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# Communication and Relations between Healthcare Professionals before and after Implementation of a Telehomecare System: A Study Protocol

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## Abstract

*Twenty years after Reed Gartner stated, that a successful implementation of IT systems is 80% organization, and 20% technology, the organizational part of implementing health IT is still overseen or gives challenges in many projects.*

*This research project follows the implementation of a telehomecare project for citizens with heart failure and focuses on the communication and relations between the health professionals.*

*The hypothesis is that new forms of cooperation and relationships between the actors emerge, mediated by the telehomecare technology used. The methodology includes Actor-Network Theory (ANT) and Relational Coordination as the conceptual framework. Data is collected using a mix-methods approach combining a before/after survey and focus group interviews. The relations between the actors are analysed using Social Network Analysis (SNA), and data from the interviews are analysed using an iterative condensation.*

*The objective is to show that relational coordination, ANT, and SNA, are useful theories and tools to elucidate changes in collaboration before/after implementation of a telehomecare solution, and provide an indication of why implementation in comparable organizations gives different results.*

## Keywords:

Telemedicine, Medical Informatics, Organisations, Organisational Change, Social Network Analysis, Actor-Network Theory, Relational Coordination.

## Introduction

It is now twenty years ago that Reed Gardner, at a health informatic conference in 1998, stated that successful implementation of IT systems is 80% dependent on the development of the social and political cooperation skills, and 20 percent or less on the hardware and software implementation [1, 2]. Marc Berg [3] supported this view by claiming that technology is crucial,

but secondary – even today several IT projects in the healthcare sector do not prioritize the organizational element of implementing IT enough.

In addition to the fact that the Danish municipal reform in January 2007 reduced the number of municipalities from 271 to 98, and the 14 counties became five regions, municipalities became more important in the health sector [4]. The municipalities gained major responsibility for prevention efforts, care and rehabilitation in relation to citizens, and the municipalities should contribute to the financing of health care in the future [4]. The latter was in order to encourage the municipalities to effectively carry out the tasks in the field of health. The changed division of tasks between primary and secondary sectors calls for closer cooperation with an increased need for coordination of treatment and care of patients/citizens between the sectors. To support the closer cooperation, new IT solutions have been developed for the exchange of information between the sectors – among these, an increased focus on telehomecare.

The use of telehomecare in general is growing and many local anchored pilot projects have been implemented, of which few have become decisive operating projects - with even fewer becoming large-scale or nationwide projects. Between 2012 and 2015 TeleCare Nord<sup>1</sup> ran a large-scale project in the Northern Jutland Region, Denmark. The purpose of the project was to offer telehomecare to citizens with Chronic Obstructive Pulmonary Disease (COPD). The experience of this project (hereinafter referred to as the COPD project) is part of the foundation for the rollout of telehomecare for citizens with COPD at national level. At the same time, the experience from the COPD project is being used for a new large-scale project, where telehomecare is to be offered to citizens with heart failure - in daily terms called the Heart Failure Project or just Heart Failure.

In the TeleCare Nord COPD project, there has been a strong focus on the organizational issues. Some of the experiences from the COPD project are, that "...it is an intensive work to adjust and adapt services and procedures to get coherent and effective processes." [5]. In spite of the above focus on the organizational issues, it is stated that "... should remain operational for both solutions and cooperation relationships." [5] and

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<sup>1</sup> Established in 2015 as a cooperation between the Northern Jutland Region and 11 municipalities in the region to support telehomecare projects.

in the completion report for the COPD project, the importance of “... a constructive and close cooperation across the core actors.” [5], and that cooperation is not “... implemented to the bottom, and there must be continued focus on behavioural- and practice changes.” [5]. Another experience from the COPD project is that even with the same technology, the implementation has been more successful (measured by activity between the healthcare professionals – the actors) in some places, than in other places.

## Purpose

The purpose of the research project is to do a descriptive/exploratory study [6, 7] to:

- Elucidate cooperation relationships between the actors before and after the implementation of TeleCare Nord Heart Failure to describe the importance of implementing TeleCare Nord Heart Failure on collaborative relationships.
- Elucidate whether there is a correlation between the cooperation relations and the outcome of the implementation, depending on where the actors come from.
- Understand and explain why the opinions and identities of the actors in terms of cooperation/relative coordination are changed/not changed before/after the implementation of TeleCare Nord Heart Failure.
- Understand and explain why there is a/is no correlation between the cooperation relations and the outcome of the implementation, depending on where the participants come from.

