflicts in interorganizational networks increase when the networks are large and highly differentiated, when they solve complex tasks, and when they are highly regulated through external control. Applying this insight to the telemedicine network, it is unsurprising that conflicts among the various boundary spanners occurred commonly, since the telemedicine network increased significantly in size as the program was implemented, it was highly complex, it involved various interrelated tasks, and it was performed in a functionally differentiated network by specialized health professionals. Formalization of the network structure (see Section 6.4.3) and formalization of collaboration structures among the health professionals created over-organized interfaces (Brown, 1983) between the municipalities, hospitals, and GPs, which constrained flexibility and the emergence of more informal boundary-spanning activities. Moreover, the telemedicine network was embedded in a highly institutionalized and regulated field with a high degree of external control and national legislation.

Prior studies concerning the Danish health care system have documented continual conflicts between the three core health providers—municipalities, hospitals, and GPs—regarding domain, technology, culture, and professions (Seemann, 1996; Seemann & Antoft, 2002); international studies also identify conflicts around similar issues (e.g., Abbott, 1988; Denis et al., 1999). Conflicts at the operational level in the telemedicine network revolved around these issues as well, a reflection of the ongoing collision of logics, particularly the municipal logic versus the

hospital logic. Collision of these logics manifested in various ways at the operational level. For instance, a recurrent conflict concerned disagreements about assessment of when the patients' conditions required hospital intervention, which reflected a general conflict about division of responsibility and criteria for assessment. This disagreement appears the municipal actors' and the hospital actors' perspectives, respectively:

> We [in the health center] find it strange that the patients can be hospitalized several times and that the hospitals still don't take the responsibility of monitoring these patients.
>
> Health center nurse, municipality C

> One of the lung physicians explains: "The assessments [of the patients] from primary sector are always very different from the assessments from secondary sector. The municipalities cannot understand that the hospitals don't monitor the most severe and the terminal patients, but the hospitals cannot do any more for them.
>
> Observation notes, Meeting between the four hospitals

Similar disagreements about tasks, assessments, and responsibilities were also observed in regard to the GPs. Such disagreements about placement of responsibility and tasks in relation to the patients were typical conflict manifestations that reflected the actors' divergent logics. However, none of the actors articulated these disagreements and confronted their collaborating partners with their dissatisfaction. Consequently, nothing was done to resolve these types of conflicts, and dysfunctional conflicts ensued in which the status quo was maintained through an interaction pattern that most closely resembled "interorganizational isolation" (Brown, 1983). This isolation was enforced by the actors' orientation towards their own organizational domains.

Conflicts over domain and jurisdiction presented another significant issue in the network. The implementation of new technologies, such as telemedicine, may create disturbances in existing power relations between professions and within systems of professions (Abbott, 1988). Such disturbances were particularly evident in the network in regard to the collaboration between the municipal actors and the GPs. In virtue of the municipal nurses' central position in the network, their specialized knowledge about COPD, and their close monitoring of the patients' condition, they were able to challenge the GPs' medical authority and question their the choice of treatment and assessments of patients' conditions (see "Does Telecare Improve Interorganisational Collaboration?"). From the municipal nurses' perspectives, such questioning of the GPs' work concerned different issues. First, the design of the monitoring system stipulated that the municipal nurses react on measurements beyond the threshold values. For example, a vast number of the enrolled patients had hypertension, which was discovered in relation to the regular

blood pressure measurements in the program. These hypertensions created "red alarms" in the monitoring system, necessitating some form of intervention by the municipal nurses. Often, they asked the patient to contact their GP, or they contacted the GP themselves. However, these inquiries from the municipal nurses were in several instances perceived as clinically irrelevant by the GPs, since they were already aware of the issues in these inquiries and had initiated treatment of the hypertension. One of the GPs' explained how she was annoyed by this questioning:

> Well, we just get annoyed when their [the municipal nurses] questions create extra work—and when we have to explain why we do as we do. That we have to explain that this patient actually is sufficiently looked after in regard to his blood pressure. The patient has been admitted at the hospital and is being treated for it—there is nothing more to do (…). For me it is extra work when I have to discuss it and explain what we did and why to a [municipal] nurse.
>
> GP

The GPs' medical authority was challenged in that their work was questioned and they had to justify their choice of treatment. However, from the municipal nurses' perspectives, these inquiries were not a matter of questioning the GPs' work; instead, they were practical matters, since the blood pressures created red alarms in the monitoring system, to which the municipal nurses had to react. One of the municipal nurses described how these continuing red alarms disturbed her work and how the GP refused to adjust the threshold values:

> I've been in contact with the GPs to get the threshold values adjusted for two of my patients since their blood pressure are high in general, but they refuse to do it. And when I ask more about it, one of the GPs answers, "Well the blood pressure is just high for this patient and it's fine," but when I ask whether we can adjust the threshold values to this so I can get rid of the red alarms, the GP just refuses.
>
> Health center nurse, municipality C

This municipal nurse contacted the GP to remove the red alarms in the monitoring system, since they continuously created meaningless extra work for her; if the GP assessed the patient's blood pressure to be acceptable, it is fruitless for the municipal nurse to interpret the blood pressure every week (as required in the case of a red alarm). Accordingly, her inquiries concerned more practical matters, not a fight over domain, despite that the GPs perceived it as such. Moreover, the quotation demonstrates that the GPs' dominant position in the network was maintained by the existing formal authority structures (e.g. in relation to formal responsibility for treatment and diagnosis, including adjustment of the threshold values).

Still, the municipal nurses' inquiries did not concerning solely practical matters relating to the design of the monitoring system. In other instances, the inquiries did reflect low trust of the GPs' treatment of the patients, and thus a more subtle questioning of the quality of the GPs' work. One of the municipal nurses described how the municipal nurses sometimes acted as controllers of the GPs and how they had to remind the GPs about various tasks:

> We become a kind of nannies—you know, we observe that something is missing [in regard of the treatment] and then remind them about it. And it is like that in general in the district nurse units—we remind the GPs about different things.
>
> District nurse, municipality A

Hence, some of the municipal nurses were uncertain about the quality of GPs' work, leading to reminders and suggestions about other treatment plans or diagnoses to the GPs; this kind of interaction created domain-centered conflicts (see "Does Telecare Improve Interorganisational Collaboration?"). The GPs mostly responded to such attempts to gain more influence by "silently ignoring" them and maintaining practice as usual, which was possible because of their dominant position compared to the municipal nurses. One of the GPs explained how he maintained the medical autonomy related to his position:

> Well, I would refuse to refer a patient with an arterial puncture based on a municipal nurse's request; I would do the assessment myself. There could be a lot of other reasons for a worsened condition—it could be cardiologic reasons or something else.
>
> GP

As the quote demonstrates, the GPs' dominant position in the network enabled them to resist the municipal nurses' attempts to influence their work. These conflicts over domain were most often visible at the interface between the municipalities and GPs.

Overall, the implementation of telemedicine reinforced recurring conflicts among the network actors in regard to assessment criteria and domain. The conflicts resembled the network actors' divergent logics, which continued to collide as in the prior phase, along with inter-professional conflicts over domain. Contrary to the prior phase, these conflicts were not resolved due to the actors' non-confronting behavior, accompanied by a lack of interaction arenas, and hence an insufficient conflict level. Since the formal collaboration structures were designed according to a sequential collaboration logic, the collaboration among the health professionals consisted primarily of (digital) information delivery without mutual knowledge exchange or direct interaction, which constrained conflict resolution and thus the establishment and maintenance of trust in the network.

7.4. BUILDING OF TRUST WHEN USING DIGITAL ARENAS

Since the formalized procedures for interorganizational collaboration in the program relied on a sequential collaboration logic, there seemed no need for arenas for physical interaction; the digital arena that was constituted by their electronic message system and the shared access to the monitoring system was perceived to be sufficient to enable interorganizational collaboration. However, this digital arena for collaboration and the shared access to the monitoring system created distrust between hospital nurses and municipal nurses; the continued use of the mono-organizational electronic records to register the interventions in relation to measurements below or above the threshold values created mutual distrust and suspicion about whether or not appropriate actions were taken to intervene when the patients' measurements were below or above the threshold values, as demonstrated "Does Telecare Improve Interorganisational Collaboration?" Hence, the monitoring system, as a boundary object, reinforced existing boundaries and constrained collaborative efforts, since it fostered distrust among the health professionals. A municipal nurse and a hospital nurse, respectively, demonstrate this mutual distrust about the counterpart's ability to react to measurements outside the threshold values:

> We have a patient who is currently being monitored by the hospital. I am curious, so I still check his data. I discovered that the hospital doesn't really react to bad vital signs from him (…). But I get indignant about the hospital staff not completing their tasks. And if I go deeper into his measurements [in the monitoring system], it is obvious that they don't react properly—and that is not okay from a professional perspective, but also from the patient's perspective (…). And then I observed that they haven't monitored his data in more than a week, and according to the program they have to monitor their patients three times a week—so that is not good enough (...). So I have this distrust: "Are they [the hospital nurses] checking the patients' data and are they reacting to it? So I feel like I have to check up on it myself.
>
> Health center nurse, municipality A

> Well, I don't check the patients who are monitored by the municipalities. However, when I see the list of patients [in the monitoring system before selecting my own patients], I think it's strange that there are so many patients with red alarms [indicating measurements outside the threshold values].
>
> Hospital nurse, hospital Y

In line with prior studies (e.g., Antoft, 2005; Seemann & Antoft, 2002), the articulated distrust particularly concerned how the counterpart solved their

telemedicine tasks and hence reflected (dis)trust within each other's competencies to handle the telemedicine tasks. One of the consequences of this distrust was that collaboration among municipal actors and hospital staff was constrained. Since the actors distrusted their counterpart's ability to perform the telemedicine tasks, their willingness and motivation to collaborate were low, making it difficult to realize the shared network goals, for example reduction of control visits at the outpatient clinics. Therefore, co-exploitation and realization of the expected savings were, indeed, challenged. However, at other times the different interviewed actors claimed to trust the other actors' competencies to solve the telemedicine tasks. This trust was based either on prior interactions (i.e. process-based trust) or trust in the institutions they represented (i.e. institution-based trust). This institution-based trust also existed among the municipal and hospital staff, independent of prior knowledge or interaction:

> Well, I have a high degree of trust [in the hospital nurses] even though I don't have any specific situations or interactions with them to refer to.
>
> Health center nurse, municipality C

These opposite views of trust or distrust concerning the other actors in the network elucidated a more nuanced understanding of trust in such interorganizational networks. Based on these findings, it can be argued that trust is complex; actors can trust and distrust their counterparts at the same time, dependent on the specific situation and the level at which the trust is located (i.e. the individual or organizational level). For instance, the municipal nurses may have a high degree of trust in the hospital nurses' competencies because of their professional and organizational affiliation. This kind of trust was institution-based, predominantly reflecting trust at the organizational level, that is, trust towards the hospital as an organization (see Table 2.3: Conceptualizations of levels of trust, Section 2.2.3). However, since the nurses distrusted each other in relation to their ability to sufficiently monitor and intervene when necessary, it can be argued that this institution-based trust towards the organizations was not automatically transferred to the individual level. Likewise, the process-based and interpersonal trust at the strategic and administrative level from the previous phase were not transferred to the operational level. Instead it seemed like pre-existing personal relations or repeated interactions served as dominating sources of trust building among these nurses. Particularly, the repeated interactions over time seemed important for building trust beyond institution-based trust, since these interactions served as a form of evidence of the counterparts' trustworthiness. An example of this building of trust was one of the hospital nurses who in the re-interview explained how they had become more aware and confident in the municipal nurses' competencies to handle to the telemedicine tasks:

> Our perception now—compared to earlier—is that they are more qualified in the municipalities. I'm not sure whether it is because of our shared program and that we observe that they handle the telemedicine tasks well—and this gives us confidence about their competencies (…), but our awareness of the municipalities' competencies is higher now (…). I don't know whether we were insecure about their competencies before, but our anticipation was that we were the experts and they were not. And, of course, we are still the experts, but in relation to the COPD patients, I actually think that we are now quite equal.
>
> Hospital nurse, hospital Y, re-interview

Surprisingly, it seemed like trust in relation to the specific collaboration context, in this case, telemedicine, was necessary to be built even though the hospital and municipality collaborated on various other areas and had been collaborating about COPD patients. Following this line of argument, trust at the operational level was built over time, relied on the personal experiences of interaction with the counterpart (where the expectations were fulfilled) in relation to telemedicine, and concerned trust in the counterparts' competencies. Accordingly, institution-based trust and trust towards an organization were insufficient to alter the interorganizational relations among the health professionals in the network.

Aside from this coexistence of trust and distrust between the hospital and municipal nurses, trust between the municipal actors and the GPs also effected interorganizational relations in the telemedicine network. As demonstrated in "Does Telecare Improve Interorganisational Collaboration?" telemedicine reconfigured relations among the municipal nurses and GPs in several ways. Correspondingly, on the one hand, telemedicine enabled more focused and professional communication between them, since the municipal nurses' inquiries were more aligned with the GPs' need for information (i.e. vital signs) and hence improved collaboration. On the other hand, as the previous section demonstrates, telemedicine created conflicts over domain. Moreover, the municipal nurses characterized the GPs as a highly heterogeneous group, where some GPs were, broadly speaking, unwilling to collaborate, while others were very committed to collaboration, as was the case more specifically with the telemedicine program. Particularly in relation to municipal nurses' characterization of the "unwilling" GPs, it seems like the negative stereotype that emerged during the transformation phase was transferred and confirmed at the operational level. A health center nurse presents an example of how this negative stereotype was reflected in the municipal nurses' statements about the GPs:

> Some of the GPs' responses on our questions [in the electronic message system] are "TeleCare North, what is that?" or "If you think that's a good idea, then do it, but we are not part of that

> program"—and that is just tiresome, because they ought to be supportive of the program, because we know they've been informed about it and they also got paid for it, so it's a bit de-motivating for us since we are dependent on their support.
>
> Health center nurse, municipality A

This municipal nurse expressed disappointment about some of the GPs' attitudes to the program and their willingness to participate. This kind of perception of the GPs at the operational level also effected the municipal nurses' approach to the GPs and their collaborative efforts (see Section 7.5 about collaboration strategies), and reproduced the negative stereotype of the GPs that emerged during the prior phase, at the operational level. Accordingly, trust in the GPs was conditional and highly dependent on the specific GP, and thus it appeared to be rather dependent on the personal relations, since trust in the GPs as a collective group was not established.

