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Facilitating and Carrying out Innovation Processes in the Public Sector:

Implementing Assistive Technology on a Municipal
Level

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Science and Technology

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Science and Technology Studies

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Learning Outcomes

This thesis is part of the master's degree in Science and Technology Studies (STS). The student will be working with a company or an institution/organisation, and the thesis should be of relevance for the organisation. The thesis will provide the students theoretical and practical experiences of conducting Research and Development work.

The course Science and Technology Studies – Employment Oriented Master's Degree, at NTNU, provides students with modules on theoretical and methodological perspectives worth 45 credits. Moreover, the students will complete a work placement worth 15 credits. During this course, the student has completed a month-long work placement and the thesis is closely linked to the work placement and a topic of relevance for the organisation, and it is worth 37,5 credits.

The master's thesis is a result of an independent Research and Development work, and the student has been supervised by academic staff at NTNU. This course represents a further specialisation and knowledge building in relation to the student's bachelor's degree. The aim is to provide the student with skills to apply and practice the subject at a high level, as well as practical work experience.

A degree in Science and Technology Studies – Employment Oriented Master's Degree, provides qualifications to work in different sectors, such as teaching, public and private sector, media, information activities and consultancy, research and development work and strategy/policy development.

Summary

This thesis explores the process of facilitating and carrying out an innovation process in the public sector. I do so, by examining how the process of implementing assistive technology unfolded. The Norwegian government has great expectations for the public sector, which is believed to play a crucial role in solving challenges in today's society. This applies to the Norwegian healthcare services as well, where an ageing population and a projected lack of healthcare personnel may create new and complex challenges. The *Testing and Distribution Project*, which ran from 2013–2020, was intended to solve some of these challenges by implementing assistive technology in all Norwegian municipalities. In this thesis I explore the complex process undertaken by multiple actors of organising and operationalising this innovation process. My aim is to better understand how the public sector works to digitalise and modernise healthcare services.

The empirical data primarily stems from a month-long work placement in a consultancy firm that guides municipalities through the project. Qualitative observations and field studies were conducted in order to follow the actors involved in this process. This included observing 102 participants from 54 different municipalities and attending seven workshops in the project. Furthermore, seven interviews were conducted with participants during the workshops and two phone interviews were conducted with two project leaders. I use two theoretical perspectives from the Science and Technology Studies (STS), *Mode 2* and *Framing*, as such perspectives have been suggested as an ideal focus to untangle complex innovation and knowledge making processes involving technology and humans.

My key findings illustrate how the organisation of the project involved actors collaborating across disciplines in novel ways. Through transdisciplinary problem solving the actors aimed to produce diverse and socially robust knowledge. Three tools were developed, two toolboxes and the workshops, which were used to frame the process and facilitate knowledge transferring. Finally, the findings suggest that the municipalities deal with large varieties of challenges at the municipal level, prompting the need for locally embedded processes to implement national policy. My findings enrich the understanding of how one innovative process in the public sector unfolded. Moreover, the findings highlight the actors' focus on transdisciplinary problem solving and locally adapted processes as key elements in innovative processes. The implication these findings may have on future innovation in the public sector are discussed.

Keywords: innovation, public sector, assistive technology, framing, Mode 2, local adaption, transdisciplinary knowledge production

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1 Introduction

Norway has a well-organised and efficient public sector. However, there still exists many challenges. We need to improve the services we deliver to our inhabitants, industry and non-governmental organisations. To do so, we need new technology, we need to be innovative and we must be able to change. The challenges cannot be solved by one organisation or one sector. We should work together, across sectors and organisations.

(Ministry of Local Government and Modernisation, 2019)

These opening lines of the *Digitalisation Strategy* published by the Ministry of Local Government and Modernisation has great expectations for the Norwegian public sector. There is a great focus on how digitalisation, technology and innovation may contribute to solve challenges in the public sector in Norway. The public sector will have to address problems that are complex and composed of many different factors the next decades (White Paper 27, 2015–2016; Solberg, 2005). One example is the demographic changes and their effects on the healthcare sector. In this thesis, I am interested in how the healthcare sector and the municipalities try to overcome these problems and to meet the demands for new technologies, innovation and change. I have conducted qualitative observations of representatives from 54 municipalities, conducted seven interviews with various actors involved, and analysed how relevant actors work in practice to prepare the healthcare sector, by facilitating and carrying out an innovation project in Norwegian municipalities.

Demographic trends both globally and nationally show increased ageing populations in industrialised countries, which may create new and complex challenges for the healthcare system. In Norway, the proportion of people aged 60 years or older is projected to nearly double from 12% in 2015 to 22% in 2050 (NOU, 2011). Moreover, the relative number of workers per unemployed citizen is falling, leading to a projected lack of 50 000 healthcare workers in 2030 (SSB, 2009). The potential problems in the healthcare sector, due to the demographic change were addressed in the White Paper, *Innovation in the Care Services* (NOU 2011:11):

The challenges in the Care Services are not caused by the ageing population. It is caused by the delusion that the care services cannot be delivered differently than it is today (NVC, 2012, p.37).

This White Paper prompted a need for innovation in the care services and in the public sector, and set the wheels in motion for the initiation of an innovation in the healthcare sector. The suggested solution to address the demographic challenges, was to initiate a National Welfare Technology Programme (NWTP) in 2013 (White Paper 29, 2012–2013).

The National Welfare Technology Programme was divided into five projects, and my thesis will explore one of these. I will refer to this project as the “Testing and Distribution Project”. The project involved the testing, distribution and implementation of assistive technology for older adults, and is an interesting case in order to explore how the public sector aimed to modernise and digitalise to address future challenges of healthcare. Assistive technology is in a Scandinavian context branded as “welfare technology”, with strong connotations to the Nordic welfare states (Moser, 2019). The aim of the Testing and Distribution Project was to integrate assistive technologies into the healthcare services in all Norwegian municipalities to increase the welfare and wellbeing of its inhabitants. This project may be understood as an innovation in the public sector as it aimed to implement changes in the

healthcare services which could lead to considerable improvements in efficiency, performance and quality of the service (Albury, 2005). Thus, creating value for society and the inhabitants (Bason, 2010).

However, to digitalise, change and introduce new technology in the public sector is a complex process. A regional project leader for assistive technology in Denmark explained why in a newspaper article (Kusk, 2010):

When implementing technology, 20% of the changes are related to the technology. The remaining 80% is about new ways of working and new ways of organising processes.

This statement suggests that there are multiple factors, both technological, structural and organisational, involved in innovation processes in the public sector. To account for these factors in the Testing and Distribution Project, the members of the committee who published the White Paper, believed that a combination of resources and actors from different sectors had to be enrolled (NOU, 2011). The idea was that a public-private partnership would create value for both the public and private actors involved in the partnership (Røiseland, 2013). Furthermore, it was, from a political level, believed that such partnerships are necessary in order to deal with today's complex challenges (White Paper 29, 2012–2013). Although the Testing and Distribution Project was a political initiated project, there were multiple actors responsible for the organisation and operationalisation.

Both the Digitalisation Strategy (Ministry of Local Government and Modernisation, 2019) and the White Papers (NOU, 2011; White Paper 29, 2012–2013) emphasised the importance of collaborating across disciplines and sectors when innovating the public sector. Thus, there were many expectations for how the project should be organised and what its outcomes should be. But how does this type of innovation processes work out in practice and what does this tell us about how the public sector works to digitalise and modernise?

Through this thesis I explore how this project was organised and operationalised. Organised, as in what actors were involved, what were their roles and what the outcome of the organisation was. Operationalised, as in how the actors carried out the project in practice. The aim is to examine how one innovation project in the public sector tried to meet the expectations of digitalising, changing and introducing new technology to solve complex challenges. The main research question is then as follows: *How do actors facilitate and carry out an innovation process involving the implementation of assistive technology?*

In order to answer this main research question from a holistic analysis I will also explore the following sub-research questions:

- How was the Testing and Distribution project organised?
- How did different actors shape and facilitate the project?
- How did the municipalities affect how the project was carried out in practice?

1.1 Innovation in the Public Sector

One way to define innovation in the public sector is to describe it as the implementation of changes in the services provided, for instance new technology or new ways of organising services, which aim to lead to a considerable improvement in efficiency, performance or quality (Albury, 2005; Bason, 2010). Researchers refer to the term *innovation in the public*

sector as “young” and “groundbreaking” (Bugge & Skålholt, 2013, p. 55; Ringholm & Holmen, 2019, p. 15). This is not because innovation in the public sector did not exist until now. There has always been reorganisations, changes and new technology in the public sector leading to innovation (Berge, 2013). For instance, the public sector has established banks and energy companies (White Paper 29, 2012–2013). However, not until recent years has innovation in the public sector started to be acknowledged and received more attention by researchers and society in general, as the previous research has focused mainly on the private sector (Foyn, 2011).

Røste (2013) explains the lack of attention by arguing that there exist some myths about innovation in the public sector. For instance, that the public sector changes and develops less frequently than the private sector. Moreover, that the public sector is the opposite of the private sector, or the belief that the public sector is not a producer of anything. However, Røste (2013, p. 75) argues otherwise by suggesting that the public sector goes through changes constantly and produces services to all the citizens. This is supported by Bason (2010), who suggests multiple times in his book, that the public sector also should be viewed as an arena for innovation. The researchers suggest that new knowledge on innovation in the public sector may be important in order for society to maintain high quality services. Multiple actors from academia and policy makers also prompted the need to produce knowledge on the processes that takes place, when carrying out innovations in the public sector (EC, 2010; EC, 2011; OECD, 2010; White Paper 7, 2008–2009; UK Department for Business, Enterprise and Regulatory Reform, 2008).

Thus, researchers and actors from academia and policy makers ask for more research on how innovative projects in the public sector unfolds. They argue that the public sector plays an important role in providing high quality services to the inhabitants. The public sector must deal with large variety of challenges in future years, as explored earlier in chapter 1. Therefore, my aim is to add to this knowledge by examining how one innovative project in the public sector unfolded to increase the understanding of how such processes are facilitated and carried out by actors in practice. This could contribute with knowledge which can be useful when organising and operationalising future innovations in the public sector. But, what was the Testing and Distribution Project? Why was it initiated and what aims did it try to achieve?

1.2 The Testing and Distribution Project

The empirical case in my master’s thesis is the Testing and Distribution Project which was part of the innovation programme called the National Welfare Technology Programme. The National Welfare Technology Programme was initiated, in 2013, building on two White Papers (NOU, 2011; White Paper 29, 2012–2013), focusing on innovation in the healthcare services. The aim of these two White Papers were to explore future challenges in the healthcare sector and how Norway could overcome these challenges. In the White Papers it was suggested that assistive technology should be an integrated part of the healthcare services in Norway. It was acknowledged that assistive technology on its own would not solve all the challenges. However: “assistive technology could aid and support the healthcare service in order to deliver a service that focuses on empowering individuals, independence, social participation, active care, and everyday rehabilitation” (White Paper 29, 2012–2013, p. 109).