The working assumptions for the research work are:

- The implementation of TeleCare Nord Heart Failure leads to a higher degree of collaborative relationships/relational coordination, as the functionality of the application supports a greater degree of cooperation between the different actors.
- That the cooperation relations have a major impact on the outcome of the implementation of a telehomecare system - and that close collaborative relationships in an organization lead to better implementation than organizations with more loyal and sporadic cooperation relationships.

The purpose is chosen based on the evaluation of the COPD project and has been done in cooperation with TeleCare Nord. It is the intention that this PhD Project can help generate knowledge, that can subsequently help minimize the organizational challenges that emerged from the COPD project, as mentioned earlier, and thus be of benefit to other similar telehomecare projects.

The scope of the project is to contribute knowledge about communication/relations between actors through the implementation of telehomecare solutions. The currently included actors are:

- The health professionals at the four hospitals in the Northern Jutland Region

- Care staff in the 11 municipalities in Northern Jutland
- General practitioners in the Region of Northern Jutland

However, the citizens with heart failure, as an actor, have been excluded from the study. This is done to keep the focus on the organizational conditions and not the individual's medical progress.

The scientific purpose is to be able to use the theory of relational coordination and Actor Network Theory (ANT) as the conceptual framework for:

- Understanding change in relationships between health care professionals before/after the implementation of the telehomecare solution.
- Understanding why there is a difference in the implementation depth of the different groups of health care professionals.
- Suggesting one solution to what the healthcare sector can do to optimize the implementation of telehomecare solutions.

## Materials and Methods

The overall methodological approach is to use relational coordination as the theoretical framework, ANT as the conceptual framework and Social Network Analysis (SNA) as the data collection and analysis tool, but also to incorporate other relevant theories to discuss the outcome of the above.

### Conceptual framework

The conceptual framework is based on the assumption that relational coordination is based on two “legs” – (1) relationship between the actors, and (2) coordination task between the actors. The focus of this project will be on the relationships, and to describe relations between the actors as well as between the actors and the technology – telehomecare. ANT is included, as ANT focuses on networks consisting of heterogeneous actors, things, facts, etc. Gittell’s relational coordination will be discussed in regards to other management literature, which is not currently selected – but could be related to change management [8], Balogun & Hailey’s cultural web [9], and/or wayfinding/wayfaring [10-13].

As the general theoretical framework for analysing and discussing cooperation relationships between the participants in the Heart Failure project, Jody Gittell’s [14-16] concept of “relational coordination” is used. Relational coordination has been used as inspiration in building the former and current organizational structure of the Northern Jutland health service as well as across the sectors. Jody Gittell’s concept of relational coordination is used to understand what skills (professional, personal and social), that are required for collaboration in the Heart Failure project to work. ANT is involved as the conceptual framework for interpreting and analysing the relationship between the individual health professionals, and between them and the technology used (telehomecare). This involves both an understanding of why actors do what they do, and the perception, that the actors attach to why they do as they do. In this way, an

understanding of the interaction between professional identity, technologies, and other material circumstances, that enables or conversely prevents successful implementation of the Heart Failure project, is created.

As a tool for analysing data about actors' collaborative relationships, SNA is used. SNA is a structured approach to uncovering and describing networks [17-20]. By using SNA, it is expected that an insight can be given to the difference between communication and relations between the actors in the individual municipalities and to show whether there has been a change following the implementation of Heart Failure. The data collection for the SNA will be via electronic questionnaires and interviews with health professionals.

### **Paradigmatic background**

The project forms part of a theoretical framework regarding the development of management technologies and organizational structures used in public administration. Overall, this has been a development from New Public Management (NPM) towards New Public Governance (NPG). New Public Management was introduced by Christopher Hood in an article from 1991 [21], but since the 1980s it has been the governance paradigm in the public sector, where efficiency, performance management and continuous change are the goal and governance through incentive management [22, 23].

In addition, NPM works from a market mechanism and customer orientation where the patient/citizen becomes users [22]. As a replacement – or perhaps more in addition to the NPM, there has been more focus in recent years on NPG, where collaboration in network/partnership and innovation is in focus. This is because, among other things, NPG's focus: "... is very much about inter-organizational relationships and the governance of processes, and it stresses service effectiveness and outcomes." [24]. The NPG is based on a fundamental assumption, where the public sector is seen as an arena of co-operation and where network management and innovation are in focus [25].

At the moment, I see that relational coordination can be used both within a governance paradigm based on NPM, but also – and perhaps most – within a governance paradigm based on NPG.

### **Relational Coordination, ANT and SNA**

Relational coordination is largely based on network thinking [15], where Gittel uses some of the same calculations (eg Strengths and Cronbach's alpha) and chart types, which are also used in SNA. Until now, however, no explicit reference to SNA has been in the read literature, but it is my view, that the use of SNA, as a tool for analysing relational networks, will be obvious.