In summary, trust among the health professionals at the operational level was characterized by the coexistence of trust and distrust. Some of the same kinds of mechanisms to build and maintain trust as in the prior phase seemed crucial: repeated interactions, clarification of mutual goals and expectations, and acknowledgement of mutual dependence and differences, indicating an interpersonal process-based trust. Calculative trust did not seem as important for collaboration at the operational level as it was in the prior phase, though, whereas competence trust seemed more crucial for collaboration at the operational level. Opposite to the prior phase, the arenas for interaction relied on digital interfaces where communication was principally characterized by information delivery rather than by shared decision-making. This form of interaction also constrained conflicts resolution and the ability to joint decision-making processes, which made it more difficult to build trust among the actors at the operational level. One of the consequences of this lacking conflict resolution was that distrust among the actors was not openly articulated at the network, making it difficult to change. This non-confronting behavior reflected an insufficient conflict level in the network, resulting in such issues being suppressed. Accordingly, none of the actors addressed their concerns to their counterparts, which constrained the establishment of trust among them. However, an explanation of this suppression of conflicts and lack of confrontation raising concerns may be that there was no facilitation of such processes, since the communication channels were related to passing on information instead of sharing knowledge, gaining knowledge about each other (and each other's differences), and nurturing trust.

7.5. COLLABORATION STRATEGIES

Although collaboration in the telemedicine network was highly formalized (as in the health care system in general), various forms of interactions emerged. The different forms of interactions reflected more informal styles of approaching collaboration and initiating collaborative efforts. Throughout this section, these forms of interaction are denoted as collaboration strategies, referring to the actors' deliberative approach to initiate and engage in interaction with the other health professionals in the network. Although these different strategies to collaborate foremost reflect the municipal actors' various strategies to initiate collaboration, the three collaboration strategies are not limited to encompassing the municipal actors. Since the municipal nurses depended greatly on medical expertise and were the only actors who used the telemedicine technology, it was necessary for them to initiate collaboration primarily with the GPs, and in some instances with the hospitals. Still, these different strategies to collaborate also more broadly indicated different forms of conflict in the network in relation to disagreements about work methods, logics, and assessment criteria for the patients, along with differences in motivation and willingness to collaborate. Correspondingly, the three different strategies to collaborate mirror the actors' responses to the more problematic dimensions of collaboration in the network, and thus the municipal actors' countermoves on their disadvantage in power (see Pfeffer & Salancik, 1978 and Rogan & Greve, 2015).

7.5.1. SUBORDINATION AS A STRATEGY

Since the municipal nurses depended so much on the GPs—as is also affirmed in nurses statements regarding GPs and further elaborated in the article "Does Telecare Improve Interorganisational Collaboration?"—they initiated collaboration with the GPs when they needed assistance to interpret the patients' data or interventions in the patients' treatment. The municipal nurses were highly aware of the GPs' (possible) unwillingness to collaborate and their hostility towards the program, which pushed them to use different strategies to approach the GPs. One of the health center nurses explains how she carefully formulated suggestions for adjustment of the treatment without overruling the GPs' medical authority:

> It is also about communication [with the GP] and how you do it. For instance, I could write a note: "The patient is not receiving inhalation medication according to the GOLD guidelines," but then I would have drawn a line in the sand. And I would never do that because I also have to collaborate with that GP in the future. Instead, I would write a note to the patient that he or she could

> show the GP: "Go talk with your GP about your inhalation medication" because that's like more open [for the GP to decide what to do] (…). And yeah, you can easily use some more broad formulations like: "Well, there are so many new inhalation medications, so there might be one that is better for you, but try and ask your GP about that." So in that way you can easily wrap your suggestion into something more [digestible].
>
> Health center nurse, municipality C

The municipal nurses thus carefully considered how to approach the GPs without challenging their medical authority and stepping into their domain. This consideration also demonstrates how the municipal nurses were fully aware of the asymmetrical power relations between them and the GPs, specifically with regard to medical authority and professional status (cf. Abbott, 1988), and how this differential influenced their collaborative efforts.

This subordination further included compliance with a clinical framing of the inquiries that corresponded with the GPs' (and hospital staff's) clinical focus. Accordingly, the municipal nurses were able to reframe their observations to fit with this clinical focus when initiating collaboration with the GPs:

> I know what GPs want to know (…), and I try to deliver that information [when contacting them] (…). If they are to take me seriously, I have to present something concrete [in terms of vital values], and I know how to serve that information.
>
> Health center nurse, municipality C

Awareness of this clinical focus legitimated the municipal nurses' inquiries and thus increased their trustworthiness in regard of competencies. This clinical framing was also recognized by the GPs, who at the re-interview expressed satisfaction with the increased professionalism in the municipal nurses' inquiries (see "Does Telecare Improve Interorganisational Collaboration?"). In this matter, the telemedicine technology served as a support for this clinical reframing due to the embedded hospital logic in the telemedicine program. Hence, telemedicine functioned as a boundary object in this strategy of collaboration, enabling the municipal nurses to reframe their collaborative efforts in accordance with the GPs' clinical focus.

Overall, this collaborative strategy exhibits a form of subordination to and compliance with the GPs' medical authority, and the collaborative efforts are carefully formulated to maintain the municipal nurse role as subordinate and compliant to the medical authority. This form of collaboration strategy reflected a power-based relationship (Hardy et al., 1998) and was only identified in relation to the municipal nurses and GPs. It should be noted, however, that municipal nurses

are subordinated to the doctors' medical authority, according to the overall regulations on the health care field in Denmark.

7.5.2. THE PATIENT AS AN INTERMEDIARY

One of the implications of implementing telemedicine was that collaboration among the health professionals in the network was mediated by the patients (see "Does Telecare Improve Interorganisational Collaboration?"). Involvement and motivation of the patients was one of the goals in the program in relation to empowering the patients to handle their disease, and this goal was also used as an explanation of why most of the interorganizational collaboration (particularly between the municipal actors and the GPs) was delegated to the patients. However, a more subtle explanation could be that this indirect collaboration with the patient as an intermediary was used as a strategy to handle difficulties and conflicts in relation to collaboration. For instance, in the cases where the GPs were perceived as unwilling to collaborate and take part in the program, the GPs would probably respond to the patients' requests and questions when it would be more challenging for the municipal nurses to interact directly with the GP. This interpretation was supported by a discussion in the implementation group in which several of the municipal project managers stated that collaboration between their municipal nurses and the GPs was eased by engaging the patient:

> One of the project managers says that the municipal nurses have stopped contacting the GPs about adjustment of the threshold values, and instead they handle them themselves. She says, "It's easier for them to handle it themselves and involve the patient because it takes a lot of effort to contact the GPs and get them engaged [in adjusting the threshold values]." Several of the other municipal project managers recognize this from their own organization.
>
> Observation notes, implementation group

Although the municipal nurses were not stating this directly in the interviews, they indicated that collaboration with the GPs was easier when it was mediated by the patients. For example, one of the municipal district nurses explained how she requested that patients contact their GPs themselves as a part of "giving the patients the responsibility for their disease," but by the same token she delegated information exchange between her and the GPs to the patients by requesting that they "ask [their GP] about this and that, and then it would be nice if you also ask them to write it down [on a note to us] or send a message to us" (district nurse, municipality A). Correspondingly, collaboration was delegated to the patients, and they became intermediaries between the municipal nurses and the GPs. Similar

descriptions of how the patients carried information among the various health professionals were also identified in relation to collaboration between municipal actors and hospital staff.

Using this indirect collaboration strategy, however, constrained the sharing of information and knowledge, along with joint decision-making. One of the GPs explained how a patient was "sent" to her by the municipal nurse without being notified by the municipal nurse about the professional reasons behind this request:

> The [municipal] nurse asked her [the patient] to see me based on her measurements (…), and the patient doesn't think it's necessary but comes here anyways. And I can explain why she had some low measurements on her oxygen level over the past while, since it corresponds with her two latest exacerbations—about which we were in contact, and she was treated and got well again. But then I just wonder why the municipal nurse asked her to come here. It would have been nice if she'd written me her reasoning behind it; what was the purpose of the patient's visit here? What are her thoughts about it? Because the only thing the patient could say was: "Well my [municipal] nurse just thought it would be a good idea to have a check-up with you."
>
> GP

From the GP's perspective, this visit from the patient became waste of time since neither the patient nor the GP found any purpose or meaning in the visit. The GP was unaware of the municipal nurse's reasons for recommending the visit, which made it impossible for the GP to fulfill the municipal nurse's expectations for the visit, since the patient was unable to recount them. Hence, this form of interaction constrained the building and maintaining of trust, since expectations of each other's behavior were probably not met. Additionally, exchange of knowledge and joint decision-making was not possible when collaborating indirectly with the patient as an intermediary. Moreover, building treatment alliances among the health care actors was difficult when collaborating indirectly through the patients (see "Does Telecare Improve Interorganisational Collaboration?"). Lastly, from a patient perspective, this indirect collaboration mediated by the patient may be experienced as a burden and may cause feelings of insecurity in the patients, since it seems random which information has been delivered to other health care providers (Ørtenblad, 2013).

Overall, this collaboration strategy delegated collaboration in the network to the patients, who became responsible for carrying information around in the network.

7.5.3. FORMING OF ALLIANCES

The final strategy to collaborate in the telemedicine network concerned the formation of alliances and the exclusion of actors. Similar to the other strategies, this strategy was utilized by the municipal actors as a response or countermove to their relatively vulnerable position in the network due to the asymmetrical dependence structures (see "Does Telecare Improve Interorganisational Collaboration?"). Formally, collaboration among the municipalities and the hospitals was mediated by the GPs, although informal collaboration activities among municipal nurses and hospital staff also emerged during the program, as previously described in Section 7.2. However, these informal collaboration activities were not merely a more flexible supplement to the existing formal collaboration structures; they were necessitated by some of the GPs' reluctance about collaboration. As a result, the municipal actors tried to form alliances with the hospital staff to accommodate their need for medical expertise. Although, this strategy was most visible at the level of the municipal nurses (i.e. the weakest actor in the network), other actors also engaged in this strategy. For example, a hospital nurse explains how she collaborated with a municipal nurse to convince a GP to adjust the treatment and referral of a patient:

> For instance, we have this municipal district nurse who called us because she was uncertain about this patient and needed an assessment of the patients' oxygen treatment. She asked us if we could see the patient in our outpatient clinic, but we can't without a referral from the GP. So we joined our forces to get the referral. She'd been trying to get it before, but the GP didn't think it was necessary, so we agreed that we [at the hospital] should give it a try. Normally, we don't do it like this, but we contacted the GP and told him about the possibility for referring to an artery puncture [to assess the oxygen treatment] and we actually got the referral and called the patient to a visit and got the oxygen treatment adjusted.
>
> Hospital nurse, hospital Y

The municipal nurse was thus able to form an alliance with the hospital nurse to pressure the GP to refer a patient to an artery puncture, so the municipal nurse succeeded in reconfiguring the existing asymmetrical dependence and power structures in the telemedicine network. The result of such alliance formation was an exclusion of the GPs from decision-making processes and a reduction in the GPs' ability to influence and decide treatment for the COPD patients. Such strategic maneuvers, where alliances were formed with the hospital staff, were observed to different degrees in the various municipalities. However, it can be argued that this form of alliances constrains the building of trust, since the GPs may feel outmaneuvered and excluded from the network. Since the GPs already show low commitment and weak motivation to participate in the program (cf. the national

conflict that preceded implementation of the program), such countermoves may be a risky business, as they may result in further detachment from the GPs and create a rather inhospitable environment for future collaboration. Finally, this strategy of collaboration reflected a power-based relationship where the municipal nurses gained power by creating an alliance with the hospital staff.

This strategy of forming alliances was also visible in a different manner; instead of forming alliances with the hospital staff, the municipal nurses could form alliances with the patients, in which case the GPs were again excluded from the network. Several of the interviewed municipal nurses, along with a nurse from a general practice clinic, shared experiences in which the patients changed their GP due to disagreements about telemedicine:[15]

> We had some cases where we [the district nurse and the GP] just couldn't agree [about telemedicine] and where the patient actually changed her GP (…). And now with the new GP collaboration is just great and we have no complaints about it.
>
> District nurse, municipality A

By forming an alliance with the patient, the municipal nurses were able to avoid and exclude "challenging" GPs from the telemedicine network. Nevertheless, it is difficult to determine whether or not a municipal nurse actually effects a given patient's decision to change her GP, and in that sense whether they intentionally formed an alliance is a matter of speculation.

Overall, this collaboration strategy demonstrates how the network actors can form alliances that reconfigure the existing power structures in the network.

In summary, these three collaboration strategies illustrate how the different actors make moves and countermoves to promote their own position or (re)balance the positions in the network. This section reveals how medical authority serves as the main source of formal authority to make decisions at the operational level in the network, whereas the prior phase rested upon a more hierarchical, administrative authority for decision-making that created these altered collaboration dynamics and caused the emergence of the three different collaboration strategies. Moreover, the collaboration strategies demonstrate that the municipal nurses' position in the telemedicine network was ambiguous; their position was essential since they were the main, central actors in the network, and at the same time they were underdogs without medical authority and hence without decision-making power. Therefore, the municipal actors were in a position of disadvantage, where they lacked both formal power (constituted by medical authority) to make decisions about treatment

[15] In Denmark, citizens can change GPs.

and depended on medical expertise (as a scarce resource) from the hospitals and GPs (Hardy & Phillips, 1998). In the telemedicine network, the weaker partners in the collaboration were the municipal actors, due to their dependence on medical experts and their subordination. However, it seems like the municipal actors could use various collaboration strategies that served as countermoves and resistance in what, on the surface, appeared to be a weaker position; by presenting data in a specific manner, they were able to "manipulate" or convince the GPs to act according to their agenda, or they could form alliances with the hospital staff or the patient and hence exclude the GPs from collaboration. By contrast, the GPs and the hospital staff's response to these actions was to silently ignore the municipal nurses' knowledge about the patient and continue "business as usual" without recognizing or adjusting their behavior to incorporate the municipal nurses' augmented position and role in the telemedicine network. In that way, they were able maintain their dominance.