Assistive technology may be defined in several ways and include a wide range of technologies and solutions. In Scandinavia, assistive technology is referred to as *welfare*

technology. It is defined as technologies and solutions that increase safety and security, that secure a high quality of life, that assist with completing day-to-day tasks, that increase physical activities, improve physical health, and in general improve services to the users and their relatives (Melting & Franzen, 2015; Moser, 2019; Nakrem, 2017; NOU, 2011). Other terms used to describe similar technologies include *Telecare* and *e-health* (NOU, 2011; Scottish Government, 2012) *Active Assisted Living* (Siegel & Dorner, 2017) and *Gerontechnology* (Micera et al., 2008), and the terms may overlap. I will use the term *assistive technology* as it allows a broad conceptualisation of what such technologies are. Examples of such technologies are automatic pill dispensers, wrist-worn wellbeing monitors, fall sensors, anonymous remote supervision and GPS-technology (Nakrem, 2017; Moser, 2019).

There was a need for something that could support the municipalities in order to integrate assistive technologies in their healthcare services. Research conducted by the Norwegian Association of Local and Regional Authorities (KS) (*Kommunesektorens organisasjon* in Norwegian) revealed that most Norwegian municipalities requested more information on assistive technology, and advices on how to implement and integrate these technologies from the local and regional authorities (Hoen & Tangen, 2011). However, it requires a continuous and long-term work to utilise the potential of assistive technology. Furthermore, no single actor (e.g. the government) would be able to solve the complex challenge related to the demographical change. To succeed, users, employees, municipalities, the government, researchers and industry/businesses would have to cooperate and pull in the same direction (NOU, 2011). Thus, the committee of the White Paper (NOU, 2011) recommended that a project or programme that could facilitate this cooperation should be initiated. However, more research and information on assistive technology was required before they could initiate this programme.

Based on the findings in the White Paper (2011), the Ministry of Health and Care Services asked the Norwegian Directorate of Health (NDH) to write a technical report on assistive technology. One of the aims was to develop ideas and solutions on how to implement assistive technology in the municipal healthcare services (Norwegian Directorate of Health, 2012). Their suggested solution was to initiate a National Welfare Technology Programme (NWTP). The National Welfare Technology Programme was a *national innovation process* as all Norwegian municipalities were supposed to be part of the project. The NWTP was meant to last from 2013-2020 and the overall aim was that: "In 2020, assistive technology should be integrated in the healthcare services in all Norwegian municipalities" (Norwegian Directorate of eHealth, 2019).

If the aim was achieved, the health and care service was believed to be more able to meet future demands by implementing technologies that offer smarter ways to work, while maintaining high professional quality of the services. To achieve this aim, the National Welfare Technology Programme was divided into three phases:

- I. Architecture and Infrastructure – phase one
- II. Development and Testing – phase two
- III. Distribution – phase three

In the *first phase* of the National Welfare Technology Programme, it was established standards for assistive technologies to ensure predictability and good solutions to the users. Furthermore, standards would allow different suppliers to offer their solutions, instead of excluding potential suppliers. The *second phase* involved the development and testing of assistive technological solutions. These solutions included, new technology, new

service operation models, new working processes, new organisations and new knowledge (these were tested in 31 municipalities). In the *third phase*, the aim was to distribute the knowledge that was produced, and the assistive technological solutions that were tested, to all Norwegian municipalities (KS, 2018; KS, Norwegian Directorate of Health & Norwegian Directorate of eHealth, 2018). In total 341 (before the municipality merge in 2020) municipalities participated, and they were organised into 43 clusters. I observed and met representatives from 54 different municipalities representing 7 of the 43 clusters.

The three phases of the National Welfare Technology Programme had five sub-projects². I have focused on one of the projects called the Testing and Distribution Project which involved the testing, distribution and implementation of assistive technology in all Norwegian municipalities. This was part of phase two and three of the National Welfare Technology Programme. More specifically, I have studied how the actors involved worked in practice to facilitate and carry out the process of implementing assistive technology.

To summarise, a National Welfare Technology Programme was initiated in 2013 as an innovation in the healthcare sector to address challenges related to the demographic changes. One of the projects in this programme was the Testing and Distribution Project which is the empirical case in my thesis. The overall aim was that assistive technology would be integrated in all Norwegian municipalities in 2020. To do so, phase two of the project aimed to test different solutions in order to produce knowledge on how to implement assistive technology. Then, in phase three, the aim was to distribute the knowledge produced and the assistive technological solutions tested. Thus, the empirical case is about an innovation process in the public sector which involves the implementation of assistive technology. But what has previous research found on these topics?

1.3 Previous Research

In this part I will give brief overview of previous research on innovation in the public sector and on the implementation of assistive technology. I will use this overview to raise questions relevant to my own empirical case.

1.3.1 Previous Research on Innovation in the Public Sector

Research on innovation in the public sector is believed to be necessary and important in order to improve the public sector, by increasing the understanding and knowledge on innovative processes in this sector (Holmen & Ringholm, 2019; Ringholm, Teigen, & Aarsæther, 2013). The same researchers highlight the importance of researching this field and the impact it may have on future innovative processes. Especially when it comes to innovations involving technology, as technologies, like assistive technologies, are believed to improve and increase the efficiency in the public sector in Norway (Carlin, 2015).

Furthermore, previous research has focused on innovation in the healthcare services in the public sector. Rønhovde (2012) has examined how the process of an innovation project in the public sector in Norway called *The Coordination Reform (Samhandlingsreformen* in

² The other four projects are: 1. Project Testing of Remote Medical Monitoring on Patients with Chronical Diseases (DT).

2. Project Testing of Assistive Technology on Children and Youth with Physical Disabilities (DT).

3. Project Testing of Technology to Mitigate Isolation among Older Adults (DT).

4. Project Architecture and Infrastructure (AI)

Norwegian) unfolded. The Coordination Reform was initiated to improve the coordination and create a more coherent health and care service in Norway. The researcher found that one important condition to successfully achieve such innovation projects was the creation of environments where actors could participate and share knowledge and experiences. However, Rønhovde was left with some questions. Firstly, what environments were created and what characterise these environments? Secondly, are there primary definers in these environments, or are they open processes where everyone can share and evaluate knowledge? In my analysis chapters I will try to shed light on some of these questions.

Another study conducted by Røhnebæk and Lauritzen (2019) explored how an innovation in the public sector called "Men in Healthcare" was attempted to be distributed nationally to multiple Norwegian municipalities. "Men in Healthcare" was a project where municipalities, county authorities, KS, the Norwegian Directorate of Health and the Norwegian Labour and Welfare Administration (known as NAV in Norway) cooperated to recruit more men to work in the healthcare services. The findings of the study emphasised the importance of local adaption and to contextualise the innovation process when distributing it nationally. The authors argued that because the municipalities differ from one another, the innovation process must account for these differences and be locally embedded (Røhnebæk & Lauritzen, 2019, p. 198). Did the Testing and Distribution Project account for local differences, and if so, how was the process locally adapted? I will come back to this in the analysis chapters.

1.3.2 Previous Research on the Implementation of Assistive Technologies

In Norway, Moser (2019) and Nakrem (2017) has contributed to the research field on assistive technologies in their books on this topic. They describe what assistive technologies are, what opportunities and challenges these may represent for the users, their relatives, healthcare workers and society in general. The books summarise various studies which enlighten different perspectives of assistive technologies. For instance, ethical perspectives or views on the implementation of such technologies. One study emphasised the importance of including healthcare personnel as their knowledge on challenges, obstacles and opportunities are important in the process of implementing new technology (Kleiven, 2017). Some of these studies mention the Testing and Distribution Project, but they have not focused specifically on this project.

On the other hand, there also exist some research on the Testing and Distribution Project. When the Testing and Distribution Project was initiated, one of the Norwegian Health Directorate's demands was that the project had to be studied. The aim was to evaluate the effects, and the utility value for the users, relatives, healthcare personnel and the services as a whole (Melting, 2017). Therefore, there exists some research on the implementation of assistive technologies. However, the research has mainly focused on evaluating the effects of the implementation of assistive technology, while few have evaluated the processes according to Knarvik et al. (2017).

The effects of assistive technologies were evaluated when assistive technological solutions were tested in 31 municipalities. The effects and benefits of the technologies were evaluated (Melting, 2017). This resulted in the recommendations of some assistive technologies (e.g. automatic pill dispensers, electronic door locks and anonymous remote supervision) the municipalities should aim to implement. The same report also suggests that there are some prerequisites to succeed with the implementation of assistive technology. For instance, to change the mindset of what municipal healthcare services *is*

and *should* be, or that the solutions offered should accommodate the needs of the end-users.

Other reports have focused on factors affecting the implementation of assistive technologies. The Norwegian Centre for E-Health Research found that there are some factors affecting the process (Rotvold et al., 2018). For instance, the importance of management and leadership, or continuous stakeholder management (important actors need to be involved, interested, possess the knowledge needed, and be dedicated to accomplishing the project). Another study found that the municipalities experienced that up to 90% of the challenges of implementing assistive technology are related to organisational and structural aspects (Knarvik et al., 2017). Thus, suggesting that there are many factors affecting the process which makes it complex. However, researchers like Greenhalgh and Papoutsi (2018, p. 6) asks for more research on the complexity of innovative processes in the healthcare service.

Thus, previous research on innovation in the public sector pointed out two central conditions when conducting innovation in the public sector. Firstly, the creation of an environment where knowledge and experience could be shared. Secondly, the importance of locally adapted processes. However, the researchers were still left with questions unanswered, which my thesis will try to answer. Previous research on the implementation of assistive technology focused mainly on evaluating the effects of the implementation of assistive technology. Researchers have highlighted some of the factors affecting the process and the complexity of it. However, to a smaller extent has previous research aimed to explore the *processes* that unfolds when facilitating and carrying out the implementation of assistive technology.

My thesis seeks to extend to previous research by exploring the processes in this innovation project, not the effects. Furthermore, by applying different methods to collect empirical data, such as observations and shadowing which I will describe in chapter 3.

1.4 Summary and Thesis Structure

I have described how the process of implementing assistive technology was an innovation in the public sector. The aim of Testing and Distribution Project was to contribute to solve the challenges in the healthcare sector related to the demographic changes, by integrating assistive technology in all Norwegian municipalities. In this chapter I have explained how there is an increased focus on innovation in the public sector and the importance of producing knowledge on how innovations in the public sector unfold. This knowledge may contribute to develop society by producing knowledge that may improve future innovative processes in the public sector.