One of the possibilities of combining ANT and SNA is that it will be possible to work with a larger number of actors, and that it will be possible to follow them over time as data collection to SNA can be done via quantitative methods where ANT primarily works with qualitative approaches [26]. This is supported by Latour et al. [27], which discusses the combination of SNA and ANT, and among other things, highlights SNA's ability to display and follow actor networks over time.

Venturini et al. [28] concludes that there are important common features of SNA, ANT, and digital networks that allow (SNA's) graphs to be used in the study of actor networks, although there are many differences.

At the same time, I see that ANT can be used to discuss the thinking behind relational coordination and thus a logical relationship between relational coordination, ANT and SNA.

### **Data**

The project includes a before/after study, with the purpose of seeing if the implementation of Heart Failure causes a change in the cooperation, relationships and communication between the involved actors. Later a study based on focus group interviews is planned. The purpose is to create a dataset, that makes it possible to compare the use and implementation of Heart Failure across the 11 municipalities. In addition to providing material from the municipalities, the interviews also provide material for comparing the data collected in the before/after study and the study based on interview as a data collection method.

#### ***Before/after study***

Data collection is based on an "adapted prospective panel longitudinal" study [29]. "Adapted" as data collection first occurs after some of the respondents have begun to use or have been trained to use the Heart Failure solution. This could speak for calling the first data collection retrospectively, but since other respondents at the data collection point had not begun to use or trained in the Heart Failure solution, it is decided to call it the "adapted" approach. The "prospective panel longitudinal" is chosen, as the study follows the same population over time before implementation, and has two data collection points over the period [29, 30].

The pre-survey was conducted as a questionnaire survey and was done via an electronic questionnaire in SurveyXact. Access to the questionnaire was via link in a mail sent to the respondents. The questionnaire has been sent to the 11 municipalities, four hospital locations and 175 GPs in the Region of Northern Jutland. Three reminders from the TeleCare Nord secretariat were sent to the respondents. In order to be stringent, the questionnaire is used again for data collection for post-analysis, scheduled to take place in September 2018, when Heart Failure has been in operation for some months.

#### ***After examination***

In addition to the questions relevant to the SNA analysis, interviews will include questions that implicitly address relational coordination, ie. relating to common goals, shared knowledge, and mutual respect, as well as questions that implicitly address the technology-actor in relation to ANT.

After the last data collection and analysis, it is planned to have a focus group interview to go into depth with the result and discuss possible explanations of these with selected respondents. The combination of quantitative and qualitative study will be done with inspiration from mix-methods [31, 32] and successive triangulation [33], to seek an explanation of the results of the quantitative examination.

The goal is to understand and possibly explain why there is/is no correlation between the relationship of cooperation and the outcome of the implementation, depending on where the participants come from.

### *SNA as an analysis tool*

The purpose of using SNA in this project is to use a recognized approach to analyse the communication/relationships between the health professionals in the Heart Failure project, thereby creating the basis for working with ANT - and ultimately relational coordination. The aim is to elucidate and, if so, to what extent the number of relationships between health professionals' changes after the implementation of Heart Failure. The limitation of looking at the health professionals is justified by the fact that the organizational experience from the COPD project does not include the citizens with COPD, but points to organizational conditions among and relationships between the health professionals.

### **Implications**

The understanding before starting the study is that patients were previously in physical contact with the hospitals and the GP's, but that the care staff via the telehomecare solution have the opportunity to quickly and easily answer questions - either from the GP or from health professionals at one of the hospitals. Previously, the citizen had to meet physically at the hospital or at the GP to make the measurements that it is currently possible to make in the citizen's home via the Heart Failure solution. At the same time, the GP is able to confer measurements from the patient with the health professionals at one of the hospitals in an easy and fast way through the Heart Failure solution.

After the implementation of the Heart Failure solution, the hypothesis is, that new forms of cooperation and relations between the actors are seen, mediated by the telehomecare technology used.

The objective is to show that relational coordination, ANT, and SNA are useful theories and tools to elucidate changes in collaboration before/after implementation of a telehomecare solution and can be used to provide an indication of why implementation of the same technology in comparable organizations gives different results.

On the empirical side, the goal is to give TeleCare Nord an insight into how relations and collaboration change after implementing a telehomecare solution, as well as through the final discussion of the results, to chart why the collaboration is changed/not changed - and perhaps suggest, what can be done to change the cooperation. This is in anticipation of providing knowledge that can be used to address and possibly minimize the organizational challenges in relation to the relationships and collaboration between the health professional and across the sectors. In addition, if a difference can be seen between the different organizational units.

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