Finally, this section demonstrates how the network actors may utilize various strategies to collaborate (or avoid collaboration) in the network. These strategies reflect that interaction and collaboration is more complex in interorganizational networks than in dyadic relations, since the forming of alliances, the exclusion of actors, and the interrelatedness between the various dyadic relations in the network create complex network dynamics.

7.6. SUMMARY

The analysis of the large-scale phase contributes with different insights about the continuing innovation process. The transition to the large-scale phase denoted a *shift in network orientation* from co-exploration to co-exploitation, a shift involving the decentralization of activities to the health professionals' day-to-day routine and enforcing focus on one's own organizational domain among the network actors; thus, this shift changed collaboration, the building and maintaining of trust, and conflicts in the network. Whereas shared decision-making and the NAO governance form dominated the prior phase, this phase was characterized by individual decision-making within the network organization and thus indicated a mono-organizational utilization of telemedicine. Although the telemedicine program was still governed by the steering group and the project secretariat, decentralization of activities significantly reduced these actors' ability to manage the day-to-day operation of the program, and this reduction was emforced by the lack of feedback mechanisms and vertical collaboration structures in the telemedicine network.

By zooming in (Nicolini, 2010b) on each of the network actors, it was evident that *telemedicine was utilized differentially* in this phase: from integration into existing work practices to non-use. One of the reasons for this divergent utilization of

telemedicine was the alignment between the existing practice and the tentative telemedicine logic emerging in this phase. This emerging logic mixed the health center approach, emphasizing empowerment and rehabilitation, with a hospital logic, emphasizing vital signs. Particularly, the health centers in the municipalities utilized telemedicine and were able to integrate into their existing work practices, as telemedicine was perceived as a support and extension of their existing rehabilitation services for the COPD patients. More difficult was this integration at the district nurses' units, since telemedicine involved a reorientation of the more paternalistic approaches to the patients. Their usage of telemedicine was mandatory, though, since they were responsible for monitoring the majority of the enrolled patients (along with the health centers).

A second insight concerns the *building and maintaining of trust* in the telemedicine network. Trust at the operational level needed to be rebuilt, accomplished primarily through repeated interaction or through pre-existing interpersonal relations. Even though the health professionals were used to collaborating and had collaborated on other matters, the incremental building of interpersonal trust seemed crucial for interorganizational collaboration. However, the digital arenas for collaboration, namely the monitoring system, constrained the building of trust among the health professionals. This limitation was particularly evident in relation to the distrust between the municipal and the hospital nurses. Moreover, the findings demonstrate how trust in the technology also needed to be built to enable utilization of telemedicine in practice, particularly at the hospitals. Accordingly, the hospital staff expressed distrust towards the municipal nurses *and* telemedicine, which may explain of their resistance to its utilization.

The third insight relates to the *conflicts in the network*, which concerned continuing collisions of logics and struggles about domain, since the implementation of telemedicine created disturbances in the existing power relations among the various health professionals. These conflicts too the form of conflicts well known in Danish and international studies about inter-professional and interorganizational collaboration in health care systems (Abbott, 1988; Denis et al., 1999; Seemann, 1996; Seemann & Gustafsson, 2016; Seemann & Antoft, 2002).

Finally, the analysis demonstrates how *three distinct collaboration strategies* emerged at the operational level, which the different actors utilized to rebalance their position in the network. The municipal nurses who had a subordinate position in the network, particularly, used the various strategies to gain more (informal) power in the network, illustrating how the actors make moves and countermoves in an attempt to gain more advantageous positioning in the network or to (re)balance their positions.

CHAPTER 8. SUMMARIZING CHANGE IN THE TELEMEDICINE NETWORK

Based on Chapter 6, concerning the transformation phase, and Chapter 7, concerning the large-scale phase, this chapter summarizes the main changes in the telemedicine network across the two phases. The main changes are described on the basis of the selected theoretical points of departure (as presented in Chapter 2), and hence concern how the telemedicine network developed over time in terms of network orientation, governance form, boundary spanners, trust, collaboration, and conflicts, see Table 8.1.

The main shift between the phases was characterized by the changing network orientation, which shifted from co-exploration in the transformation phase to co-exploitation in the large-scale phase; the latter included a shift from shared governance and NAO governance (Provan & Kenis, 2008), where the power to make decisions rested upon hierarchical and administrative sources, towards a governance form that relied more upon the network actors' mono-organizational governance, where the decision-making power at the operational level rested upon the medical authority. This shift was also a consequence of the decentralization of activities and the change of activities; the activities in the transformation phase mostly concerned development of a telemedicine program, whereas the activities in the large-scale phase were related to operation of the program and involved the day-to-day activities within each network organization.

The main boundary spanners in the transformation phase were (top) managers and administrative workers. Collaboration, therefore, happened at the strategic and administrative level. In the large-scale phase, by contrast, the main boundary spanners were the health professionals, and collaboration occurred primarily at the operational level in relation to solving the telemedicine tasks. Similarly, the collaboration patterns changed from interorganizational problem-solving and bargaining in the transformation phase to three distinct collaboration strategies that were utilized to handle dysfunctional collaboration at the operational level. These collaboration patterns were closely related to the conflict level in the network, along with the collaboration arenas that established the frames for collaborative endeavors. In the transformation phase, the interorganizational meetings constituted the arenas for collaboration and enabled repeated face-to-face interactions, fostering mutual learning, knowledge of differences between actors, the handling of colliding logics and conflicts, and the building of mutual trust. Still, some conflicts and tensions remained unsolved, particularly in relation to the GPs, which resulted in the emergence of a negative stereotype of the GPs. Instead of interorganizational meetings, the telemedicine monitoring system created a digital interface for

collaboration in the large-scale phase. Collaboration was highly formalized (and in line with existing formalization of collaboration and division of labor in the health care system in general) and was based on an underlying sequential collaboration logic. The network actors divergent logics continued to collide, but the digital arenas for collaboration and the sequential collaboration logic constrained the resolution of tensions and conflicts. In relation to this lack of venue for conflict, the conflict level was insufficient, and none of the actors confronted each other with their various disagreements about domain, assessment of the patients, and treatment. Accordingly, the conflicts at the operational level in the network remained unresolved, and trust was difficult to build. These main changes are summarized in Table 8.1.

	Transformation Phase	Large-Scale Phase
Network Orientation	Co-exploration	Co-exploitation
Governance Form	Shared governance/NAO* Shared decision-making Hierarchical/administrative sources of decision-making authority	NAO*/mono-organizational Mono-organizational decision-making Medical authority as source for decision-making
Main Boundary Spanners	(Top) managers and administrative workers	Health professionals, i.e. frontline staff
Main Boundary Objects	Business case Facilitating collaboration and building legitimacy	Monitoring system Both facilitating and constraining collaboration
Trust Forms, Levels, and Mechanisms for Building Trust	Mix of calculative and companion-like trust forms Interpersonal Mix of process based, personal relationships, contractual agreements, institution based Distrust to GPs (emergence of negative stereotype)	Predominantly competence trust mixed with companion-like trust Interpersonal Mix of process based and personal relationships Distrust between municipal and hospital nurses, to the telemedicine technology, and to GPs
Collaboration Arenas	Interorganizational meetings and workshops	Digital interfaces
Collaboration Patterns	Co-presence and face-to-face collaboration Predominantly interorganizational problem-solving and bargaining	Sequential collaboration logic Emergence of three collaboration strategies: (1) subordination, (2) the patient as intermediary, and (3) forming of alliances
Conflicts	Collision of logics Lacking commitment from GPs Appropriate conflict level, though insufficient in relation to GPs	Collision of logics Struggles about domain Insufficient conflict level

*Network administrative organization

Table 8.1: Main changes in the telemedicine network across the transformation phase and large-scale phase.

As the table clarifies, the longitudinal perspective on the telemedicine network elucidates the various and interrelated changes in the telemedicine network. In the remainder of this chapter, the multiplicity of trust in the telemedicine network is discussed more thoroughly, based on the longitudinal and multi-level analysis.

8.1. THE MULTIPLICITY OF TRUST IN NETWORKS

The following section elaborates further on the findings from the analysis of trust by discussing the multiplicity of trust that characterized the telemedicine network. Since trust is portrayed as fundamental for interorganizational collaboration in the literature (see for instance Lane & Bachmann, 1998; Vangen & Huxham, 2003; and Webb, 1991, the findings about trust in the telemedicine network are selected for further examination and discussion.

The analysis in the dissertation demonstrates the multiplicity of trust; various sources and forms of trust along with internal and external dynamics create a complex form of trust in the network. Studying trust over time and across "hierarchical levels" within the telemedicine network elucidates how trust changes and must be rebuilt in the network, since it is rather conditional. More specifically, the strategic-level trust (Janowicz & Noorderhaven, 2006) that was built and maintained among the top managers and the other central boundary spanners in the various workgroups was not automatically translated into operational-level trust (Janowicz & Noorderhaven, 2006) among the health professionals in the subsequent large-scale phase. Accordingly, trust at the operational level in the network needed to be (re)built through same kind of mechanisms that established trust at the strategic level in the prior phase. Particularly, arenas for interaction seemed important, since disagreements, divergent interests, and conflicts could be resolved in them; moreover knowledge exchange, mutual learning, and acknowledgement of interdependencies in relation to the joint telemedicine tasks could be facilitated. Such arenas created the interaction frame in the transformation phase, and the various boundary spanners collaborated and interacted face-to-face in these arenas (e.g. the workgroups and steering group), enabling the incremental establishment of trust, based on specific experiences. In the large-scale phase, these arenas were constituted by digital systems such as the monitoring system and the electronic communication systems. The design of these systems facilitated sequential collaboration in which most of the collaboration consisted of information delivery. One consequence of the use of these digital arenas for interaction was that disagreements and conflicts remained unresolved and trust building was challenged—even though the health professionals interacted in relation to various other issues (e.g. treatment of COPD patients in general), had former a history of

interaction, and were embedded in a highly institutionalized field where formal agreements between the municipalities, hospitals, and GPs mandated them to collaborate and created institutional and calculative trust. The establishment of interpersonal trust through repeated interactions seemed fundamental for establishing trust at the various levels in the network. This finding indicates that trust in the telemedicine network relied on an interpersonal trust that was *not* externalized, and thus was not institutionalized to become interorganizational trust (Kroeger, 2011) relatively independent of the actual boundary spanners and of the hierarchical level in the network.

Overall, this discussion of trust expands the analysis of trust in the telemedicine network. Even though strategic-level trust is in the literature argued to create the frames and structures that may facilitate operational-level trust (Janowicz-Panjaitan & Noorderhaven, 2009), the strategic-level trust in the telemedicine network was not transferred or translated into operational-level trust among the health professionals. However, trust in the network was constituted by different forms of trust and established and maintained by multiple sources, and it appeared to be closely attached to specific individuals and their relationships. Therefore, trust in the network was foremost characterized by interpersonal trust that had yet to be institutionalized.

The literature about trust in interorganizational networks investigates trust from a variety of perspectives. This dissertation explores trust as an interpersonal and interorganizational phenomenon that can take different forms and be constituted through multiple sources (Bachmann & Inkpen, 2011; Bachmann & Zaheer, 2006; Lane & Bachmann, 1998; Newell & Swan, 2000; Oomsels & Bouckaert, 2014; Zaheer et al., 1998). Based on the analysis, however, it can be argued that trust in objects is also an important dimension of trust in interorganizational networks, particularly when the objects are used as boundary objects. Two examples from the analysis develop this claim. The first example concerns the business case that functioned as a boundary object in the transformation phase in that it mediated a shared understanding and language for the telemedicine vision (that was yet to be translated into material existence). Still, the business case remained flexible enough to enable each network actor to interpret the telemedicine vision according to their own organizational goals and interests. However, the most important feature of the business case, in regard to this argument, is the credibility and legitimacy of the business case. Findings from research in relation to the pilot innovation TELEKAT and external consultants' estimations on investment and costs formed the foundation of the business case in TeleCare North. As a result, the various network actors (as well as external actors) trusted the business case, which in turn facilitated collaboration in the network. The other example concerns telemedicine as technology and represents the opposite: when the (boundary) object is not trusted. The hospital actors' did not initially perceive telemedicine as a sufficient substitute for hospital activities (e.g. visits to the outpatient clinics), which reflected distrust

towards the technology. This effected how telemedicine was utilized at the hospitals: Why use a technology that has not been granted sufficient trust to replace the existing activities? However, the analysis also demonstrates that trust in telemedicine actually accumulated over time, following the same kind of mechanisms as in trust building between individuals, that is, through repeated interactions. Moreover, telemedicine as a technology functioned as a boundary object, since it created a shared language for the various health professionals from the municipalities, hospitals, and the GPs to communicate about the patients' conditions. Particularly, the measurements of the vital signs served as "hard" evidence about changes in the patients' condition, as compared to the prior more "soft" interpretations of the patients' condition. At the same time, telemedicine created suspicion and distrust between the municipal nurses and hospital nurses, since the design of the monitoring database did not allow the nurses to document which interventions the measurements provoked. Instead this was documented in the mono-organizational documentation systems (e.g. electronic patient record). From this perspective, telemedicine as a boundary object constrained the building of trust and reinforced the existing organizational boundaries. Hence, interorganizational collaboration was constrained.

Overall, the examples demonstrate that objects are not neutral—they are also performed as actors and can be trusted and distrusted. Based on this discussion, it appears that trust in objects is built through the same kind of mechanisms as trust between individuals. By taking this dimension into account, once can explore how objects such as new technologies are utilized (or not) and how they may serve as facilitators or impediments to inter-professional and interorganizational collaboration.

CHAPTER 9. ARTICLES

To finalize the analysis, the two articles in the dissertation are briefly presented through their abstracts, since the remainder of this monograph concerns the entire dissertation, including the two articles.