I have structured my thesis in 7 main chapters, with this first one creating a basis of knowledge for the empirical case in my thesis, the Testing and Distribution Project. Moreover, it outlined previous research on innovation in the public sector and implementation of assistive technology.

Chapter 2 presents the theoretical perspectives used, which are *Mode 2* and *Framing*. These are two perspectives from the academic field of Science and Technology Studies (STS). Chapter 3 will describe the methodological choices, how I collected the empirical data and how I analysed it. In chapter 4, I investigate how the Testing and Distribution project was organised in order to understand the knowledge production in this project. I shift focus in chapter 5, where I explore how the project was shaped in order to facilitate

knowledge production and transferring important when carrying out an innovation process in all Norwegian municipalities. In Chapter 6, I examine how local challenges and differences affected the how the project was carried out in practice. Finally, in Chapter 7, I will summarise and discuss the implications of my findings.

2 Theoretical Approaches

In my thesis I explore *how actors facilitate and carry out an innovation process involving the implementation of assistive technology?* As described in chapter 1, this is a complex innovation process characterised by new technologies, changes, new organisations, multiple actors, and the production and distribution of knowledge. In order to examine how this process unfolded, I will apply perspectives from the academic field Science and Technology Studies (STS). STS have been suggested as an ideal focus to unwrap complex processes involving human and non-human actors, such as technologies, and the relational networks between these (Bijker, Hughes, & Pinch, 2012; Jasanoff, 2015; Latour & Woolgar, 1979; Skjølsvold, 2015).

2.1 Studies of Science and Technology (STS)

STS is an academic field which focuses on co-production of technology, science, knowledge and innovations (Skjølsvold, 2015). To understand how political, cultural, social and material elements affect, and are affected by, technology, science, knowledge and innovations, are key elements in STS (Jasanoff et al., 2002). Moreover, STS-theories are interested in socio-technical processes involving humans and technology (ibid). My empirical case is about the digitalisation and modernisation of the healthcare sector. This innovation project involves new technology, multiple actors and the production of new knowledge (Bijker, Hughes, & Pinch, 2012).

STS perspectives focus on the *process*, rather than the *results* of technological implementations. What happens in practice, and how does projects unfold? The results depends on the process, thus, to understand the process is crucial in order to understand the outcomes (Skjølsvold, 2015). The outcome is not determined, it could always have been otherwise depending on the process (Latour & Woolgar, 1979). Therefore, my aim is not to explore whether or not the Testing and Distribution Project was successful, but to focus on the process in order to understand how this innovation project unfolded.

However, STS perspectives approach innovation processes from a critical point of view. For instance, STS is critical towards a linear innovation model because it fails to account for the complexity of processes involving human and technology, or to ignore the feedback-loops between the stages and to be too static (Skjølsvold, 2015).

I have chosen two STS-perspectives to enlighten how the Testing and Distribution Project was facilitated and carried out. The first perspective is *Mode 2* (Gibbons et al., 1994) which focuses on knowledge production in society, for instance, in innovative processes. The second perspective is *framing* (Callon, 1998) which explores how actors perceive and organise situations and processes.

2.2 Mode 2 Knowledge Production

As explored in Chapter 1, today's society is characterised by a growth of complexity and uncertainty and there is a constant need to increase efficiency, to change and to innovate. Gibbons et al. (1994) argue that this calls for new forms of knowledge production. There is a need to shift from Mode 1 knowledge production, characterised by silo mentality with clear borders separating different strands (e.g. industry, university, state or the private strand), and linear processes (e.g. linear innovation processes or linear knowledge transferring), to what they call "Mode 2 knowledge production". This shift represents a move towards multi- and interdisciplinary problem solving to become more dynamic and

flexible, because science on its own cannot solve the complex problems. It requires the involvement of multiple participants, their institutional and disciplinary connections, their interests, networks and experiences (Nowotny et al., 2001). Mode 2 knowledge production has five characteristics (Nowotny et al., 2003, p.186):

- i. *Application oriented* – knowledge production does not appear all of a sudden, it aims to solve specific problems and occurs in a context
- ii. *Transdisciplinary problem solving* – it mobilises multiple theoretical perspectives and practical methodologies to solve problems
- iii. *Diverse knowledge production* – knowledge production is socially distributed, for instance, new kinds of ‘knowledge’ organisations like think-thanks, management consultants and activist groups, join the research game
- iv. *Reflexive and dialogic process* – knowledge production involves endless conversations between research actors and research subjects, and it is more related to challenges in society
- v. *Novel forms of quality control* – it is harder to argue for an objective truth and many actors are involved with different opinions of what quality is.

In other words, Mode 2 conceptualise knowledge production to be embedded in society, more contextualised, more inclusive and more dialogue based than Mode 1. Nowotny et al. (2001), thus, argue that knowledge has gone through a transformation from *reliable knowledge*, science produces true and objective knowledge because it uses reliable methods, to *socially robust knowledge*, the production of knowledge is relevant and accepted by multiple actors in the context of its application.

One concept from Mode 2 is the *agora*, stemming from ancient Greek cities, where the agora was a central public space, known for its markets and trading. However, it was also an arena for politics, debates and exercising of power. Regardless of the social class, people could participate in the discussions. Nowotny et al. (2003) used *agora* as a concept to describe a problem solving environment, in which technology and knowledge production takes place. The agora is the public space where “science meets the public” and the public “speaks back” to science (Nowotny et al., 2001, p.247), meaning that it is not the science, the public sector (the state) nor the private sector (the market) exclusively that contextualise problems. The public, or the lay people, are also important when contextualising problems. Therefore, the agora is the space where uncertainties and problems are framed and defined, and later negotiated by multiple actors.

The agora is more than a commercial and political arena where knowledge is produced, it is a place where multiple stakeholders (e.g. experts, organisations, institutions, and lay people/the public) meet to produce and share knowledge. Thus, Nowotny et al. highlighted the social and political aspects of knowledge production, and the importance of including lay people (Skjølsvold, 2015). In the Testing and Distribution Project multiple actors were involved. Were there any arenas where actors could meet to produce and share knowledge in this project?

Mode 2 has also received some criticism. For instance, it has been criticised for being an ideology rather than a descriptive theory (Godin, 1998; Shinn, 2002) and its lack of focus on economic aspects (Skjølsvold, 2015). However, I will use Mode 2 to analyse how the Testing and Distribution Project was organised and operationalised, to understand the knowledge production which took place in this process. Did the organisation and operationalisation of the project reflect the characteristics of Mode 2? Mode 2 may shed

light on the knowledge production, how it affected, and was affected, by the organisation and operationalisation, relating to a wider societal trend of how knowledge is produced.

As mentioned in chapter 1, the actors involved had to cooperate and pull in the same direction (NOU, 2011). To better understand how different actors worked to shape, or *frame* the project in practice, to allow various actors to work together on this project, I will complement the understanding of Mode 2 with another STS perspective, the *Framing theory*.

2.3 Framing

I will use the theory of framing to analyse how actors framed the Testing and Distribution Project, to be able to carry it out. The term *framing* originates from Goffman's studies of environmental sociology (Goffman, 1975). As Brewster and Bell (2009) point out, Goffman was interested in understanding everyday-life situations at the individual level. Depending on what individuals or actor groups perceive as relevant for the situation they frame it differently (Goffman, 1975). Goffman believed that these frames stabilised the world. Callon (1998) on the other hand, in redeveloping framing, believed that framings are dynamic and was interested in how large groups of actors framed complex problems.

Externality, overflow and reframing are important terms in the theory of framing (Callon, 1998). *Externalities* are factors that are perceived to be less relevant and placed outside the perceived frame of an actor. This may happen consciously or unconsciously, and they can be both positive and negative. Externalities are not separate from the factors that are framed. Thus, they may *overflow* the framing. This may reopen closed processes, destabilise frames and reframe situations. Callon believed that overflows are necessary in order to produce new knowledge and improve established understandings (Skjølsvold, 2015). Actors may approach overflows and leaks in two ways (Callon, 1998). *Approach one*, suggesting that framing is the norm and overflows are leaks. *Approach two*, involves a *reframing* of the situation, suggesting that overflows are the norm and framings are not. Overflows may be positive and negative.

Callon (1998) differentiated between *hot* and *cold* situations. Hot situations are complex, and difficult to solve. They are difficult to frame because there are so many factors affecting the process and overflows are likely to occur. Callon argued that experts and scientist on their own cannot solve hot situations. Society as a whole, and multiple actors must agree to take action to produce knowledge. Moreover, researchers and specialists must interact and work with non-specialists. On the other hand, cold situations are less complex and easier to solve, but according to Callon, society is increasingly having to deal with hot, complex issues as knowledge, technology and practices entangle.

Framing has been used to better understand the underlying factors of how and why actors frame technology and processes differently (Goffman, 1975; Levold, 2014), and could provide insight into the sociotechnical side of innovation processes (Søraa, 2018). I will use framing to explore how actors involved in the Testing and Distribution Project framed the innovation process, and how externalities and overflows affected their framings of the innovation process.

2.4 Summary of Theory

In this chapter, I have given an overview of STS and the two perspectives, *Mode 2 knowledge production* and *Framing*, which I will use in my analysis. I will use the theories

to focus on how the innovation process in the public sector was organised in order to produce new and relevant knowledge, how it was framed and how it was carried out in practice. Building on these theoretical perspectives, my sub-research questions are further developed as:

- How did the organisation of the Testing Distribution Project affect the knowledge production in this innovation process?
- How was the project framed to facilitate knowledge transferring and a national innovation process?
- How did local challenges and differences affect the project and the framings of the project?

3 Methods

In this chapter I will describe the methods I used to collect the empirical data. The empirical data primarily stems from a month-long work placement in PA Consulting (PA). PA is a management consultancy firm that guided the municipalities through the innovation process in the Testing and Distribution Project. The work placement allowed me to come in contact with a large number of different actors and to explore how actors worked on this process in action. I conducted qualitative observations and shadowing in order to follow the actors involved in this project, by attending five workshops and two Skype-meetings, held by PA. Additionally, seven in-depth interviews and two phone-interviews were conducted. This methodology enabled me to examine how the project was organised, operationalised and what challenges the actors dealt with during the innovation process from multiple angles.

3.1 Work Placement and Shadowing

I collected the majority of the empirical data during a month-long work placement at PA, September 2019. I established the relationship with the firm when I had an internship at PA, summer 2019. Because PA's field of expertise is management consulting and because they are involved in the Testing and Distribution Project, they were interested in my research topic and accepted my request for having a work placement in their firm.

The work placement lasted for nearly a month, and seven of these days I followed a consultant from PA in his daily work. His job was to facilitate workshops and meetings in order to teach the municipalities methods and strategies on how to carry out the innovation process. I applied a form of shadowing by following this consultant. I did not follow a strict guideline on how to shadow, but some aspects of shadowing were applied. Such as, following an actor during his/her everyday activities (Gill, Dean, & Barbour, 2014). I travelled with the consultant to five different locations in Norway where the workshops were facilitated. We travelled by trains, flights, buses, ferries and driving, which allowed us to discuss the case during the journeys and gave me insight in how the consultant prepared for each workshop.

During the work placement, I attended seven workshops with seven clusters of municipalities with the clusters consisting of 54 municipalities. Five of the workshop lasted a full working day and in total 85 participants from 21 municipalities attended the workshops (Table 1). Additionally, I attended two Skype-workshops with 33 additional municipalities and 17 participants. I spent the remaining days of the work placement in PA's office working on my thesis and attending internal meetings. The work placement gave me an opportunity to access valuable information and do interesting observations by experiencing the innovation process in action. Hence, I gained unique insight and new perspectives on the field I was researching, which otherwise would have been unavailable to me without the work placement.

Table 1. Key facts about the seven workshops.

Workshop	Number of municipalities at the workshop	Size and population per cluster	Number of Participants
Workshop A	5	Medium 20 000 – 40 000	39
Workshop B	2	Large < 40 000	8
Workshop C	5	Medium 20 000 – 40 000	10
Workshop D	4	Medium 20 000 – 40 000	11
Workshop E	4	Small > 20 000	17
Skype-workshop F	19	Large < 40 000	13
Skype-workshop G	15	Large < 40 000	4

The selection of municipalities represented in this study was not a targeted selection. During my work placement the consultant had planned to facilitate five workshops and two Skype-workshops. If my work placement had been in a different month, I would have attended other workshops with different municipalities.

3.2 Qualitative Observations

I conducted qualitative observations in order to follow actors involved in this innovation process. By shadowing the consultant from PA, I also had the chance to do qualitative observations of the participants who attended the workshops and meetings.

At the workshops I met various actors with different roles in the Testing and Distribution Project. Firstly, I had the chance to meet participants from the municipalities who worked in project groups. For instance, intermunicipal project leaders, municipal project leaders, healthcare personnel (e.g. care home employees, home care service employees, ergo therapist, mental health workers, managers etc.), IT-professionals, users (e.g. older adults or other municipal employees (e.g. employees from the Allocation Office of Home Healthcare Services, or municipal health managers). Secondly, at some of the workshops I met representatives from the Norwegian Directorate of Health and KS who sometimes participated to follow the progress.

I applied a *semi-structured* and *open* design to the observations. Semi-structured to allow for an open inquiry based on what the informants would describe as important. The informants were informed that I was present and what my topic of research was (Thagaard, 2018). This allowed me to meet, talk to and observe people who were in the middle of the innovation process I was researching. During the workshops, I listened to discussions, I observed how the participants worked on group tasks provided by the consultant and took detailed notes on my laptop throughout the day (Figure 1 and 2). During the Skype-meetings I sat in a room with the consultant from PA and observed back-to-back meetings he had with inter-municipal project leaders and municipal project leaders. The first meeting lasted 2 hours, while the second lasted 7 hours, including short breaks. These observations left me with valuable insights, many interesting quotes and a great amount of data. However, in order to further explore the innovation process I decided to conduct more in-depth interviews as described below as well.



Figure 1. Illustration of a workshop (KS, 2019)



Figure 2. Illustration of a workshop (KS, 2019).

3.3 Qualitative Interviews

In addition to the observations, I conducted seven in-depth interviews with participants during the workshops and two phone interviews were conducted after the work placement. The in-depth interviews were not arranged in advance and the recruitment happened during the observations. Henriksen and Tøndel (2017) refers to this as spontaneous in-depth interviews, which are short and spontaneous. In-depth interviews aim to explore how participants experience situations (Kvale & Brinkmann, 2009). Thus, I applied this method to better grasp how the participants from the municipalities experienced the innovation process and how it unfolded.

When conducting interviews, it is important to have contextual knowledge on the topic in order to ask relevant questions (Thagaard, 2018). One of the strengths with spontaneous in-depth interviews is that the method allows the researcher to observe, achieve a contextual understanding and then interview the informants (Henriksen & Tøndel, 2017). In this way I could observe how participants worked and what they discussed during the workshop. Then, I could interview the participants to explore topics into more depth. For instance, challenges the municipalities faced or the role of the municipalities in the innovation process. The spontaneous in-depth interviews lasted from 10 to 15 minutes.

I used a method Thagaard (2018) refers to as the snowball-method in order to recruit participants for the phone interviews. I contacted an employee in PA to ask if the employee could provide me the relevant information. However, I was recommended to contact a project leader in the Testing and Distribution Project. Thus, I conducted an 18-minute long phone interview with this project leader. At the end of the interview the project leader recommended me to contact a senior consultant working on the Testing and Distribution Project. Therefore, I conducted a 16-minute long phone interview with this senior consultant as well.

Both the interviews at the workshops and the phone interviews were semi-structured (Cachia & Millward, 2011). I prepared a few open and probing questions in advance, like "could you say more about...?" or "can you give me examples of...?". I used similar questions to follow up interesting topics that were mentioned during the interviews. Thus, the aim was to examine the innovation process in-depth, by exploring interesting factors of the process, challenges, or to clarify aspects of the process.

3.4 The Analysis of the Empirical Data

The analysis in my thesis has been empirically driven. I started by collecting data and tried to summarise the interviews and the observations without analysing it. This was the first

step of structuring and organising the data, and it gave me an overview of the data I had collected. Based on the summaries, I tried to identify some patterns and topics in the empirical data I could focus on. Researchers refer to this as *thematic analysis* (Braun & Clarke, 2006; Thagaard, 2018). In this way I could identify what aspects of this innovation process many of the actors involved focused on. Then, I chose theoretical perspectives based on the empirical data and on what theories I believed could help me answer the research question. After identifying aspects to focus on, I started to analyse the empirical data more thoroughly. I did so by applying the theoretical perspectives to shed light on the empirical data. This led to the three analysis chapters in this thesis.

I decided to write my thesis in English as I am bilingual and wanted it to be available for a wider international audience. All the qualitative interviews I conducted was in Norwegian and I translated all the quotes used in the analysis from Norwegian to English. Similarly, many of the documents and reports I referred to were also in Norwegian. Excerpts from these were also translated from Norwegian to English.

3.5 Ethical Considerations

According to the principle of confidentiality researchers should ensure the confidentiality of the data collected (Thagaard, 2018, p. 24). In my project I collected information which could identify several municipalities, the informants' profession and their role in the municipalities. Therefore, I decided to anonymise both the municipalities and the participants from the municipalities. This would not affect the results in my thesis. However, as my project was going to process personal data, I had to report my project to the Norwegian Centre for Research Data (NCRD). NCRD accepted my project before I initiated the data collection.

A great number of participants attended each workshop and I had to ensure that all participants knew that I was collecting data. In the beginning of each workshop I introduced myself, the topic of my research project and asked the participants if I could take notes during the workshop. I ensured that all participants would remain anonymous and no personally identifiable information would be used in the thesis. All the participants agreed to this condition. Therefore, I could take notes during discussions and during the spontaneous interviews with the participants.

3.6 Methodological Challenges

In order to allow the reader to evaluate the reliability and validity of the empirical data, I think it is important as my role as a researcher to acknowledge some of the methodological challenges I have met while working on this project. I will briefly discuss two of the challenges I experienced.

Firstly, I had to take notes instead of recordings during the field research. The NCRD recommended me not to take recordings during my field research and referred to the principle of data minimisation. The data collected should be kept to the minimum (Thagaard, 2018). Because of the high number of participants per workshop, a lot of the data recorded could potentially be irrelevant. Therefore, I took detailed notes on my laptop during discussions and during the spontaneous interviews with the participants. As a result, one limitation may be that I missed out some aspects during discussions if I did not manage to note everything that was said during the discussion. I tried to account for this, by

following up discussions later in the spontaneous in-depth interviews or in the telephone interviews which I conducted some weeks after the workshops.

Another challenge with researching this innovation process was to account for its complexity and explore the huge number of actors when collecting data. In order to overcome this challenge, I applied several qualitative methods, also referred to as triangulation of data (Thagaard, 2018). For instance, observations and in-depth interviews. This allowed me to explore different perspectives of the innovation process and to explore how more than 100 actors worked on the innovation process in-action. On the other hand, I will emphasise that my analysis represents one perspective on this innovation in the public sector which is based on my methodological approaches. Thus, my findings cannot be generalised to all innovations in the public sector and, more research and other methods are also needed to further explore innovation processes in the public sector.

In the next three chapters I will be analysing the data I collected and discuss the findings using the theoretical perspectives Mode 2 and Framing.

4 The Organisation of the Testing and Distribution Project

In the first chapter, I described how the Testing and Distribution Project was initiated as part of the National Welfare Technology Programme. The aim was to implement assistive technology in all Norwegian municipalities by 2020. The project aimed to implement changes in the healthcare sector that was believed to result in considerable improvements. For instance, increased efficiency and quality of the services. The aim of the Testing and Distribution Project was to contribute to solve some of the challenges in the healthcare sector related to the demographic changes of the projected ageing population. However, it is suggested and expected, that when solving complex challenges in the public sector, multiple actors from different sectors need to combine their resources to develop high quality services (Ministry of Local Government and Modernisation, 2019; NOU, 2011).

As stated in chapter 1 and 2, innovations can be understood as new ways of organising projects and new ways of working which involves the production of new knowledge. I referred to Mode 2 knowledge production as a way that actors could share and produce knowledge in today's society (Nowotny, Scott, & Gibbons, 2003). In this chapter I will analyse the organisation of the Testing and Distribution Project in a Mode 2 perspective. How was the project organised to facilitate knowledge production? What kind of knowledge was produced, what actors were central in this process and what were their roles?

This includes, focusing on the role of the three programme members responsible for the project; (1) the Norwegian Directorate of Health, (2) the Norwegian Directorate of eHealth and (3) KS (the Norwegian Association of Local and Regional Authorities). In addition, the public-private partnership and PA Consulting's role is of crucial importance in this collaboration. Finally, I will explore the municipalities role in this innovation process.