9.1. LAUNCHING A LARGE-SCALE TELEMEDICINE PROGRAM: POLITICAL DYNAMICS IN SCALING UP INNOVATIONS[16]

Jannie Kristine Bang Christensen
Jeppe Agger Nielsen
Jeppe Gustafsson
Janne Seemann

This paper examines the underexplored role of political dynamics in the process of scaling up innovations in an interorganizational context, a notoriously difficult task that often meets with failure. We first revisit the concepts of *translation* and *theorization* to provide a sound theoretical context for examining political dynamics, as embedded both in local settings where innovations are materialized and modified (translation) and in the broader organizational field where they are legitimated and packaged as concepts (theorization). We then provide a longitudinal case study (2008–2014) of how a Danish telemedicine pilot project was successful transformed into a large-scale program through heterogeneous actors' translation and theorization efforts in a cross-sectorial and politicized context loaded with competing logics, interdependencies among actors, and conflicting interests at the local and field level. We demonstrate how political dynamics during upscaling were handled through three distinct kinds of activities that we term "(re)mobilizing networks" (to handle interdependencies), "strategic translation and theorization" (to handle conflicting interests), and "co-translation" (to handle competing logics), and we illustrate the core actions underpinning each of them. Accordingly, our paper advances a political perspective on the innovation process by shedding new light on the inherent political dynamics of translation and theorization.

This article has been submitted to *Organization Science* as of February, 2017.

[16] A prior version of this article was presented at the Academy of Management Annual Meeting in Anaheim, California, USA, in 2016.

9.2. DOES TELECARE IMPROVE INTERORGANISATIONAL COLLABORATION?

Background: Previous studies have suggested that telecare can improve interorganisational collaboration within fragmented health care systems, yet this outcome has not been examined in a large-scale setting. This study explores the effects of a large-scale interorganisational telecare programme in Denmark based on home-monitoring on collaboration in a telecare network between municipalities, hospitals, and general practitioners.

Method: Semi-structured interviews and observations of collaborating health professionals from the municipalities, hospitals, and general practitioners were undertaken and then repeated a year later. Collaboration was analysed both at the interorganisational network level and within each part of the network, including its interrelations.

Results: Collaboration between municipalities and general practitioners was initially intensified as a result of implementing telecare, though this changed over time as the first start-up obstacles were overcome and the patients became more active in their treatment. Conversely, collaboration between hospitals and municipalities and hospitals and general practitioners was uneffected by telecare.

Discussion and conclusion: Changes in collaboration among municipal nurses, general practitioners, and hospital staff were related to dependency structures and municipalities' newly gained central role in a telecare network. While the telecare network was initially characterised by asymmetrical dependency structures, these were partially equalised over time because of the municipalities' new position in the network.

The article is published in International Journal of Integrated Care, vol. 16, no. 4 and is enclosed as Appendix A.

CHAPTER 10. CONTRIBUTIONS

In the following sections the various insights from the dissertation (including the two articles) are summarized to clarify the main contributions of this dissertation. Though the contributions overlap, the remainder of the chapter is divided into an empirical contributions (Section 10.1) and theoretical contributions (Section 10.2).

10.1. EMPIRICAL CONTRIBUTIONS

This dissertation makes three main empirical contributions. The *first* concerns telemedicine. Organizational perspectives on telemedicine have been underrepresented in the research literature about telemedicine (Barlow et al., 2006; Bower et al., 2011; Bøg et al., 2015; Darkins et al., 2008; Fasterholdt et al., 2011; Hendy et al., 2012; Hueppmeier et al., 2010; Nicolini, 2006; Pare et al., 2007). This dissertation contributes with a rich empirical account of telemedicine from an interorganizational perspective, grounded in the Danish large-scale telemedicine program TeleCare North. The telemedicine program was studied from a longitudinal perspective covering a period of three years (extended to 7 years in the article "Launching a Large-Scale Telemedicine Program"). Insights from the dissertation demonstrate how telemedicine technologies can be used as boundary objects that facilitate or constrain collaboration in a network of heterogeneous actors. Hence, telemedicine both reconfigures existing boundaries, dependence and collaboration structures among the various health professionals from the municipalities, hospitals, and GPs *and* reinforces existing organizational and professional boundaries in relation to the domain of medical authority. Moreover, this dissertation illustrates how telemedicine as a technology not is a neutral digital device; instead, various "scripts" are inscribed in the technology reflecting the logics of the actors who developed it. These empirical insights contribute to the existing research on telemedicine, particularly in relation to the extensive effect-studies of telemedicine, since my empirical findings may serve as an alternative interpretation of the effects (or lack of effects) of telemedicine. By investigating the organizational aspects of telemedicine, a deeper understanding of various uses and local translations of telemedicine, how telemedicine is aligned (or not) with existing work practices, and the reconfiguration or reinforcement of complex interorganizational relations among health professionals can serve as an explanation of the effects found in relation to telemedicine. An example of this deepened understanding concerns the study of the health-economic effects of the TeleCare North program, which found limited effects of the program in terms of savings and which also corresponds with findings from what is, to my knowledge, the world's largest RCT on telemedicine, The Whole System Demonstrator (Henderson et al.,

2013). The savings were most significant for the patients with severe COPD and were primarily related to a reduction in hospitalization, whereas costs to outpatient clinic visits (among others) remained the same (Udsen, 2015). Based on my findings, these health-economic findings can be explained through the unsuccessful translation of telemedicine into hospital staff practices. The result of this failure was that the hospitals kept treating the COPD patients as usual, without substituting any of their activities with telemedicine monitoring of the patients. However, the municipal actors were enabled (and required) to translate telemedicine into their practice, and through the use of telemedicine they were able to prevent some cases of hospitalization for patients with severe COPD. Accordingly, my empirical findings deepen our understanding of telemedicine.

The *second* empirical contribution relates to the black boxing of innovation processes. The processes of innovation are described by several scholars as contingent and proceeding according to a fuzzy logic by which dead ends, conflicts, and situations of opportunity arise (Hoholm & Araujo, 2011; Nicolini, 2010a; Van de Ven, Polley, Garud, & Venkataraman, 1999). Despite repeated calls for more attention to innovation processes, their dynamics, and the "making of innovations," knowledge of theseprocesses is rather limited (Hoholm & Araujo, 2011; Nicolini, 2010a; Swan & Scarbrough, 2005). This dissertation contributes detailed descriptions of some of the hidden activities in the innovation of the large-scale telemedicine program. Particularly, activities concerning collaboration, trust building, and conflicts are illuminated in the dissertation. These activities are almost invisible in the official stories and presentations of the TeleCare North program (see e.g., TeleCare Nord, 2015). In "Launching a Large-Scale Telemedicine Program," these activities are extended to encapsulate the pilot study TELEKAT, whereby the entire process from pilot initiation through upscaling to large-scale implementation and operation is investigated. Moreover, this innovation process is related to the institutional context in which it unfolds. By following the innovation "in the making" and in "real time" (Hoholm & Araujo, 2011), this study attends to numerous tensions, conflicts, and informal activities. Bringing these elements of the process into the light, this study contributes detailed descriptions of the political dynamics and other activities hidden in the innovation process. Lastly, the detailed empirical analysis of the innovation process from pilot initiation to large-scale implementation reveal the instability of the network, as well as of the innovation as it evolves; everything needed to be "re-made." Accordingly, the network needed to be re-mobilized when the innovation transitioned from one (empirical) phase to another, and the network actors' goals and interests were re-negotiated continuously, interorganizational relations reconfigured, trust among the boundary spanners rebuilt as the main boundary spanners changed, and the telemedicine innovation itself reinvented in the transformation of the pilot initiative. Neither the telemedicine network nor the telemedicine innovation was stabilized during the period they were under study. Therefore, my findings illuminate some of the hidden activities in innovation processes and demonstrate how innovations (and

their surroundings, i.e. the network) are not stable entities but are re-translated as they transition into new phases or contexts.

The *third* empirical contribution relates to the network literature. Research on networks has predominantly focused on the structural-, institutional-, or macro-level, so processes and dynamics in networks, along with micro-level analysis, present less explored avenues within the extensive body of literature on networks (Jack, 2010; Provan et al., 2007; Williams, 2012). This dissertation contributes with detailed empirical accounts of network dynamics in terms of collaboration, building and maintaining trust, and conflicts in the network. The boundary spanners and their interactions, collaboration strategies, interpersonal trust, and various conflicts are described and analyzed in detail. Micro-level analysis is at center of this research, even though the structural properties of the network and the institutional context are also examined. Particularly, the analysis has illustrated how the boundary spanners' divergent logics collide and are enacted in an interorganizational network and in an interorganizational innovation process. Since interorganizational networks, and certainly systemic networks in mature institutionalized fields, inevitably bring together a variety of actors with divergent logics that influence their behavior, norms, and values, the micro-level perspective in network studies is beneficial to draw out how divergent logics are enacted in networks and how they may collide, merge, or compete—and how this enactment influences collaboration, trust, and conflicts in such networks. In past, logics have mostly been investigated at the field level, with scant attention towards micro-processes and their materialization in the day-to-day-routines in the organizations. As a result, translation and enactment of logics in practice have been investigated only to a limited degree (Lindberg, 2014; Reay & Hinings, 2009). This dissertation contributes to the understanding of such micro-oriented processes by exploring how collision of divergent logics (e.g. hospitals versus municipalities, and health professionals versus administrators) materialized in an interorganizational telemedicine program where these divergent logics were represented and inscribed in the technology (i.e. the TeleKit and the Open Tele monitoring database), generating intraorganizational and interorganizational dynamics. Moreover, this dissertation illustrates how competing logics and the derived conflicts may be productive and may move the innovation process forward if the conflict level is appropriate and the actors manage to handle the conflicts. Hence, the dissertation offers to the network literature further insight into micro-processes in terms of collaboration, trust building, and conflicts, along with how these elements are influenced by the enactment of divergent logics in systemic networks.

10.2. THEORETICAL CONTRIBUTIONS

The theoretical framework in this dissertation consist of a synthesizing of the divergent literature about interorganizational networks, with particular emphasis on systemic networks and network dynamics in terms of collaboration, trust, and conflicts. This theoretical framework is extended in "Launching a Large-Scale Telemedicine Program" to encompass two concepts from institutional theory: translation (inspired by Scandinavian institutionalism, e.g., Czarniawska & Joerges, 1996; Czarniawska & Sevón, 2005 and theorization (Greenwood et al., 2002; Strang & Meyer, 1993)). Based on its extended theoretical framework, the dissertation has two theoretical contributions.

The *first* theoretical contribution relates to this theoretical framework as it concerns the multiplicity of trust types in interorganizational networks. Research about trust in interorganizational networks and collaborative endeavors has focused on various forms of trust (Newell & Swan, 2000; Oomsels & Bouckaert, 2014), sources of trust and trust building (Sydow, 1998; Vangen & Huxham, 2003; Zucker, 1986), and levels of trust (i.e. individual, organizational, interorganizational, or institutional) (Currall & Inkpen, 2006; Fuglsang & Jagd, 2013; Janowicz & Noorderhaven, 2006; Kroeger, 2011; Paul & McDaniel, 2004). This dissertation extends the existent research by synthesizing divergent theoretical approaches to create a multidimensional concept of trust by which different forms, sources, and levels of trust are studied within a systemic network, where collaboration is partly mandated and embedded in a highly institutionalized health care field. More concretely, the dissertation demonstrates the multiplicity of trust and how trust needs to be nurtured, maintained, and rebuilt in interorganizational networks. The building of interpersonal trust among the various boundary spanners seemed crucial to establish and maintain trust in the network, even though the telemedicine network is embedded in a highly institutionalized field where the municipalities, hospitals, and GPs have formalized collaboration agreements (which establish calculative trust), carry a long history of collaboration (fostering process-based trust and in some cases companion-like trust), and consist of health professionals (which support competence-based trust and social identification, e.g. in nurse-to-nurse collaboration),. Furthermore, it was evident that interpersonal trust was not transferred from one level in the network to another or from one phase to another; trust at the operational level of the pilot study was not automatically transferred to the strategic and administrative level in the transformation phase, but needed to be rebuilt; as well, this interpersonal trust was not transferred to the operational level in the large-scale phase. Accordingly, interpersonal trust at various levels and phases in the network appears to be fundamental for collaboration in interorganizational networks.

Moreover, the dissertation contributes to the literature by adding a dimension about trust in objects, particularly boundary objects, and how this form of trust may

explain network dynamics such as collaboration and conflicts. Studying this dimension of trust can further our understanding of how objects (both material and immaterial) are taken into use and how they function as boundary objects by facilitating or impeding collaboration. Furthermore, this insight about trust in objects may be utilized more strategically to facilitate and support interorganizational collaboration by designing and creating (boundary) objects (e.g. digital tools) that also focus on establishing trust among their users. This research avenue remains, to my knowledge, underexplored.

The *second* theoretical contribution relates to the innovation literature and is based on the article "Launching a Large-Scale Telemedicine Program." In the article, the two complementary concepts of translation (Czarniawska & Joerges, 1996, and Czarniawska & Sevón, 2005) and theorization (Greenwood et al., 2002; Strang & Meyer, 1993) are combined to examine the innovation process (from pilot initiation through upscaling to large-scale implementation) as the result of ongoing translation and theorization activities. In a recent study by Nielsen, Mathiassen, & Newell, 2014 the two concepts are combined to investigate IT institutionalization processes, whereas this study extends the two concepts to explore the political dynamics related to translation and theorization activities in innovation processes at the local and institutional level. Combining the two concepts enables investigation of political dynamics that arise in the local setting where the innovations materialize (translation), as well in the broader organizational field where innovations are justified and packaged as concepts (theorization). Although most current studies focus on either translation (e.g., Czarniawska & Sevón, 2005; Frenkel, 2005; Nicolini, 2010a; Zilber, 2006) or theorization (e.g., Greenwood et al., 2002; Mena & Suddaby, 2016), it is by combining these concepts that new insights into the innovation process can be gained through the exploration of political dynamics at multiple levels. The findings from this article suggest that upscaling processes, and more broadly innovation processes, unfold as series of translation and theorization activities in which the innovation materializes in local settings and is simultaneously justified, legitimated and abstracted into a more general concept. Combining these two concepts begets sensitivity towards the broader institutional context in which the innovation is embedded and the bidirectional relationships between the institutional context and the local innovation. Moreover, the article extends the concepts of translation and theorization by proposing three distinct activities termed *(re)mobilizing networks, strategic translation and theorization*, and *co-translation* that are used to handle political dynamics. As such, *(re)mobilizing networks* refer to efforts to connect relevant actors, both at the local level and between local and field level to create "chains of actors" to translate and theorize the innovation as well as the attempts to organize the interfaces among the participating actors. *Strategic translation and theorization* activities concern how actors balance and negotiate divergent interests to ensure representation of multiple stakeholders' interests by which commitment to the innovation is established. *Co-translation* refers to joint translation activities that the actors engage in to ensure

that competing logics are aligned and divergent practices are connected which may create feasible compromises and emergence of shared practices. By handling the political dynamics through these three forms of activities, the political dynamics may function as generative forces that support progression of the upscaling process.