In chapter 1, I described how the Testing and Distribution Project was initiated, but in order to accomplish the project, an efficient and well-functioning structure and organisation was required (Norwegian Directorate of Health, 2012). The organisational chart of the project is found in Figure 3. The role of the Ministry of Health and Care Services, their responsibility for the White Paper and the initiation of the project, was described in chapter 1. Therefore, I will start by exploring the three actors which are placed on the level below the Ministry of Health and Care Service on the organisational chart. By doing so, I aim to demonstrate how the process was organised and explore the roles of these actors. These actors are *the Norwegian Directorate of Health, the Norwegian Directorate of eHealth and KS (the Norwegian Association of Local and Regional Authorities)*.

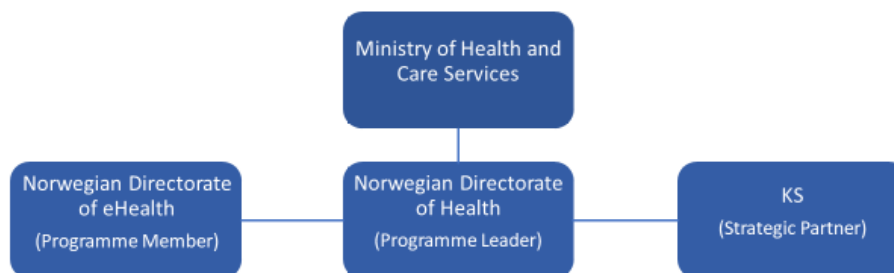


Figure 3. Illustration of the initial organisation of the Testing and Distribution Project.

4.1 The Roles of the Three Programme Members

The three programme members were responsible to carry out the Testing and Distribution Project. The Norwegian Directorate of Health was appointed as the programme leader because it was already a key actor in the former care plan, "Care Plan 2015" (White Paper 29, 2012–2013; White Paper 25, 2005–2006). Furthermore, they played an active role in the initiation of the project as they produced the technical report which suggested the initiation of a national welfare technology programme (Norwegian Directorate of Health, 2012). The project leaders from Norwegian Directorate of Health were responsible for the service and knowledge development in the project. For instance, to collect information and experiences in municipalities and write reports in the Test phase where assistive technologies were tested in 31 municipalities. Moreover, they offered recommendations and produced knowledge that could be used in the distribution of assistive technologies in all Norwegian municipalities.

The second actor was the Norwegian Directorate of eHealth. The Norwegian Directorate of eHealth was a programme member and the project leaders from the Norwegian Directorate of eHealth were responsible for the technical architecture, standards and infrastructure. Their role was to establish a national standard which could simplify the implementation of assistive technology in all Norwegian municipalities (Norwegian Directorate of eHealth, 2019).

The third actor KS (Norwegian Association of Local and Regional Authorities, *Kommunesektorens organisasjon* in Norwegian) was described as a strategic partner. KS is the largest public employer organisation and work closely with all municipalities in Norway (KS, 2020). The project leader and senior advisors in KS worked to increase the efficiency and independency in Norwegian municipalities. Thus, the organisation of this programme included two actors representing the state (two directorates, the Norwegian Directorate of Health, and the Norwegian Directorate of eHealth) and one actor representing the municipalities and the regional and local authorities (KS).

4.1.1 State-Municipal Partnership

Hence, the organisation of the programme members allowed a cooperation between the directorates (the state), and KS representing the municipalities (the local and regional authorities). I will refer to this partnership as the *state-municipal partnership*. A project leader in KS described this partnership between the state and the local regional authorities as unique and as an innovation in the innovation process. The project leader elaborated on this:

To have a partnership where the state and the municipalities cooperate is very unusual. Normally the directorates themselves carry out a project, or they assign tasks to KS. However, in this project we work together. The cooperation itself may be viewed as an innovative project.

According to the project leader in KS, project leaders from the Norwegian Directorate of Health and the Norwegian Directorate of eHealth, KS was a strategic partner (Innovative anskaffelser, 2020). The project leader in KS argued that the state-municipal partnership was a key factor to why the Testing and Distribution Project succeeded and argued that:

It allows a close cooperation with the municipalities, and adapts the process locally when we always start by asking "what are the needs in this particular municipality?"

Okay, we do have some ready-made tools and methods that may help them [the municipalities] through the process, but they always have to be adapted locally.

Thus, KS may have aimed to give the municipalities a voice in this innovation process by trying to adapt the process locally. By including KS, an actor with knowledge and expertise on how the municipalities worked, was brought in. Moreover, as explored in the introduction chapter, a complex innovation process like the Testing and Distribution Project involves many radical changes. For instance, new ways of working, new technology and new organisations. This may lead to resistance among the employees (e.g. the healthcare workers) as they receive new tasks, must learn how to operate new technology and adopt to different ways of working. Especially, considering that the innovation process was initiated externally, at the top level, by the Ministry of Health and Care Services, and not from the municipalities themselves. One reason why KS was included as a strategic partner, could be to create a link to the municipalities. I will come back this when exploring the role of the municipalities in this project. First, I will explore how the organisation of the Testing and Distribution Project developed after a new actor was introduced.

4.1.2 From a State-Municipal Partnership to a Public-Private Partnership

After assembling the three programme members, the next step of the organisation of the Testing and Distribution Project was to find a driving force in the innovation programme. The Norwegian Directorate of Health pointed out in their report how a driving-force would play an important role in the organisation of the project (Norwegian Directorate of Health, 2012). They suggested that it was necessary to include an actor that could: "motivate, stimulate, advise, mitigate risks, provide information and support the municipalities so the municipalities themselves, will be able to carry out the innovation process (...) This actor and driving force, also needs to be a national link between municipalities, businesses/industries, users, relatives, and research." (Norwegian Directorate of Health, 2012, p. 105). Hence, the report described a driving-force with many functions, that should both drive and bridge communities and actors in the Testing and Distribution Project.

The report suggested that an establishment of a Municipal Knowledge Centre could be this driving force. However, this was never initiated. A project leader in KS explained that this was due to economic reasons, because it would be expensive to hire more people and establish a new Municipal Knowledge Centre. Instead, the three programme members decided to take the process in a new direction. The project leader from KS described how the situation unfolded:

It was decided that an external actor should be hired instead of establishing a new knowledge centre. In this case an external actor was hired due to their expertise in transformation and change management. A Municipal Knowledge Centre was never initiated. However, its role was meant to be filled by bringing in a consultancy firm, PA Consulting.

Thus, the quote describes how it was decided to transform the state-municipal partnership into a public-private partnership. Actors from the public and private sector were supposed to work together towards a common goal of improving the Norwegian healthcare services (Figure 4).

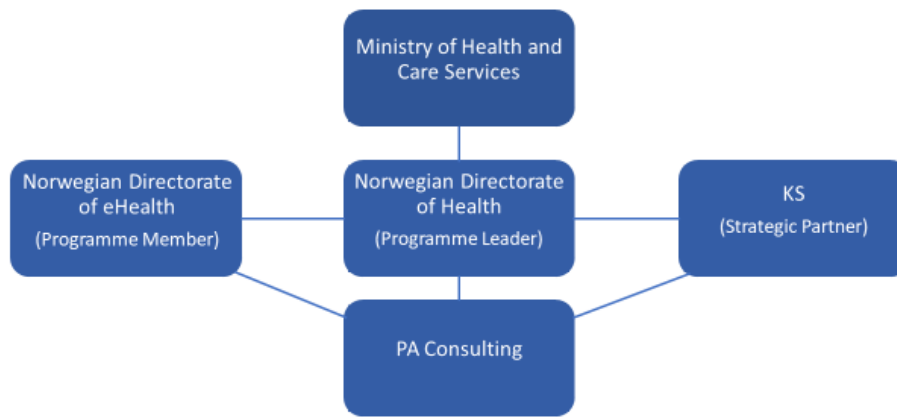


Figure 4. Illustration of how the Testing and Distribution Project was organised after the introduction of PA Consulting.

The innovation process involved actors from different parts of the public sector (directorates, departments, and local and regional authorities) and the private sector, aiming to utilise the knowledge production of each actor. For instance, KS' knowledge on and relation to the municipalities, the Norwegian Directorate of eHealth's knowledge on technical architecture and standards, and PA's knowledge on transformation and change management. This may reflect some of the ideas of Mode 2 knowledge production, and suggest that the Testing and Distribution Project required diverse knowledge production and a combination of different sectors that together could produce new knowledge necessary to drive the process forward. However, what was PA's role in the Testing and Distribution Project, how did they contribute with their expertise in transformation and innovation?

4.2 PA's Role in the Process

As the project leader in KS mentioned, the programme members decided to hire a management consultancy firm called PA Consulting in 2013. PA is an innovation and transformation consultancy specialised in management consulting (PA Consulting, 2019). Their clients are based in the private and the public sector, and most projects are related to digitalisation and technological innovations. PA's responsibility in the Testing and Distribution Project was to support and give practical advices to 340 Norwegian municipalities. Moreover, PA was intended to develop a strategic plan on how to carry out this innovation in the Norwegian healthcare sector.

According to one project leader in the Testing and Distribution Project: "this is the first time the Norwegian health authorities have used a private consultancy firm as a governmental instrument to enable and enforce political policies at the municipal level." This quote suggests that the actors were innovative and creative in the organisation of the project. Similarly to the example of how the state-municipal partnership was an innovation within the innovative project, the use of a private consultancy firm to enable political policies can also be viewed as an innovation in the innovation process. But what was PA's role and how did PA work to fill this role? An employee in PA described the consultancy firm's role:

We make sure that the municipalities start off with the right processes. For instance, the municipalities should not begin an acquisition process before they have identified what needs they have in their municipality. Moreover, PA teaches and

advises the municipalities how to use methods, tools and strategies when going through this innovation process.

Hence, PA had the role as a facilitator and had to work closely with the municipalities in order to give advices on how to go through this innovation process. Even though PA offered practical advices, these were only advices. PA did not carry out tasks at the municipal level which drove the process forward. This was the responsibility of the municipalities. But what exactly was the role of the municipalities and how was the Testing and Distribution Project organised at the municipal level?

4.3 The Role of the Municipalities

The municipalities represented by the *project groups* were responsible to carry out all relevant tasks needed to successfully implement assistive technology. As mentioned in chapter 1, the municipalities were organised into clusters of 2-5 municipalities. Each cluster of municipalities had an *inter-municipal project leader*, and each municipality had a *municipal project leader* (Figure 5).

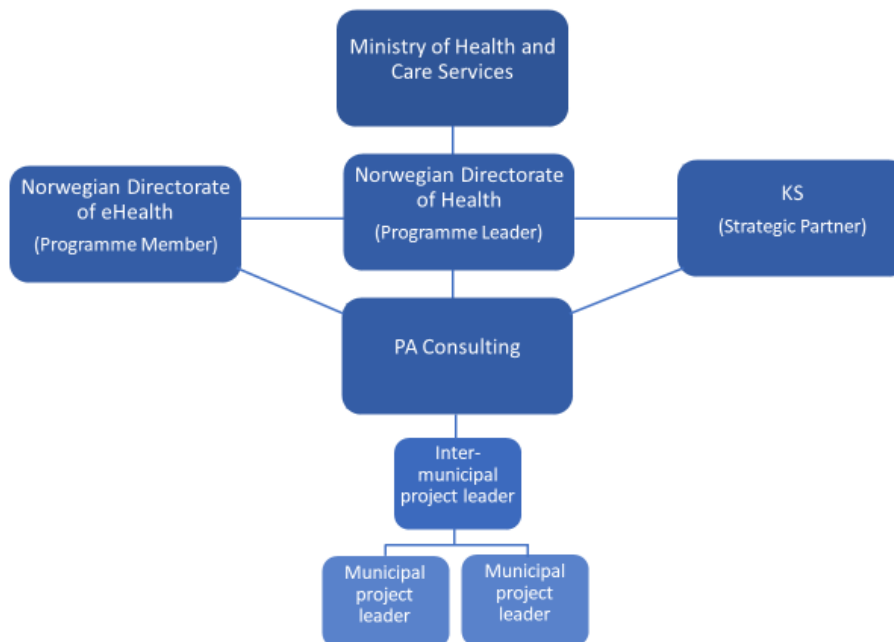


Figure 5. Illustration of the organisation of the Testing and Distribution Project including all the main actors involved.

The project leaders were responsible to organise project groups in each municipality. These project groups were transdisciplinary and included people with diverse backgrounds and from different units in the municipality. The project groups normally included healthcare personnel (e.g. care home employees, home care service employees, ergo therapist, mental health workers, managers etc.), IT-professionals, users (e.g. older adults) or other municipal employees (e.g. employees from the Allocation office of home healthcare services, or municipal health managers). One inter-municipal project leader in a medium-sized cluster, explained how they strategically designed the project groups:

We composed the project groups with participants from services we believe will benefit from integrating assistive technology. For instance, the home care service,

mental health service, services for persons with disabilities etc. It is important that we include employees from these services, to get their opinions and inputs.

Thus, this inter-municipal project leader found it important to include the end-users and users like the employees. One potential outcome of this way of organising the project groups could be the creation of socially robust knowledge, as multiple actors were involved and had the opportunity to affect and carry out the innovation process at the municipal level. The inter-municipal project leader also explained how diverse knowledge and people with diverse backgrounds were needed in the project groups:

We also found it necessary to include people from the Information and Communication Technology (ICT) unit in the municipality, the municipal management, municipal health managers, and people from the Allocation office of home healthcare services, because of their knowledge.

However, this was not the case in all the clusters. It was the inter-municipal project leaders' job to decide who to include and who to leave out of the project groups. The project groups I met during the workshops varied. For instance, in some project groups older adults, actors from the municipal management, or from the Information and Technology Unit in the municipality were present, while in other project groups they were not. Thus, a choice regarding who could express their opinion and affect the process, and who could not was made.

On the other hand, most inter-municipal project leaders argued that the project affected the whole municipality. Thus, they argued, that in order to develop a new service — where assistive technology is integrated — a transdisciplinary and intersectoral collaboration within the municipalities was required. Why was it important to include some of the end-users and people with diverse backgrounds? One reason could be the municipalities role in this process. The project groups, the municipal project leaders and the intermunicipal project leaders were responsible for the implementation of assistive technology in their municipalities. As the intermunicipal project leader pointed out, to organise the right project groups with diverse knowledge may have been important to enable the implementation of assistive technology. Another inter-municipal project leader also highlighted the role of the municipalities in this process. According to this inter-municipal project leader in a large cluster:

When thinking of all the organisation required, resources and knowledge required and training of users and employees [in how to use assistive technology] in the municipalities, this process demands a great amount of effort from the municipalities. They [the municipalities] are the most important driver in this process.

Hence, suggesting that the municipalities themselves play an important role in this process. Furthermore, that the organisation at the municipal level, including project groups and actors in the municipalities, is crucial in this process in order to enable the implementation of assistive technology.

4.4 Collaborating Across Disciplines

My findings illustrate how the organisation of the Testing and Distribution Project involved actors from different sectors with transdisciplinary backgrounds. Both, in the cooperation between the three programme members and the consultancy firm, and in the project groups at the municipal level. In Chapter 2, I explored how the theory of Mode 2 suggests

that new ways of producing knowledge is required to solve complex challenges like the problems in the healthcare sector due to the demographic change (Gibbons, et al., 1994). The organisation of this project illustrates how multiple actors with diverse backgrounds collaborated in innovative ways to produce new knowledge relevant to drive this process forward. The knowledge production was application oriented in order to accomplish the innovation process as it focused on a specific challenge, which was to implement of assistive technology. Moreover, Mode 2 theory suggests that knowledge production involves endless conversations between *research actors* and *research subjects* (Nowotny et al., 2003). In this project it was not research actors and subjects who were involved in these conversations. Instead, actors from different sectors, with different roles and with different backgrounds came together to discuss, produce and share knowledge.

The actors involved in this process were meant to fill different roles in order to develop and accomplish the innovation process. Based on their knowledge and expertise, they were given different tasks to complete. For instance, the Norwegian Directorate of eHealth focused on information and communication technology to develop the infrastructure needed, KS' knowledge on the municipalities to establish a link between the programme members and the municipalities, or the municipalities that worked on relevant task in order to implement assistive technology. Thus, in lines with the ideas of Mode 2, the organisation of the Testing and Distribution Project involved actors from different sectors to facilitate diverse and transdisciplinary knowledge production.

4.5 Summary

In this chapter I have explored the organisation of the Testing and Distribution Project to see how the organisation affected the knowledge production in the project. Firstly, the collaboration between the three programme members and the consultancy firm involved a transdisciplinary composition of actors. Two actors represented the state (the Norwegian Directorate of Health and the Norwegian Directorate of eHealth), one represented the municipalities (KS) and one represented the private sector (PA). At first, the project was organised as a state-municipal partnership where the two directorates were responsible for different parts of the project, while KS was included as a strategic partner. Later, this state-municipal partnership transformed into a public-private partnership, when a management consultancy firm, PA was hired. However, this was not according to the original plan, which was to establish a Municipal Knowledge Centre that could be a driving-force in this process. This suggests that the process and organisation had to be flexible and dynamic.

Secondly, at the municipal level, the project groups representing the municipalities were also composed of individuals with diverse backgrounds and from different units in the municipalities. The empirical data suggests that the municipalities played a central role in the process, as they were responsible for the implementation of assistive technology at the municipal level. However, how did these actors work to shape and facilitate the project? In the next chapter I will examine how the knowledge produced in the Test phase was used to develop tools in the Testing and Distribution Project. Moreover, how these tools were used to frame the project in order to facilitate a national innovation process and knowledge transferring.

5 The Development of Tools for Framing Collaborative Work

In chapter 4, I explained and explored the organisation of the Testing and Distribution Project. It started as a state-municipal partnership where the Norwegian Directorate of Health, the Norwegian Directorate of eHealth and KS cooperated. Later, it transformed into a public-private partnership as an actor from the private sector, PA Consulting, was hired. I concluded that the organisation of the project facilitated transdisciplinary problem solving and diverse knowledge production.

In this chapter, I will explore how actors worked to shape and facilitate the project. I am specifically interested in how the knowledge produced in the Test phase was used to develop tools and the tools' role in facilitating and carrying out the project. How were the tools used to facilitate a national innovation process and how was the project framed to facilitate knowledge transferring? To further unwrap the findings, I will continue to use perspectives and concepts, like the *agora*, from *Mode 2 knowledge production*, to see how actors worked to produce and share knowledge throughout the process. Moreover, the *theory of framing* could help explaining how and why this project was framed the way it was (Callon, 1998; Levold, 2014).

Through my analysis, I identified three tools, two *toolboxes* and the *workshops*. These were developed as results of the transdisciplinary organisation and knowledge production of the Test phase in the Testing and Distribution Project. I will start by exploring the development of the two toolboxes, followed by an analysis of the third tool, the workshops.

5.1 The Development of Two Toolboxes

As explored in Chapter 1, the Test phase of the Testing and Distribution Project involved the testing of assistive technological solutions. This included, the testing of different assistive technologies (e.g. automatic pill dispenser and electronic door locks), new services operation models, new ways of working and new ways to organise processes in 31 municipalities. The aim of the Test phase was to test the assistive technologies and produce new knowledge which could be distributed to all Norwegian municipalities in the Distribution phase. The experiences, insight and the new knowledge produced in the Test phase resulted in the development of two toolboxes. PA, in cooperation with the three programme members, developed the toolboxes, which were a *website* and one *document/report*. The aim of the toolboxes was to help enabling the implementation of assistive technologies in Norwegian municipalities.

5.1.1 Toolbox A: The Roadmap for Service Innovation

The first toolbox was the "Roadmap for Service Innovation" which is a website that provides information on how to develop new services where assistive technology is integrated (KS & PA, 2019a). The Roadmap for Service Innovation was described as: "a toolbox for you who want to improve the services to the inhabitants in your municipality" (KS & PA, 2019a). It included six stages which the municipalities should go through when implementing assistive technology³. However, the Roadmap for Service Innovation emphasised that the innovation process was not a linear process.

On the interactive website, actors may click on each stage/phase (Figure 6) to read more about tasks related to each phase. The toolbox also provided examples and experiences from municipalities who participated in the Test phase of the project. Moreover, it included methods and templates that could help the municipalities to accomplish the stages. For instance, in stage two, *insight*, the municipalities were recommended to assess the needs. To do so, they were recommended to interview employees and end-users (e.g. older adults), to see what types of assistive technologies could be implemented to benefit the users. Thus, guiding and advising in how to conduct interviews, structure the data and analyse it were provided in the toolbox.