CHAPTER 11. CONCLUSION

This dissertation aims to analyze and discuss the organizational implications of telemedicine. Thus, its purpose is to produce new empirical knowledge about telemedicine from an (inter)organizational perspective and, more generally, to produce knowledge about network dynamics in terms of horizontal collaboration processes; building, nurturing, and maintaining trust; and conflicts in systemic networks. Secondarily, it proposes to synthesize existing literature on interorganizational network dynamics and to elaborate on existing theory. Through a longitudinal qualitative case study, an interorganizational telemedicine network is studied over a period of three years through an organizational ethnography-inspired approach.

The dissertation has been guided by its main research question: *How can we understand the unfolding of a telemedicine innovation, and its related dynamics in an interorganizational network, from a longitudinal perspective?*

This research question is divided into two sub-questions, answered through this present monograph and two separate articles, entitled "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling Up Innovations" and "Does Telecare Improve Interorganisational Collaboration?" To conclude the dissertation, the two sub-questions are addressed by synthesizing the core findings from the dissertation's three parts.

Political dynamics in scaling up the telemedicine innovation
The first sub-question in the dissertation relates to the extensive research on innovation processes by addressing a relatively underexplored issue in innovation processes: the political dynamics related to innovation processes and, particularly, in relation to the upscaling of innovations (Garud et al., 2013; C. Koch, 2004; McLouglin, Koch, & Dickson, 2001; Swan & Scarbrough, 2005). Emphasizing political dynamics in upscaling processes, the first sub-question runs as follows: *How can we through the theoretical lenses of translation and theorization understand the political dynamics involved in scaling up an innovative telemedicine pilot study?*

This sub-question is explored in the article entitled "Launching a Large-Scale Telemedicine Program: Political Dynamics in Scaling Up Innovations." The article demonstrates how the entire innovation process is characterized by pervasive political dynamics generated by the multiple actors' competing logics, by interdependencies among the actors, and by conflicting interests. These various political dynamics are not impediments for the innovation process; instead, they are handled in three distinct ways: *(re)mobilizing networks (to handle*

interdependencies), *strategic translation and theorization (to handle conflicting interests)*, and *co-translation (to handle competing logics)*. These forms of handling ensure aligning of logics, handling of interdependencies, and inclusion of various interests which move the innovation forward. This article concludes that telemedicine innovation proceeds as series of continuing translation and theorization activities. The political dynamics function as generative forces that move the innovation forward through the three ways of handling the political dynamics.

Reconfiguration of interorganizational relations

The second sub-question in the dissertation is formulated as follows: *How does the systemic telemedicine network evolve over time with special attention to building, nurturing, and maintaining trust, to conflicts within the network, and to horizontal collaboration dynamics?*

This sub-question is addressed in two separate parts: first, the article entitled "Does Telecare Improve Interorganisational Collaboration?" which explores how telemedicine reconfigures interorganizational relations at the operational level among health professionals from municipalities, hospitals, and GPs. The article zooms in at the large-scale phase and investigates horizontal collaboration and conflicts in the telemedicine network 6 months and 18 months after implementation of the large-scale program TeleCare North. Overall, this article elucidates the dynamic nature of the telemedicine network, with a particular focus on the dependence structures in the network and the changing interorganizational collaboration relations. As McLouglin et al., 2001 argue, network studies without a longitudinal design offer a snapshot in time of the current dependence structures without capturing the effects of countermoves and the other actors' responses to those countermoves (Rogan & Greve, 2015). These countermoves and attempts to balance asymmetrical dependence structures are illustrated in this article and are further elaborated in this monograph. The article suggests that telemedicine reconfigures horizontal collaboration at the operational level at varying degrees and generates intra- and inter-professional struggles. Although telemedicine does not radically alter horizontal collaboration in the telemedicine network, it appears, like telemedicine, to amplify existing mechanisms that facilitate collaboration and revitalize existing conflicts among the main actors in the Danish health care system.

Change in network structures

The third part of the dissertation is the monograph, which contributes several insights about the dynamics in the telemedicine network, thus focusing on the second sub-question. The monograph illustrates how *network structures* in terms of governance and degree of formalization are related to collaboration patterns, the building, maintaining and nurturing of trust, and conflicts (and their handling) in systemic networks where collaboration is partly mandated and partly voluntary.

More concretely, the monograph illustrates how the telemedicine network structures became more formalized and hierarchical as the telemedicine innovation moved forward and was translated into more tangible objects (e.g. work instructions). This change reflected a shift in network orientation towards co-exploitation and a decreasing commitment to shared network goals.

Horizontal collaboration processes

The monograph illustrates the changing *horizontal collaboration processes* in the network. The horizontal collaboration processes in the telemedicine network were dynamic, characterized by political dynamics caused by the collision of the actors' divergent logics, the mutual but asymmetrical dependencies among the actors, and conflicting interests. As a result, interorganizational collaboration in the network was challenging and time consuming, and it required resources, willingness, and commitment from the various actors. Based on these findings, it can be argued that interorganizational collaboration may not always present the most efficient form of interorganizational engagement (cf., Hardy & Phillips, 1998).

Interorganizational conflicts

Closely related to interorganizational collaboration in the network were the various forms of *conflicts* and their management. The main conflicts concerned the collision of the network actors' divergent logics, which was especially evident in relation to the collision of municipality logic and hospital logic, and that of health professional logic and administrative logic. These conflicts were handled in different ways at different times. In the transformation phase, these conflicts were handled through extensive collaboration, negotiations, and bargaining. This handling was facilitated by the various arenas for collaboration where the multiple actors interacted directly and where an appropriate conflict level was facilitated. The divergent logics continued to collide as the telemedicine program was translated into practice in the large-scale phase. Moreover, intra- and inter-professional conflicts became more pronounced in this phase. In contrast to the conflicts occurring in the previous phase, these conflicts were not handled, since the digital collaboration arena constrained handling of conflicts and behavior was characterized by non-confrontation and avoidance, which materialized in three different collaboration strategies at the operational level. These collaboration strategies emerged as responses to collaboration challenges and conflicts in the network. Accordingly, the conflict level was insufficient and disagreements and conflicts in relation to the divergent logics remained unsolved.

Another substantial conflict in the telemedicine network concerned committing the GPs to the program. The conflicts with the GPs reflected "classic" conflicts about domain, work methods, power, and differences in organizational structure, culture, and processes among the main healthcare providers in the Danish health care system (cf. Antoft, 2005; Seemann, 2010; Seemann & Antoft, 2002). Thus, telemedicine seemed to reproduce existing conflicts by amplifying tensions and

inter-professional struggles. Yet, telemedicine in some cases also improved collaboration within the primary sector, that is, between the municipal actors and the GPs.

Trust

The third insight from the monograph concerns the *multiplicity of trust* in the network. The analysis demonstrates how trust in the telemedicine network arises out of different kinds of trust, emerges from various sources, and changes over time and across hierarchical levels in the network. More distinctly, the analysis reveals how trust is not transferred from one level in the network to the next or from one phase to another. Thus, strategic-level trust is not transferred or translated into operational-level trust (Janowicz & Noorderhaven, 2006) but must be rebuilt at each level. This finding indicates that trust in the telemedicine network was conditional and tied to the individual level, although the network is embedded in a highly institutionalized field with a tradition of interorganizational collaboration across municipalities, hospitals, and GPs, collective health agreements, and numerous previously shared projects and boundary-spanning activities. Correspondingly, interpersonal trust among the boundary spanners appeared to be fundamental for developing and expanding interorganizational collaboration in the network. Another insight about trust concerns the ambiguity of trust in the telemedicine network, where trust and distrust coexisted. Consequently, the trust dynamics in the network were highly complex and multifaceted. Lastly, trust appears to be a phenomenon that is not limited to individuals or organizations. Instead, trust in objects, particularly when they function as boundary objects, is an important dimension when exploring the utilization and integration of objects in work practices and routines. Based on the discussion of trust in the monograph, it can be argued that the actors' trust in the boundary objects may explain why some boundary objects function as facilitators or impediments for inter-professional and interorganizational collaboration.

Final conclusion

Based on these various insights from the dissertation's three parts, the conclusion is that telemedicine innovation unfolds as series of interrelated translation and theorization activities in which competing logics, interdependencies among the network actors, and conflicting interests continue to create political dynamics that influence horizontal collaboration, the building and maintaining of trust, and conflicts in the network. Although the conflicts and horizontal collaboration processes in telemedicine are highly recognizable from previous research about (the partly mandated) collaboration between the municipalities, hospitals, and GPs, this dissertation also contributes new empirical knowledge about telemedicine in an interorganizational setting and extends previous research about interorganizational collaboration and conflicts in systemic networks by providing a detailed and nuanced analysis of trust. Particularly, the dissertation illustrates how telemedicine both amplifies existing collaboration and fragmentation challenges in the health

care system *and* at the same time functions as a boundary object that facilitates and improves collaboration.

Overall, this dissertation investigates the trajectory of a telemedicine innovation and the fluctuating telemedicine network, and it examines network dynamics focusing on horizontal collaboration, building and maintaining trust, and conflicts from a longitudinal perspective, by which it demonstrates how *both* the telemedicine innovation and the telemedicine network are in flux and need continuously to be re-translated and "re-made"; neither the telemedicine innovation nor the telemedicine network are stable.

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APPENDICES

Appendix A. Does Telecare Improve Interorganisational Collaboration?

Appendix B. Interview guides.

Appendix A

Does Telecare improve Interorganisational Collaboration?

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RESEARCH AND THEORY

Does Telecare Improve Interorganisational Collaboration?

Jannie Kristine Bang Christensen

Introduction: Previous studies have suggested that telecare can improve interorganisational collaboration within fragmented health care systems, yet this outcome has not been examined in a large-scale setting. This study explores the effects of a large-scale interorganisational telecare programme in Denmark based on home-monitoring on collaboration in a telecare network between municipalities, hospitals, and general practitioners.
Methodology: Semi-structured interviews and observations of collaborating health professionals from the municipalities, hospitals, and general practitioners were undertaken and then repeated a year later. Collaboration was analysed both at the interorganisational network level and within each part of the network, including its interrelations.
Results: Collaboration between municipalities and general practitioners was initially intensified as a result of implementing telecare, though this changed over time as the first start-up obstacles were overcome and the patients became more active in their treatment. Conversely, collaboration between *hospitals and municipalities* and *hospitals and general practitioners* was unaffected by telecare.
Discussion: Changes in collaboration among municipal nurses, general practitioners, and hospital staff were related to dependency structures and municipalities' newly gained central role in a telecare network. While the telecare network was initially characterised by asymmetrical dependency structures, these were partially equalised over time because of the municipalities' new position in the network.

Keywords: telecare; home monitoring; interorganisational collaboration; intersectorial collaboration; horizontal integration; dependency structures

Introduction

Health care systems in developed countries struggle with fragmentation of care, lack of coordination, and interorganisational collaboration [1–3]. Various political strategies have been developed and research undertaken to find solutions to each of these problems, yet fragmentation continues [2]. One attempt to address such problems has been through the innovation and implementation of digital tools that allow for fast and easy sharing of patient data [4, 5]. For example, experimentation with new initiatives such as telecare is growing at a rapid pace throughout the majority of the world [6]. Telecare is a new health service that involves the use of technology within patients' homes, such as home monitoring, safety monitoring, and information service technologies [7]. Certain of these technologies are already in broad use [8], though home monitoring has yet to be institutionalised within the conventional treatment of persons with chronic diseases (for an exception, see [9]). Various pilot studies of telecare show promising results, including enhancement of efficiency, improved quality of care, and better integration of care via the effective coordination of activities and collaboration between different health care providers [10–13].

As telecare services have yet to become fully mainstream, the majority of research in the field is based on pilot projects [4] and has focused on economical and clinical effects [13]. Few studies have investigated how telecare may contribute to integrate activities and collaboration between different health providers (e.g., [10, 14]). Thus, the following research question was asked: *How does telecare affect interorganisational collaboration within a network of health care professionals from different organisations and political levels?* Contrary to prior studies, this study examines a large-scale, cross-sector Danish telecare programme involving more than 1,200 patients with chronic obstructive pulmonary disease (COPD) who receive remote home monitoring from an interorganisational telecare network of eleven municipalities, four hospitals, and 225 general practitioners (GPs). The study offers two substantial contributions. First, it deepens our empirical knowledge of telecare in a complex, large-scale setting with multiple health care organisations. Second, it provides a nuanced understanding of how telecare reconfigures interorganisational networks in terms of interorganisational collaboration, dependency, and power structures.

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Context: The Danish Health Care System

The Danish health care system is a mainly public system based on general taxation. The system is characterised by rather strong regulation from the state, and is managed politically at the state, regional, and municipality levels. The health care system is organised into primary and secondary health sectors. Primary health care services are mainly provided by two separate actors: self-employed GPs (family doctors) and municipalities (the local political level). GPs act as gatekeepers to the health care system, as the majority of access to hospital treatment (except for emergency visits) and municipal health services requires referrals from GPs. Municipalities provide preventive care, home care, and rehabilitation. Secondary health care services are provided by hospitals, which are led by regions (the regional political level). Hospitals perform specialised treatment, both during hospitalisations and as a part of outpatient clinic services [15]. Even though the Danish health care system is perceived to be one of the most integrated systems in Europe, it nonetheless struggles with fragmentation challenges [3]. Such fragmentation creates extensive demand for the integration of activities between the three main health providers (municipalities, hospitals, and GPs), especially concerning patients with chronic conditions [10].

Case

The paper is based on a qualitative case study of *TeleCare North* [16], the largest Danish telecare programme. This programme is rather distinct both in Denmark and internationally because it involves interorganisational collaboration between health care actors in the primary and secondary health sectors. **Figure 1** depicts the actors in the telecare network of the programme.

The aim of the programme is to improve collaboration between different health care providers, for example, by providing shared access to the same monitoring database. Furthermore, savings in terms of hospital (re)admissions and improved quality of life are expected outcomes of the programme [16].

TeleCare North focuses on the home monitoring of patients with COPD who live in the northern part of Denmark. These COPD patients self-measure oxygen level, blood pressure, pulse, and weight, and answer questions about their symptoms. This data is then sent to a shared monitoring database that allows not only GPs to

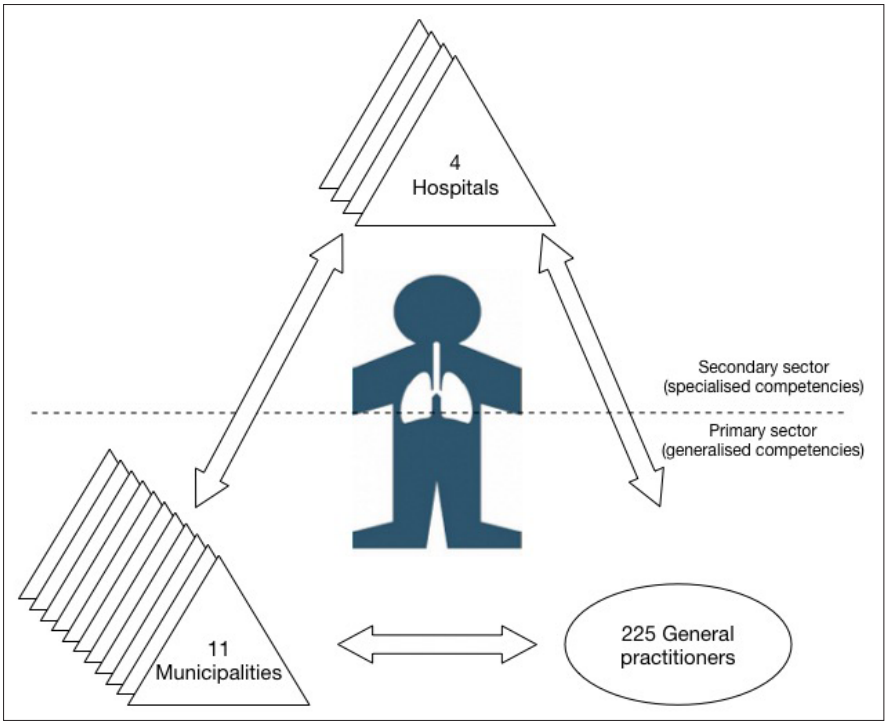

Figure 1: Interorganisational telecare network.

access and monitor patients' data, but also health professionals from municipal health centres, municipal district nurse units, hospital wards, and hospital outpatient clinics. Conventionally, various groups of health care providers use their own electronic documentation systems that are not accessible to others outside their organisation. The *TeleCare North* programme is managed by a steering group with representatives from municipalities, hospitals, GPs, and other relevant actors (e.g., patient unions and the National Agency for Digitisation), with a composition that reflects the interorganisational setup of the programme. At the administrative level, the programme's steering group facilitates interorganisational collaboration [17]. At the operational level, formal agreements between the municipalities, hospitals, and GPs assign roles and tasks to different municipalities, hospitals, and GPs. Municipalities are responsible for monitoring patients in a stable COPD course (which characterises the majority of patients in the programme), while hospitals are responsible for monitoring the most severe COPD patients. GPs are responsible for referring patients to the programme, and have an on-going responsibility to adjust each patient's measurements, such as concerning acceptable levels of oxygen in the blood. GPs serve much like a form of medical consultant to municipal nurses.

Conceptual Framework

To understand how telecare can integrate care across the different health care providers, it is necessary to understand how integration can be obtained. According to Axelsson and Axelsson (2006), integration can be divided into vertical integration and horizontal integration. Vertical integration denotes integration between organisations or organisational units at different hierarchical levels, whereas horizontal integration denotes integration at the same hierarchical level. Collaboration involves a high degree of horizontal integration and a low degree of vertical integration. Collaboration can be difficult to achieve, as it often relies on voluntary agreements and mutual adjustments between organisations in the absence of a common hierarchical structure [17, 18]. Alternatively, cooperation involves both a high degree of vertical integration and a high degree of horizontal integration. Cooperation combines hierarchical control mechanisms with greater voluntary network collaboration in a complex matrix organisation [19], requiring a kind of common hierarchical system or formal agreements in interorganisational contexts.

Collaborative processes and interorganisational relations often take place within a network structure. Interorganisational networks emerge through the repeated interactions of organisational actors from different organisations, and are the result of different kinds of interdependencies between network organisations in terms of solving tasks or achieving certain goals [17, 20, 21]. By entering or forming networks, organisations gain access to new resources, such as information, competencies, knowledge, and money, which make it possible to solve tasks that they could not otherwise have handled by themselves [2, 17, 20–22].

Numerous kinds of network types exists (e.g. joint ventures, strategic alliances etc.) [23] but a certain type is of interest to this study because it denotes relations between different kind of organisations that collaborate to reach a shared goal: a systemic network. Such networks consist of different organisations with complementary competencies, services, or products that collaborate to solve a shared task in an interorganisational context. Completing shared goals requires the functional differentiation of roles, responsibilities, and tasks, as well as horizontal processes of collaboration and the integration of activities in a network [10, 17]. Thus, organisations are highly dependent on each other to solve shared tasks. Due to such dependency, tensions and conflicts may arise between the organisations, especially when one actor is more dependent on another. According to resource dependency theory, dependent actors have a weaker position in a network and may attempt to countervail asymmetrical dependency structures by forming coalitions or searching for alternative collaborators [20]. However, such attempts do not often go unnoticed by the more powerful actors in a network, who typically counteract to remain in a powerful position [24, 25].

Interorganisational relations and collaboration processes are thus dynamic, loaded with moves and countermoves to achieve the most advantageous position within a network. Furthermore, negotiations and power struggles concerning specific domains and the division of labour serve to (re)define, and sometimes blur, the boundaries between professionals and organisations within a network. This is especially evident in health care systems that include professional bureaucracies which rely on highly trained professionals (e.g. doctors), and are characterized by a high degree of functional specialization and decentralized decision-making structure [26–28]. According to Abbott (1988) the implementation of new tasks and technologies can create disturbances in existing power relations between professions and within systems of professions. Within systemic networks that consist of professional bureaucracies, tensions and power struggles should therefore be anticipated.

Based on this conceptual framework, this study investigates the horizontal collaboration processes and dependency structures at the operational level among various health care professionals across different municipalities, hospitals, and GPs within a systemic network where tasks are predominantly mandated through formal agreements. This network is characterised by a high degree of functional specialisation and complexity, where conflicts, tensions, and power struggles among the different health professionals and the organisations are very likely to be part of collaboration processes.

Methodology

Data Collection

This study uses qualitative methods to collect data concerning the effects of telecare on collaboration within an interorganisational telecare network. Nurses from various municipalities' health centres, district nursing units,

hospital wards, and outpatient clinics, as well as physicians from hospital wards and GPs, were interviewed and observed in this study. The interviews were repeated one year after the first were conducted, for a total of 28 semi-structured interviews and 10 hours of observation. The participants were recruited through local project managers in the organisations in the programme, except for the GPs, who were recruited through a direct contact. As a result, five municipal nurses, two hospital nurses, two lung physicians, and six GPs participated in this study.

The study's interviews were based on an interview guide that includes theoretical concepts about collaboration (in terms of information flow, knowledge exchange, and boundary spanning activities), interorganisational relations (the interactions, strengths, and reciprocity between relationships), dependency structure, interorganisational and interprofessional conflicts, and descriptive themes concerning the division of labour (roles and function), task changes, and the integration of telecare tasks in existing work practices. The interviews, a combination of face-to-face interviews and telephone interviews, lasted 30–70 minutes, and were transcribed in full.

Five of the interviewed nurses were observed as they performed telecare activities. Three of the observed nurses came from municipalities, with the rest coming from a hospital setting. The observations focused on how the nurses assessed patient data and communicated with patients and other health care professionals, such as GPs, municipal, and hospital staff when assessing such data. During the observations, the nurses often spoke of their frustrations related to collaboration with other actors, as well as difficulties using the telecare database. Furthermore, they often articulated tacit knowledge and practices in relation to telecare that were not mentioned in the interviews [27]. Such information was documented in extensive field notes written immediately following the observations. Most of the conversations during the observations further expanded upon certain topics of the interview. However, the observations also revealed new perspectives and topics that were not part of the interviews. For instance, while a lack of trust between municipal and hospital nurses was not mentioned in the interviews, it was revealed in the observations.

The data collection took place six and eighteen months after the first patients were enrolled in the telecare programme, respectively. Both interviews and observations were conducted by the same researcher (the author), who had been studying the telecare programme closely since its inception two years prior.

Analytical Approach

The study of interorganisational networks and how a new telecare programme may improve collaboration among networked health care providers was done by switching analytical lenses of zooming in on each organisational part of the network and zooming out to the network as a whole at large [29]. Zooming in on the organisational level made it possible to investigate how each part in the network utilises and perceives collaboration with the other parts of the network. Conversely, zooming out to the network level enabled analysis of the network's goals and outcomes as a whole, as well as how the interorganisational network changed as a result of implementing telecare. In addition, this analysis illuminated the effects of the new telecare programme on interorganisational collaboration. The combination of these two analytical lenses served to gain knowledge as to how telecare may be used to improve collaboration among different health providers across multiple professions, organisations, and political levels.

The analysis was performed in four stages. First, the transcribed interviews and field notes were thematically coded [30] using the qualitative software programme NVivo. The codes were partly constructed from theoretical concepts in the above-mentioned interview guide, and partly emerged from the empirical data (e.g., lack of trust). Second, the data were coded in terms of each organisation in the network and the dyadic relations between them, including changes in work routines, roles, and interorganisational relations. Third, the analysis focused on the aggregate level of the network, focusing on changes of position within the network, network outcomes, interorganisational dynamics, interrelatedness between dyadic relations, and interorganisational collaboration. Finally, the findings of this study were presented to local project managers within the municipalities and hospitals, the steering group of the telecare programme, and other practitioners in the field. During these presentations, the results were discussed and validated as widely recognised among the practitioners.

Results

The results of this study are presented in three sections. In the first section, the findings concerning interorganisational collaboration between municipalities and GPs within the primary health sector are presented by zooming in on the dyadic relations and collaborative efforts between these organisations. The second section offers findings concerning the collaboration between primary health sector (GPs and municipalities) figures and hospitals in the secondary health sector. The third section identifies changes of interorganisational collaboration within the telecare network between the two data collections. Based on these results, the findings concerning the broader telecare network and implications for interorganisational collaboration among the three different health providers in the network are given.

Collaboration among Municipal Nurses and GPs in the Primary Health Sector

The analysis of each organisational part of the telecare network revealed that only municipal nurses experienced significant changes in their work after the implementation of telecare, which in turn affected their collaboration with GPs. Traditionally, municipal nurses are generalists that lack training within a specialised field. In the telecare network, the majority of smaller municipalities had only generalist nurses, whereas the larger municipalities had specialised nurses. Half of the interviewed municipal nurses did not have specialised

COPD competencies. The study's observations revealed that municipal nurses were struggling when assessing patient data, as this new task required specialised, in-depth knowledge about COPD. Telecare was found to have forced the municipal nurses into specialist roles formerly belonging to hospital nurses.

The new requirements of these specialist roles affected the nurses' collaboration with GPs, as they required increased support from GPs for the legitimacy of their data assessment. The result was more intense collaboration between municipal nurses and GPs due to the significant increase of queries from municipal nurses. Moreover, collaboration itself became more professional because, through the use of telecare, the inquiries of the municipal nurses were more precisely formulated and supported by comprehensive knowledge and information regarding patients' conditions. One GP expressed how collaboration was professionalized as a result of telecare of the collaboration as follows:

> "The municipal nurses can now deliver certain interesting observations of patients which I find useful. So, yes, telecare supports our collaboration."

The positive perception of collaboration after the implementation of telecare also resonated in the municipalities, as explained by a municipal nurse:

> "Now I communicate more and better with the GPs because our communication has more substance than before. I get more professional inputs, which I would not have gotten from another nurse. So, yeah, I really appreciate it."

In several cases, intensified collaboration was recognised as a way of increasing quality of treatment for the involved COPD patients.

Collaborative efforts in relation to telecare were initiated solely by the municipal nurses, who were highly dependent on the GPs' medical expertise. From the GPs' perspective, they could solve tasks independently of the nurses, and furthermore, felt no obligation to collaborate with the nurses. This asymmetrical dependency left the municipal nurses in a vulnerable position, leading to frustrations with GPs that were unwilling to collaborate. Despite the seemingly subordinate position of the municipal nurses, however, they were able to challenge the GPs' position and authority in the decision-making process due to their newly gained knowledge about COPD and the patients' conditions which was gained through telecare.

Both the nurses and the GPs articulated underlying issues of interprofessional tension in the interviews and observations. The GPs expressed that the municipal nurses were controlling their work and questioning their decisions about the treatment of the COPD patients. Consequently, they felt that the municipal nurses were infringing upon their professional domain. As for the municipal nurses, they expressed a similar sentiment, though in a slightly different way. Some of the nurses had experiences with GPs that suddenly became hostile and very protective of their status as clinical decision-makers. One of the nurses explained this hostility:

> "I suggested another self-treatment plan to one of the GPs and this annoyed the GP. She wouldn't comply with my suggestion because, she said, 'I have the clinical knowledge and expertise in this field. I'm in charge and I decide how this patient is treated'. It was like she wanted to put me in my place."

The majority of the municipal nurses also spoke about how their new knowledge gave them greater influence in relation to the GPs in terms of treatment and in the clinical decision-making process. Regardless of these underlying issues and asymmetrical dependency relations, however, telecare supported the interorganisational collaboration between municipal nurses and GPs within the primary health sector by making the collaboration more professional.

Collaboration between the Primary and Secondary Health Sectors

In general, collaboration facilitated by telecare services among health care professionals from hospitals in the secondary health sector and the municipalities and GPs of the primary health sector was very restricted. The interviewed health care professionals from each of these areas characterised cross-sector collaboration as weak or non-existent. One hospital nurse discussed the weak ties between her and the GPs:

> "I haven't been collaborating with the GPs at all in relation to telecare. (. . .) Actually, I don't find it necessary to collaborate more extensively with them. If they refer a patient to hospital treatment, well, then the referral is enough communication for us. What else do we need to collaborate about? So, our collaboration with the GPs can be characterised as non-existent."