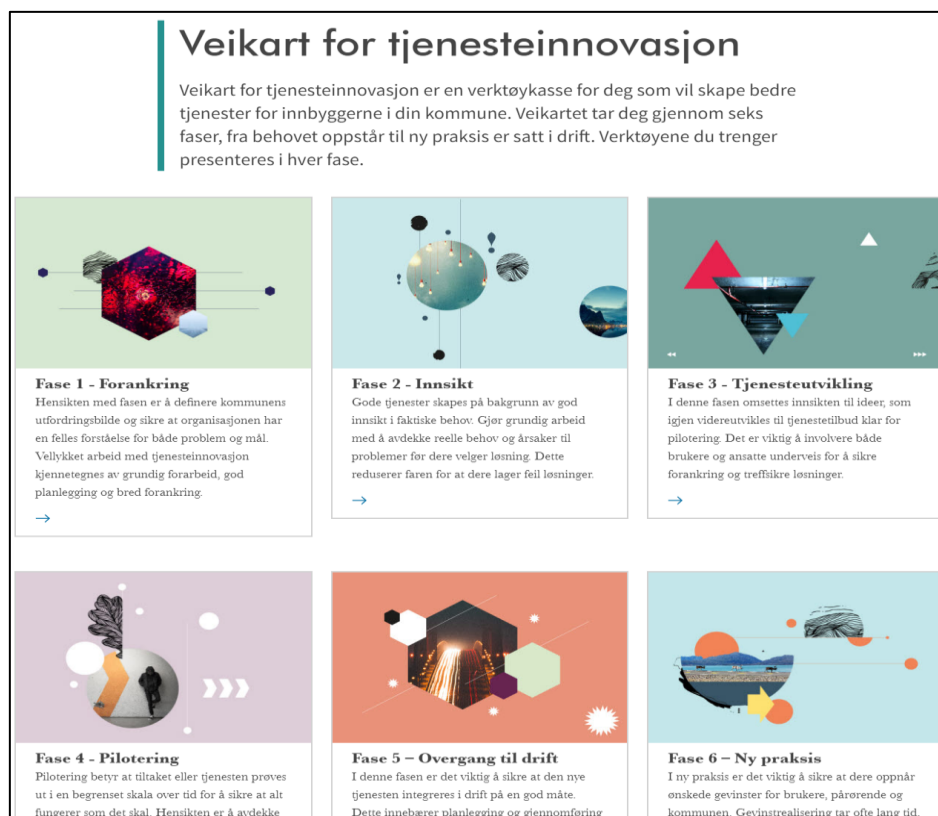


Figure 6. Illustration of the main page of the Roadmap for Service Innovation. The figure is only meant as an illustration. For further readings, go to KS' homepages: <https://www.ks.no/fagomrader/innovasjon/innovasjonsledelse/veikart-for-tjenesteinnovasjon/>

5.1.2 Toolbox B: The Quick-Guide in Assistive Technologies

The second toolbox was the "Quick-guide in Assistive Technology" (KS & PA, 2019b). This toolbox was a ten pages long document with text, pictures and figures (Figure 7). The Quick-Guide in Assistive Technology built on the Roadmap for Service Innovation and was

³ 1. *Stakeholder management*, emphasises that important actors (municipal management, healthcare managers, workers, users etc) need to be involved, interested, possess the knowledge needed, and be dedicated to accomplishing the project. 2. *Insight*, involves the assessment of the needs of each individual user in the municipalities in order to adapt to the users' needs. 3. *Service development*, based on the insight in stage two, new ideas and ways of developing the healthcare service including assistive technology is developed in this stage. 4. *Piloting*, the service developed in stage three is tested for a short period to evaluate the new service, identify errors and unforeseen problems, to reduce the risk. 5. *Operationalisation*, aims to integrate the new service in the municipality. 6. *New practice*, focused on measuring and realising the potential benefits of the new service. This is time consuming and has a long-term perspective.

based on the experiences from the municipalities that participated in the Test phase of the project. It aimed to give a short introduction to the process of implementing assistive technology and mainly focused on three processes, *stakeholder management*, *benefit realisation* and *the acquisition process*. The name "Quick-Guide" of this tool may indicate that it was a short cut, or quick fix. However, on its first page, it was highlighted that the innovation process was a complex and demanding process. Moreover, that the Quick-Guide was not a short cut, but a document which could provide a short and brief introduction to what this process of implementing assistive technology involved and required. For example: "the process involves different phases and requires thorough work" (KS & PA, 2019b, p. 2).



Figure 7. The first two pages of the Quick-Guide to assistive Technology. The figure is only meant to illustrate the design of the document. For further readings of the document, go to KS homepages: <https://www.ks.no/globalassets/kvikk-guide-ny.pdf>.

5.1.3 A Result of the Knowledge Produced in the Test Phase

The development of both toolboxes was based on the experiences in the municipalities and the knowledge produced in the Test phase of the Testing and Distribution Project. For instance, the knowledge produced in the Norwegian Directorate of Health's reports (Melting & Franzen, 2015; Melting, 2017), or based on the knowledge and experiences from the municipalities or the employees from KS and PA who worked with the municipalities in the Test phase. Furthermore, PA's internal knowledge and experiences on transformation and innovation processes were added to the tools. Actors from PA, KS and the Norwegian

Directorate of Health highly recommended the municipalities to use these tools when working on the project because they could learn from the municipalities that participated in the Test phase. In this way, the two toolboxes could facilitate knowledge transferring in this process.

Thus, in this innovation process, actors from both the public and the private sector used their own research, experiences and knowledge to develop two tools used in the process of implementing assistive technology. This suggests that the transdisciplinary organisation of the project resulted in diverse knowledge production which was used to develop tools that played a central role in the operationalisation of the project. Diverse knowledge production is in a Mode 2 perspective, believed to be important when carrying out complex processes (Nowotny et al., 2003) The two toolboxes were central as they were used to frame (Callon, 1998) how the Testing and Distribution Project should be carried out in all the municipalities that participated in the project. They did so, by suggesting what stages and processes the municipalities should go through when implementing assistive technologies. In other words, as a result of the knowledge produced in the Test phase, the actors who developed the two toolboxes (KS, PA, the Directorate of Health and the Directorate of eHealth), included aspects they believed were important to successfully implement assistive technology in all Norwegian municipalities.

However, the process of producing knowledge did not stop after the Test phase and the two toolboxes were also used to frame the third tool that was developed in this process, *the workshop*. After the Test phase and the development of the two toolboxes, the project was moving on to the Distribution phase. How could the knowledge produced in the Test phase and used to develop the two toolboxes, be distributed to all Norwegian municipalities? Could an interactive website and a document enable the distribution of knowledge on their own? In order to distribute the knowledge and the assistive technological solutions another tool which could allow a closer cooperation between different actors and knowledge transferring between the actors in the Testing and Distribution Project was initiated.

5.2 Workshop

All the municipalities had to attend workshops which PA was responsible to facilitate, and the workshops were closely linked to the two toolboxes. The workshop was another way in which the Testing and Distribution Project was carried out in practice. An employee from PA explained how they used the toolboxes actively in the process of guiding the municipalities through the process:

The advices we provide are based on the content in the Roadmap for Service Innovation and Quick-Guide in Assistive Technologies. For instance, how to conduct needs assessment to analyse what technology the municipality should purchase [...] the stages in the Roadmap for Service Innovation are also the topics we focus on in the workshops we facilitate.

Thus, the toolboxes played a central role in the workshops and were used to frame the content of the workshops. PA facilitated workshops where clusters of municipalities participated, and Skype-workshops/meetings. The inter-municipal project leader in a cluster, all the municipal project leaders within a cluster and the municipal project groups (e.g. healthcare workers, ergo therapist, IT-professionals etc.) participated. Sometimes project leaders and senior advisors from KS, the Norwegian Health Directorate and the

Norwegian Directorate for eHealth participated to support and follow the progress of the innovation process.

The frequency of workshops depended on the progress in each cluster and on what stage the municipalities were in the process. Sometimes the clusters needed more time to work on the project before a new workshop could be held. Some stages, like the need assessment, required thorough work and was time consuming. This affected the frequency of the workshops. In between the workshops the consultants from PA had regular contact (e.g. follow-up meetings) with the municipalities through Skype, phone or e-mail. The consultants frequently reported back to the three programme members, the Norwegian Health Directorate, the Norwegian Directorate of eHealth and KS. An employee in PA explained why they facilitated workshops:

The aim of the workshops is to create an environment where representatives from the municipalities and PA can meet to discuss problems and opportunities when implementing assistive technology, and to share experiences and knowledge [...] It is easier for us to advise the municipalities when we meet them face-to-face. But, sometimes, of practical reasons we also facilitate Skype-workshops.

Hence, the aim of the workshops was to stimulate knowledge transferring through dialogic processes. Actors from different sectors and with different backgrounds met in the workshop and created an environment where experiences and knowledge could be shared. To better understand what environment was created at the workshops, I will illustrate how a typical workshop unfolded.

5.2.1 The Structure of the Workshop

I identified a pattern when it came to the structure of the five workshops I observed. In the first part of the workshop each municipal project leader gave a status report. They explained which tasks had been accomplished, and which had not, and the opportunities and the challenges they had faced since the last workshop. The consultant from PA gave feedback during the status reports and sometimes the status reports ended up in plenary discussions. In the second part, the consultant from PA introduced a topic the workshop focused on. The topic was based on the content from the Roadmap for Service Innovation. For instance, service development or benefit realisation.

In the third part, tasks relevant to the topic were provided which each municipal project group had to work on the next 30-60 minutes. For instance, to discuss and write down how today's service chain looked like and compare it to how tomorrow's service chain would look like after the implementation of assistive technology. When the municipal project groups worked on the tasks, the consultant sat down with each group to give suggestions and facilitate discussions. When the groups had worked on the tasks for 30-60 minutes, a plenary discussion was held where challenges and opportunities each municipality faced were discussed.

Then, the consultant gave another short presentation of a topic and new tasks were provided, which the project groups worked on. Finally, all the groups discussed today's work in plenary. The consultant set new plans and goals which should be achieved until the next workshop to maintain the progress. The municipalities would continue to work on the project based on the tasks and topics provided during the workshops until the next workshop was arranged. Thus, the main focus of the workshops was to share experiences and knowledge through dialogic processes. This happened either in plenary discussions, or

during the discussion within the project groups as I illustrated in the examples above. Through dialogic processes actors may incorporate multiple perspectives and aspects of the process which is important when producing knowledge to solve challenges in complex processes (Nowotny et al., 2003). In this case it could be the end-users' perspectives, the healthcare workers' perspective, the management consultant's perspective or the IT-workers' perspective.

5.2.2 The Workshop as a Contemporary Agora?

In Chapter 2 I described the concept *agora* which was part of the *Mode 2* theory. In ancient Greek cities the agora was a central public space and an arena for politics, debates and trading. Nowotny et al. (2003) used the agora concept to describe a problem solving environment where knowledge is produced in modern society. After exploring how the workshop unfolded, I found striking similarities between this concept and the workshops, which I will explore as a "contemporary agora"

Firstly, Nowotny et al. (2003) used *agora* as a concept to describe a problem-solving environment, in which technology and knowledge production takes place. In fact, the consultant from PA used similar words to describe the aim of the workshops. Which was: "to create a problem-solving environment where actors could share knowledge and experiences". On the other hand, no technology was produced in the meetings between the actors at the workshops. However, relevant knowledge needed when implementing assistive technology was produced. For instance, how to organise the services and new ways of working were discussed and worked on during the workshops. In the introduction chapter I found previous research suggesting that only 10% of the changes are related to the technology, while 90% is about new ways of working and organising processes (Knarvik et al., 2017; Kusk, 2010). New ways of organising processes and working were often discussed in the workshop. For instance, a section leader in a care home in a small cluster described how they worked on this:

We discuss how to organise the future service, institutions [care home], and the home care services. It is a huge process which is time consuming, and it requires a lot of both employees and employers.