No interdependencies between hospital nurses and GPs were acknowledged by all interviewees. Similarly, the lung physicians, for example, did not express any dependency on the GPs or the increased need for collaboration. In line with this statement from the hospital nursenearly every GP was surprised to hear that the hospitals were a part of this programme even though it had been implemented for nearly six months at the time they were first interviewed. This clearly exemplified the non-existent collaboration between the hospitals and GPs. Similar to the hospital staff, none of the GPs expressed a need for greater or extended collaboration.

At the municipalities, the need for interorganisational collaboration with the hospitals was more pronounced. The municipal nurses expected better information flow and knowledge exchange with hospital staff to be one of the goals of telecare. However, these expectations were not met, as one of the municipal nurses explained:

> "We had one patient who was hospitalised. During his hospitalisation they changed his medicine and oxygen treatment. However, we were not notified at all, even though the hospital staff and his GP knew he was part of this telecare programme [and that we monitor his data, ed.] (. . .) Afterwards, we talked to the patient, and he assumed we knew about the changed medication and oxygen treatment, but we didn't."

This lack of integration in terms of knowledge and activities between municipalities and hospitals created fragmented care for patients in two ways. First, missing information related to hospitalisation meant that municipal nurses lost a degree of their authority in terms of knowledge and were not able to build a treatment alliance with the hospital staff. Instead, communication across the sectors appeared incoherent. Therefore, telecare did not mediate a shared understanding or better information flow between the different health care providers from the municipalities and hospitals. Second, hospital actors did not integrate municipal nurses' or GPs' knowledge about the COPD patients into their work activities. For example, regular check-ups at the outpatient clinic were held as usual without the integration of telecare data or observations from the municipal nurses. The frequency of the check-ups was not changed regardless of whether or not the municipal nurses deemed patients to be on a stable COPD course without exacerbations, which reflected the limited collaborative efforts between the municipalities and hospitals. Hence, the integration of knowledge in the patients' courses and changes in behaviour was limited when relying solely on the voluntary behaviours and good-will of the collaborators.

One episode, however, within a municipal nursing district unit, serves as an example of successful collaboration, as the following sequence from the study's observation notes illustrates:

> "The municipal nurse calls a patient because his oxygen level is very low. They talk about his latest hospitalisation and how the physician at the lung ward recommends oxygen treatment. The municipal nurse supports this recommendation and the patient seems more convinced."

This example illustrates how the two actors successfully collaborated across the primary and secondary sectors in an alliance so as to convince a patient about starting oxygen treatment. As a result, the information and recommendations from the two sectors were coherent and integrated for the patient. In this case, telecare created an opportunity to collaborate and mediate a shared understanding of the patient's treatment.

Even though collaboration in most cases was close to non-existent, conflicts between municipal and hospital nurses were nonetheless identified in the study's interviews and observations. These conflicts concerned distrust of each other between the nurses. Certain patients were monitored at different times by both the municipalities and the hospitals. The majority of the nurses, regardless of their organisational affiliation, checked up on their patients when they were monitored by the other party, even though they were not supposed to, which led to suspicions concerning how the other party was reacting to patient data. One of the municipal nurses expressed this issue in the following way:

> "Collaboration with the hospital has not been very successful. We have a patient who is currently being monitored by the hospital. I am curious, so I still check his data. I discovered that the hospital doesn't really react to bad vital signs from him. So I don't think the collaboration actually works."

This nurse was not able to access the hospital's electronic medical record so as to see how the hospital nurses were reacting to the patient's measurements, but could only see the patient's basic data. Similar situations were observed in the hospitals. In the study's observations, it was evident that the counterpart (either the municipal or hospital nurses) did in fact react and offer treatment based on poor measurements, but this was not noted in the monitoring database in the telecare programme. As the health professionals only documented their actions and decision-making processes in the medical records of their own organisations, the sharing of knowledge was highly restricted. Consequently, the inability to gain insight into other institutions decision-making processes was a barrier to interorganisational collaboration.

Changes in Interorganisational Collaboration

As demonstrated, telecare predominantly affected collaboration in the primary sector between municipalities and GPs. However, networks are unstable entities that fluctuate and change according to different network dynamics [31], which was found to be the case in terms of horizontal collaboration processes in a year follow-up examination. Two main changes were identified. The first concerned collaboration between GPs and municipal nurses. Between the first and the second interview round, collaboration was found to have decreased. One hypothesis for this was that the need for collaboration simply decreased after initial challenges with telecare and adjustment of the programme were overcome. However, this was not altogether true. In certain cases, decreased collaboration was a result of telecare being utilised mainly as a mono-organisational service, with municipal nurses solving telecare tasks independently of GPs or hospitals. Interorganisational collaboration was thus in these cases almost non-existent. GPs were detached from the telecare services and no longer had any interactions with them. In other cases, the positive dynamic between the municipal nurses and GPs found in the study's first interview round was enforced, namely, with regard to the quality and professionalism of the municipal nurses' inquiries to GPs. One GP explained this on-going positive dynamic as follows:

> "Collaboration with the municipal nurses is much better. It is more relevant; the questions from the

> nurses, who have all of this information from the patients' self-monitoring, have become much more relevant compared to the beginning of the programme."

In these cases, there seemed to be greater mutual acknowledgement of interdependency and complementarity between the GPs and the nurses since the first interviews, with dependency relations appearing less asymmetrical, even though the nurses were still more dependent on the GPs than vice versa. The second change was related to the patients' role, as they had gained a more active role in their treatment and were more empowered to start treatment themselves according to their self-treatment plans. As a result, collaboration between municipal nurses and GPs became more indirect and mediated through the patients themselves. A municipal nurse explained this change of empowerment as follows:

> "In the beginning of the project, the patients disclaimed responsibility for their disease. They expected me to contact their GP when they felt bad. Now, however, most of them have taken responsibility for their disease; they are in charge now."

One GP elaborated on the indirect collaboration created by patients, who serve as links between different health providers:

> "The patients are the link between the municipal nurses and me. They contact me because their municipal nurse told them to."

Several GPs, however, stated that patients still perceive them as the medical authorities, and that the latter informs them each time they start self-treatment, even though the GPs do not require this information. Thus, it appears that the GPs' role as the medical authority remains intact despite the new central role of municipal nurses in patient courses. Despite these continuing changes, the amount of collaboration between the primary and secondary health sectors remained unchanged and almost non-existent.

Discussion

One of the main objectives with *TeleCare North* was to improve collaboration by developing and implementing an interorganisational telecare service among the three main health providers in Denmark (municipalities, GPs, and hospitals). The findings of this study reveal that telecare affected interorganisational collaboration to varying degrees, and that these degrees further changed over time. The analysed dyadic relations between municipalities and GPs in the primary sector and between the primary and secondary sectors, however, cannot be understood without taking into account other relations and dynamics in the network. Thus, the findings related to the dyadic relations at the broader network level will here be discussed.

One of the basic aspects of systemic networks is that organisations are mutually dependent on each other to solve a joint task [17]. Interorganisational relations are interconnected in a complex web, with changes to certain relations affecting other relations in the network. Therefore, when collaboration between GPs and municipal nurses is enforced, it both affects and is affected by the interorganisational relations between *GPs and hospitals* and *hospitals and municipalities*. Interconnectedness was witnessed in the network in the following ways. Strong ties between GPs and municipal nurses were often associated with weak or non-existing collaboration with hospitals in the telecare network. Stronger collaboration and enhanced competencies in the primary sector appeared to supplement demand for hospital services and expertise when delivering daily telecare services. As a result, the hospitals' role and functions in the telecare network were nearly invisible to the other actors within it, which the following quote from a hospital nurse illustrates:

> "It is my impression that the municipal nurses are skilled when handling the COPD patients. They don't need our expertise. Before [the telecare programme, ed.] we perceived our self as *the experts*, and of course we are still the experts in some aspects, but when it comes to COPD, we are quite equal with the municipal nurses, who assess the patients' data."

Despite their near invisibility to the other players in the network, no counteractions were taken by the hospitals to re-establish the dependency structures that favoured their powerful position as COPD experts.

In other cases where collaboration between municipal nurses and GPs was weak or non-existent, more informal, ad hoc collaboration between municipal nurses and hospital staff emerged, with GPs distanced within the telecare network. Traditionally, collaboration between municipal nurses and hospitals was mediated by GPs, who referred patients to hospitals or municipal health services. However, when the GPs refused to collaborate and mediate the link between the hospitals and municipalities the municipal nurses found alternative strategies to collaborate directly with hospitals when GPs refused to participate and serve as mediators. A municipal nurse commented on this issue as follows:

> "We asked the GP about a self-treatment plan, but he refused to take it, so instead we contacted the lung physician at the hospital, who made a more comprehensive treatment plan (. . .). So, we find our loopholes [when the GPs refuse to collaborate, ed.]."

The above comment reflects the asymmetrical dependency structures of the telecare network and how they force municipal nurses to initiate and maintain collaboration with various medical experts (GPs, hospital nurses, or doctors). Such unequal dependency structures speak to how more dependent organisations (in this case, the municipalities) are left in a vulnerable position in terms of support and ability to react properly on poor measurements.

However, as has been shown in this study, it is nonetheless possible for dependent organisations to work their way around certain obstacles in a network and build interorganisational relations to fulfil their needs.

Based on the findings of this study, it is important it is to take into account power and dependency structures when studying networks. These structures have often been omitted in studies on networks, as mutual dependency has been assumed to equalise power asymmetries [32]. Indeed, such power and dependency structures are not stable, but fluctuate and change according to network dynamics and changes in network organisations and broader contexts [24, 31, 33]. Fluctuation and changes in power and dependency structures was evident in the telecare network when municipal nurses became less dependent on medical expertise as they became accustomed to telecare tasks and gained more specialised knowledge concerning COPD and their patients. Consequently, the dependency and power structures in the telecare network changed, and the three health providers could act more independently in solving telecare tasks. However, with this came the risk of losing the incentive to collaborate.

Each of the actors in the network was not able to reach the shared network goals alone. For example, the network set the goal of reducing ordinary check-ups at the hospitals and among GPs. To fulfil this goal, both hospitals and GPs were dependent on municipal nurses and their assessments of patients' conditions. However, the hospital staff and GPs continued to work independently of the municipal nurses, and thus the network goal was not reached. To achieve this goal, a greater balance between autonomy and dependency in the network was required, which should be developed and maintained through the effective management of horizontal network processes [17, 34]. The findings of this study further suggest that the integration of activities in the telecare network must be achieved beyond mere collaboration. For example, it may be beneficial to focus on vertical integration through hierarchical mechanisms. That is, cooperation [18] – which involves a high degree of hierarchical control mechanisms, voluntary agreements, and mutual adjustments between organisations – may be a more useful method for developing complex health services that cross organisational boundaries.

Methodological Considerations

This study followed a qualitative case study design. Throughout the study, rich descriptions of the organisational settings and contexts allow the findings of the study to be transferred to similar settings, as well as be generalised for further analyses. The internal validity and credibility of the results were gained through the presentation to and validation of the findings by practitioners in the telecare programme. Even though the results were controversial (as they revealed that network goals were not achieved), the different practitioners confirmed the findings within their own organisations. Moreover, the researcher's insight into the field enhanced the credibility of the findings [35].

The analytical choice to divide the network into dyadic relations may be perceived as a limitation of the study. The decision was made to decrease the complexity and comprehensiveness of full network analysis. Though, dividing the network into dyadic relations does not offer a full analysis at the network level [22]. Analysing networks at the network level, however, was beyond the scope of this study. Consequently, a full explanation of the network's dynamics is not offered in this study. Instead, the dyadic relationships and their interconnectedness are investigated and discussed in relation to network goals and dynamics.

Conclusion

The implementation of telecare was found to affect interorganisational collaboration between municipalities, hospitals, and GPs to varying degrees. The changes identified in this study with regard to interorganisational relations were related to structural properties, power, and dependency structures in the telecare network. The telecare network was centralised, with the municipalities serving as its central organisations. This central position gave the former power, and thus the municipal nurses had increased influence on COPD treatment, which challenged the medical authority of GPs, as well as generated intra-professional conflicts between the hospital and municipal nurses. The municipalities were put in a vulnerable position, as they were significantly more dependent on the medical expertise of GPs or hospital staff than the other way around. This dependency initially instigated intensified collaboration among municipal nurses and GPs. When collaboration with the GPs was impossible or difficult to establish, the municipal nurses found alternative strategies for receiving medical expertise from hospital staff. Otherwise, the hospitals were nearly invisible to the other actors in the telecare network. The dependency structures, however, changed during the period that the telecare network was studied. The municipalities became less dependent on medical expertise as their experiences and knowledge about monitoring COPD patients grew. Accordingly, municipal nurses' collaboration with the GPs was less intense. However, both the GPs and municipal nurses characterised their collaboration as more professional and relevant as a result of telecare use, and that such professionalization had in certain cases been reinforced over time. At the same time, the telecare programme also led to interprofessional power struggles, as the municipal nurses challenged the GPs autonomy and positions as medical authorities. This study illustrates how networks fluctuate and change according to internal network dynamics and external dynamics. To improve or change interorganisational relations, continual effort and attention must be given to the power and dependency structures of networks and their interrelated dynamics.

Reviewers

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Competing Interests

The author has no competing interests to declare.

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Appendix B. Interview guides

Interview guide for the top management level (original in Danish)[1]

Presentation of me and introduction to the interview (e.g. practical matters, time-frame, recording of interview etc.).

Theme: The actor's narrative of the large scale program

Interview question (Q)[2]: Could you please tell me about how *TeleCare North* came into being (processes and central actors)?

Sub-questions:

- When did you start to perceive the pilot study TELEKAT as something that had potential to become a large scale program?
- Why and how did the upscaling of TELEKAT succeed?
- Who were the central actors in this process?
    - What was your role in this process?
- What have the main challenges been in relation to the upscaling?
- Can you describe the support of the program? Who supports it? Are there any actors who oppose to the program?
- What are the crucial milestones for the upscaling and the large scale program from your perspective?

Research question (RQ): What kind of interests do the actors have in the large scale program?

Q: What kind of expectations do you have to the *TeleCare North Program*?

Sub-questions:

- What about the other stakeholders?

[1] This interview guide was used for the two top managers and the project chief. The interviews was conducted in the Winter of 2013

[2] The research questions (RQ) resembles the scientific question whereas the questions (Q) and sub-questions denote the question-formulation used in the interviews (i.e. 1-2 month after implementation).

- Are your expectations aligned?
- Did you do anything to get them aligned (in case of disagreements)?

Theme: Collaboration
RQ: How does the actor experiences the horizontal collaboration processes between the main actors in the telemedicine network?

Q: Can you explain the collaboration among the different actors in *TeleCare North*?

Sub-questions:
- What are the main challenges of working across the sectors?
- Do you think that the cross-sector collaboration in *TeleCare North* influences future collaboration activities?
- If others are to copy the cross-sectorial collaboration from *TeleCare North*, what are your advises to them? What should they be aware of?

Theme: Strategic level
RQ: How do the top level management engage in connecting *TeleCare North* to national, regional, and local top-down strategies within the health care field?

Q: How do you work with *TeleCare North* at a strategic level? What kind of tasks are the most important when working with the program at the strategic level (both within own organization and more broadly)

Q: When I read the various national health, telemedicine, and digitalization strategies, I notice that *TeleCare North* is part of several of these strategies. Could you please tell about how you work with connecting the program to the various national actors and the strategies in the health care field? How was *TeleCare North* chosen to be one of the national milestones on the telemedicine area?

Q: How do you think *TeleCare North* is like in 5 years? What is the status of the program (e.g. is it widely implemented at a national level)?

Theme: Finishing remarks

Q: Lastly, is there anything important we haven't yet talked about? Do you have some closing remarks?

Interview guide, Representative from Danish Medical Association in North Jutland[3] (original in Danish)

Introduction to the interview (purpose, practical matters, time-frame, and recording).

Theme: Background information

RQ[4]: What role does the general practitioners' representative play at the top-management level in the *TeleCare North* program?

Q: Could you please explain your role in *TeleCare North*?

Sub-question:

- When were you engaged in *TeleCare North*?
- You act as the representative for the Danish Medical Association in North Jutland – what is your role in *TeleCare North*?
- Have you been a part of informing and spreading knowledge about *TeleCare North* to the general practitioners in general?

Q: How did you experience the upstart of *TeleCare North*? Does that resemble 'normal' upstart processes in the various projects you are part of?

Theme: Expectations and attitude toward TeleCare North

RQ: What kind of expectations to the general practitioners have to *TeleCare North* and the use of it in their clinical work?

Q: If you think of *TeleCare North* from your profession as a general practitioner, what do you think what do you think about the program?

Sub-questions:

- What are your expectations to the program?

[3] This interview guide was used to interview the general practitioner and representative from the Danish Medical Association in North Jutland in the Steering group. The interview was conducted in autumn 2013 (i.e. 2 months before implementation).
[4] The research questions (RQ) resembles the scientific question whereas the questions (Q) and sub-questions denote the question-formulation used in the interviews.

- Do you think you are going to use the monitoring system and the telemedicine data in your clinical work?
- How was it to enroll the patients in the program? Do you know anything about the other general practitioners experiences with this task?

Theme: Collaboration

RQ: How do the general practitioners experience horizontal collaboration processes in the systemic network that consists of municipalities, hospitals, and general practitioners? Which kind of collaborative endeavors and boundary spanning activities can be identified?

Q: Now, I would like to hear something about your collaboration with the hospitals and the municipalities in general. Would you tell me about how you experience collaboration with the municipalities in your day-to-day work?

Sub-questions:

- How do you communicate with the municipal nurses?
- Do you know about the different health services that you can refer your patients to in the municipalities?
- Could you please give an example of a successful collaboration with the municipalities?
- Could you please give an example of an unsuccessful collaboration with the municipalities?
- How would you normally characterize the collaboration?
- Lastly, are you part of the general practice-municipality collaboration meetings? What are your experiences with them?

Q: Would you tell me about how you experience collaboration with the hospitals in your day-to-day work?

Sub-questions:

- How do you communicate with the hospital staff?
- Could you please give an example of a successful collaboration with the hospitals?
- Could you please give an example of an unsuccessful collaboration with the hospitals?
- How would you normally characterize the collaboration?

RQ: How are the general practitioners self-perception and response to negative stereotypes about them?

Q: Sometimes the general practitioners are depicted as difficult to collaborate with. Why do you think it is so?

Theme: Finishing remarks

Q: What do you think are the main challenges in relation to *TeleCare North*?

Q: Lastly, is there anything important we haven't yet talked about? Do you have some closing remarks?

Interview guide, local project managers, round 1[5] (original in Danish)

Introduction to the interview (purpose, practical matters, time-frame, and recording)

Research question	**Interview question**
How is *TeleCare North* organizationally anchored in the municipalities and hospitals?	To start with I would like you to tell about yourself. Where are you positioned in your organization (also ask about department)? What is your educational background?
	You are the local project manager in the Implementation-group but in your own organization who do you refer to? Is there an intern implementation- or project group? Where do the members from the group come from (in your organization)?
	Which other departments or units are affected by *TeleCare North?* What do they think about the program? Does your organization have anyone else in any of the other workgroups?
What are the expectations to *TeleCare* North and what are the attitudes in the organizations to the program?	What are your organization's expectations to *TeleCare* North? What are your own expectations to *TeleCare North*? How was the decision-making process in relation to participation in the program?

[5] This interview guide was used to interview the local project managers from the Implementation-group in the first round. This interview guide is generic and was used as a template to the more individualized interview guides to each project manager. The interviews were conducted in winter 2013 (i.e. 9-11 months prior implementation).

Which kind of interorganizational conflicts and challenges in relation to *TeleCare North* are expected and why (e.g. based on prior experiences, incentives etc.)?	How is collaboration between your organization and the municipality/hospital/GP? What do you expect to be the most challenging when collaborating across the organizations?
How is the isomorphic network among the municipalities/hospitals?	The development of the *TeleCare North* Program requires extensive collaboration among your organizations (respectively the municipalities and the hospitals) – are you used to collaborate so extensive in other areas? What are the benefits/constraints by collaborating in this way?
How does *TeleCare North* affect or is being affected by other innovative initiatives in the organizations?	I assume that *TeleCare North* not is the only project in your organization. Are there any other projects that you think will affect *TeleCare North* or is being affected by it? Do you attempt to create any synergy effects between the various projects?
What are the most important challenges in relation to developing and realizing the *TeleCare North Program*?	Lastly, what do you think are going to be the biggest challenges in relation to developing and implementing the program?

Finishing remarks.

Interview guide, Operational level (round 1) (original in Danish)[6]

Presentation of me and introduction to the interview (e.g. practical matters, time-frame, recording of interview etc.).

Research question	**Question**
Theme 1: Introduction	
Introduction of the interview person.	Would you please start by presenting yourself (organizational position, experience, educational background)?
Which changes does the actor experience in regard of work practices, routines, and tasks in relation to telemedicine?	After you've been a part of *TeleCare* North, what kind of changes do you experience in your job? And what are the most significant changes? - The best changes. - The worst changes. What do you think about the XX[7] task is being placed at your organization? Would it be better to place it anywhere else? What about the YY task that is placed at the YY? Would it be better to place it anywhere else?
Theme 2: Interorganizational relations	

[6] This interview guide was used to interview the health professionals at the operational level in the first round. This interview guide is generic and was used as a template to the more individualized interview guides to each project health professional (depending on their organizational affiliation). The interviews were conducted in Spring 2014 (i.e. 4-6 months after implementation).

[7] This question and the following are being adjusted so they fit to the interviewed person depending on his/her organizational affiliation at the municipalities, hospitals or GPs.

Which implications does telemedicine have for the interorganizational relations between actors from the municipalities, hospitals, and GPs at the operational level?	Could you please tell me about how you collaborate with the municipality/hospital/GP in relation to telemedicine? - Examples. Is the collaboration different now when you use telemedicine? How? Does telemedicine support your work with your collaborators? How? Why?
Which conflicts characterize the interfaces between the hospitals, municipalities, and GPs?	What have worked really well when collaborating in relation to monitoring the patients? Do you have any examples? What haven't worked as good when collaboration in relation to monitoring the patients? Do you have any examples? If you should characterize your collaboration with the municipality/hospital/GP on a scale from really intense to non-existent where would you place the collaboration with the municipality/hospital/GP?
Does telemedicine cause any tranfer of tasks in the network?	Transferring some of the tasks from the secondary sector to the primary sector has been a political goal for many years – do you experience that *TeleCare North* supports this movement? Do you in relation to *TeleCare North* solve some of the tasks that the municipality/hospital/GP used to perform*?* How about the opposite, do you experience that the municipality/hospital/GP solve any of your tasks?

Case that are used to discuss the actors opinion, meaning, and experiences with transfer of tasks, changed competencies, power, and collaboration processes in the telemedicine network. The case derives from a real situation.	I would like to read a concrete collaboration scenario for you. I would like to say what you think about it and whether it is a recognizable situation. *The district nurse contacts the GP since of the the patients has a low saturation and is clinical affected by it. The district nurse assesses that the patient needs an arterial blood puncture at the hospital and wants the GP to make a referral for that. The GP disagree and wants the patient to come at the general practice clinic for a check instead. Moreover, the GP is not aware of the possibility of getting an arterial blood puncture done sub-acute at the hospital but the district nurse tells about this service (that has been established in relation to the program). The district nurse disagrees with the GP and contacts the outpatient clinic at the hospital where the patient is affiliated and goes to regularly controls. The outpatient clinic nurse agrees with the district nurse and contacts the GP. The GP continues to insist on seeing the patient in the general practice clinic. The outpatient clinic nurse informs the GP about the possibility of getting a sub-acute arterial puncture. In the end GP reluctantly send a referral.* What do you think about this scenario where the different actors disagree? Is this a typical case? Examples.
How is the actor's position (in regard of centrality and power) changing as a result of telemedicine?	After you have started using telemedicine, do you have more influence on the COPD courses than before? So do you have more or less influence on the patients' treatment? Does this affect your collaboration with the municipality/hospital/GP? Does telemedicine enable you to improve

	collaboration with the municipality/hospital/GP or to intensify it? Does telemedicine enable you to collaborate with the municipality/hospital/GP on your premises? Do you think the patients experiences changes in the way you health professionals collaborate?
Which kind of struggles over domain does telemedicine cause?	Have you in relation to *TeleCare North* experienced that someone stepped into your domain or that you stepped into someone else's domain? From your perspective, is the division of labor and responsibility clear in relation to the program? Have you experienced any grey zones or issues of doubts about who had the responsibility of monitoring the patients?
How to improve collaboration according to the frontline staff?	Lastly, if you could get a wish come true in relation to collaboration across the health professionals in *TeleCare North*. What would it be?
Finishing remarks	

Interview guide, operational level round 2 (original in Danish)[8]

Presentation of me and introduction to the interview (e.g. practical matters, time-frame, recording of interview etc.).

Research question	**Question**
Theme 1: Attitude	
What is the actor's attitude to telemedicine?	The first I would like to hear about is your thought about telemedicine. What do you think the benefits of telemedicine are?
How is telemedicine integrated into existing work practices?	I know it is quite different how many patients you are monitoring. How many patients are you currently monitoring (if relevant)? When we talked last time the monitoring task was relatively new. Now, I guess you have some more experience with monitoring the patients? So, what do you now find the most challenging when monitoring the patients? - If you have any doubts in relation to monitoring the patients what do you do? Is there anyone else in this organization that you can discuss it with? What about from the other organizations? Do you use your collaborating organizations for advises or in cases of doubt?

[8] This interview guide was used to interview the health professionals at the operational level in the first round. This interview guide is generic and was used as a template to the more individualized interview guides to each project health professional (depending on their organizational affiliation). The interviews were conducted in winter 2015 (i.e. approximately 16-18 months after implementation).

	What could make it easier for you to solve your telemedicine tasks?
Theme 2: Interorganizational relations	
How have the interorganizational relations in the telemedicine network changed due to telemedicine over time? What are the dependence structures in the telemedicine network?	The last time we talked, your experiences with collaboration with the municipality/hospital/GP[9] were a bit mixed. How do you experience the collaboration now? (ask into both of the dyadic relations) Do you experience that telemedicine supports your collaboration with the municipality/hospital/GP? How? Why? [Individualized questions based on the prior interview] Last time we talked the collaboration with municipality/hospital/GP was sparse/intense/not working/good – is it the same now or has it changed? - If yes: How has it changed? Can you give an example? - Why do think it has changed (or not)? - Do you miss the municipality/hospital/GP

[9] This question and the following are being adjusted so they fit to the interviewed person depending on his/her organizational affiliation at the municipalities, hospitals or GPs.

	when you solve your tasks? - How do you share information? - Do you feel dependent on the municipality/hospital/GP to solve your tasks? - Do you think they are dependent on you? - In the light of our talk now, do you think it would make a difference if you collaborated more extensive? In relation to the patient? In relation to your work? - Have you done anything to change the collaboration since the last interview?
Are the division of labor and responsibility still unclear? Do the actors have competence trust in each other? Which kind of conflicts is dominating the telemedicine network and have they changed over time?	From my last interview round it was visible that there were some unclarified issues in relation of division of labor and responsibility. Is it still like that? Do you experience any matters of doubt in that relation? The last interview round revealed that the municipalities/hospitals could be insecure about how the telemedicine tasks were prioritized and handled at their counterparts. Accordingly, I would like to hear about whether you experience that your counterpart handles the telemedicine tasks sufficiently? So, if you should try and characterize it, how is your trust in your counterpart's ability to solve the telemedicine tasks? What about the other way around – do you think your counterparts have trust in your ability to solve the telemedicine tasks? And do you think that influence the way you collaborate?

	So, just to finish this theme – what is the best and the worse in the collaboration with the municipality/hospital/GP? Just like the last time, can you characterize the intensity of your collaboration from a scale from really intense to non-existent?
Has telemedicine significantly changed the interorganizational collaboration processes in the network?	Lastly, I would like to there your thought about whether you perceive telemedicine as new way of collaborating in the health care sector? Why? Why not?
Finishing remarks	

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