Thus, the workshops allowed the actors to discuss, share experiences and produce knowledge on new ways of working and how to organise service during the workshops. Two aspects considered to key factors when implementing assistive technology.

Secondly, the agora is a place where multiple stakeholders (e.g. experts, organisations, institutions, and lay people) meet to produce and share knowledge (Nowotny et al., 2003). In the workshops, experts in change management and innovation processes from the organisation PA participated. Moreover, experts in healthcare from institutions, like care homes, were represented. However, the end-users and users of the technology, or lay people, were also represented. In some workshops, older adults represented the end-users, while the majority of the users were represented by the healthcare workers who would have to operate assistive technology in their daily work.

The combination of the actors' knowledge and experiences was used to drive this innovation process forward. It could be positive or negative experiences with the technology. For example, when a nurse described how the older healthcare workers at the care home were negative towards the technology, while the young workers were positive. Or knowledge on how to go through the process. For instance, when the consultant from

PA held a presentation on how to assess the needs for assistive technology in the municipality.

In this context, I will argue that some of the actors took on a role as both lay people and experts. On the one hand, the consultants from PA were experts in their field. However, they were not qualified, specialised nor experienced in practicing healthcare or running healthcare institutions in the municipalities. Similarly, the actors from the municipalities, such as the healthcare workers, were experts in their fields, but they may not have known how to best implement assistive technology and how to go through an innovation process. Hence, the workshops allowed experts and lay people to meet, share and produce knowledge on how to implement assistive technology in each municipality. This knowledge was used to drive the process forward at the municipal level.

5.3 The Workshop as an Agora and Overall Framings

In Chapter 1, I mentioned that Rønhovde (2012) argues that a key condition to successfully achieve innovation projects in the public sector was to create environments where actors could participate and share knowledge and experiences. Rønhovde also suggests that future research should examine what types of environments are created and what characterises these environments. I suggest that the workshop illustrates one such environment. The workshops represented a temporary *agora* as it resulted in transdisciplinary problem-solving, where multiple actors combined their diverse knowledge to share and produce knowledge through dialogic processes. In line with the ideas of the agora, the workshops allowed various actors to interact in a problem-solving environment where they discussed opportunities and challenges with assistive technologies and how to accomplish the innovation process (Nowotny et al., 2003). Hence, the knowledge produced in the Test phase was used to develop three tools. One of these tools, the workshops, were meant to facilitate new knowledge production and knowledge transferring.

On the other hand, the ancient agora also represented a space where everyone regardless of their backgrounds could participate and contextualise problems. Rønhovde (2012) raises a question related to this. Whether there exist primary definers in these environments, or if they are open to everyone. The workshops were not a public space where anyone who wanted could participate and contextualise problems. The municipalities were not allowed to operationalise this project the way they wanted. The consultants from PA and the actors from the three programme members (Norwegian Directorate of Health, the Norwegian Directorate of eHealth and KS) were primary definers who developed framings for how the Testing and Distribution Project should be carried out.

I will argue that together, the two toolboxes and the workshops worked as *overall framings* in operationalisation of the project. The theory of framing suggests that actors frame processes dependent on what they perceive as relevant for the process (Callon, 1998; Goffman, 1975). PA in cooperation with KS, the Norwegian Health Directorate and the Norwegian Directorate of eHealth developed, and shaped, the two toolboxes and the workshop based on the experiences and knowledge produced in the Test phase. In this project, the actors included aspects they believed to be important when implementing assistive technology. For instance, the six stages in the Roadmap for Service Innovation which should be followed, that all municipalities would receive advising through the participation at the workshops, the municipalities had to work in clusters, and they had to work in transdisciplinary project groups. Hence, the transdisciplinary organisation and the diverse knowledge production resulted in the development of three central tools. These

tools were meant to drive the process by facilitating more knowledge transferring and worked as overall framings of the Testing and Distribution Project.

5.4 Summary

In this chapter I have explored how the Testing and Distribution Project was framed to facilitate knowledge production and sharing, and how the project should be carried out in practice to facilitate a national innovation process. I argued that the transdisciplinary organisation found in chapter 4 resulted in knowledge transferring, and knowledge production used to produce three central tools in the operationalisation of the project. These tools were two toolboxes and the workshops. Toolbox A, the Roadmap for Service Innovation described six stages the municipalities should go through in order to implement assistive technology. Toolbox B, the Quick-Guide in Assistive Technology aimed to introduce actors from the municipalities to some of the key processes when implementing technology. The content of the two toolboxes were used to frame the operationalisation as it described stages all municipalities should go through to implement assistive technology.

The third tool, the workshops, were facilitated in order to stimulate more production and sharing of knowledge and to allow multiple actors to meet in a problem-solving environment. The workshop was framed by the contents of the two toolboxes. In the workshops, representatives from the municipalities participated and were responsible to drive the process at the municipal level. All municipalities followed the stages and processes described in the toolboxes. Moreover, all municipalities attended the workshops to receive advices and learn how to carry out the stages and processes in practice. Thus, the three tools worked as overall framings of the project in order to facilitate a national innovation process.

However, even though the Testing and Distribution Project was a national innovation process, there are 356 municipalities (before the municipality merge in 2020) in Norway with considerable differences. For instance, when it comes to population size (e.g. 196 inhabitants in Utsira municipality compared to 685 811 inhabitants in Oslo municipality (SSB, 2020)), geographical size (e.g. Kvitsøy municipality 6,29km² compared to Kautokeino municipality 9707 km² (Kartverket, 2020)), or when it comes to recourses like money or number of employees.

Considering the large number of municipalities in Norway and the great differences between them, how did the Testing and Distribution Project account for local differences? What challenges existed at the municipal level and how did they affect the overall framings of this innovation process? The pre-defined stages and the overall framings, or standardisation of the innovation process, may suggest that this project share many aspects similar to the ideas of linear innovation processes (Fagerberg, 2005). Was the Testing and Distribution Project just another linear innovation process? In the next chapter I will explore challenges the municipalities dealt with when implementing assistive technology, and how it affected the framings and how the project was carried out.

6 The Municipalities' Role in Re-Framing on the Municipal Level

In chapter 4, I described how the Testing and Distribution Project involved a transdisciplinary organisation, which aim was to facilitate transdisciplinary problem solving and diverse knowledge production. Then, in chapter 5, I argued that this organisation and the knowledge produced in the Test phase resulted in three tools central in the operationalisation of the project. The two toolboxes, the Roadmap for Service Innovation and the Quick-Guide in Assistive Technology, and the workshop were meant to help driving the process and worked as overall framings because all municipalities were recommended to follow the advices in the two toolboxes and had to attend the workshops. Hence, the project was organised and framed in order facilitate knowledge transferring and to enable a national innovation process where assistive technology would be implemented in all Norwegian municipalities. But how did this national innovation process account for local differences and local challenges?

In this chapter I will continue to use the theory of framing to shed light on my findings. Callon (1998) describes how aspects, *externalities*, actors' perceive to be less relevant are placed outside the framings. These externalities may *overflow* the process and lead to *reframing* of the situation.

I will explore the project at the municipal level to see what challenges existed in the municipalities, and how local challenges and differences affected the project and the framings of the project. Were aspects of the innovation process externalised, if so, what aspects were externalised and did they overflow the framings of the project? Did the actors involved in the project account for local differences? To investigate this, I first turn to analyse the local challenges that I saw through my empirical work. Then I will give an example of a cluster that struggled, before discussing my findings in this chapter.

6.1 Local Challenges

During the workshops, actors from the municipalities described multiple challenges and aspects of the process which they believed affected the innovation process at the municipal level. When I analysed the empirical data, I identified multiple challenges and aspects the municipalities dealt with in this project. I decided to categorise the challenges and aspects into three categories; (1) *common challenges*, challenges that are present in most municipalities, however, to varying degrees, (2) *important aspects*, aspects of the process that many actors emphasised to be important if they were to succeed, and (3) *location-specific challenge*, challenges that were present in some specific municipalities.

I included the table (Table 2) to illustrate the variation of challenges and aspects in the municipalities. However, there may be many other aspects I could have included as well. I will give two examples to illustrate how some of these challenges and aspects affected how the project was carried out at the municipal level.

Table 2. Table of challenges and aspects believed to affect the innovation process on a municipal level. *A list of municipalities that have not submitted a balanced budget. **Factors I have categorised to be both a challenge and an important aspect.

Common challenges	Important aspects	Location-specific challenges
Frustrated employees	Enthusiasts as a driving force	Sami culture and assistive technology
Lack of resources (e.g. money, time, humans)	The importance of "quick-wins"	Municipalities on the Robek-list*
Distribution of responsibilities	User involvement	Language and dialectal variations
Reorganisations	Not a linear process	
Technical errors	Knowledge transferring	
Different progress within the clusters	Local adaption	
Information flow**	Information flow**	
Stakeholder management**	Stakeholder management**	

6.1.1 Frustrated Employees

I will start by exploring how some actors in the project groups framed social and technical aspects related to employees' frustration and negative view of the assistive technology. In the first stage of the Road Map for Service Innovation the importance of stakeholder management, which is to encourage the employees and relevant actors to go through the innovation process, was highlighted (KS & PA, 2019a). In the workshop it was evident that many clusters and municipalities focused on this aspect of the innovation process. The challenge of encouraging the employees was frequently discussed among the participants attending the workshop. A municipal project leader in a medium-sized cluster explained why this was challenging:

When people have been doing their job the same way for 50 years, then someone tells them that they have to change the way they are working because it is not good enough anymore. It's hard for them. That's why the first phase of the innovation process is so important. It is important that the technology works and that the employees trust the technology, to stay positive and motivated to use the assistive technology.

The municipal project leader framed technical aspects as important to encourage the employees to go through the innovation process and argued that the technology itself played a role. If the technology worked as it was supposed to, it would be easier for the employees to be motivated to use it in their daily work. However, this innovation process did not rely on technical aspects solely. The actors who attended the workshops, framed social aspects as well. Especially the importance of motivating the employees to become more positive towards the new technology. For instance, an ergo therapist in a medium-sized cluster said:

Some of the employees are sceptical at first, but it helps when they realise that things are working. We [the leaders] need to be there to show the employees that

the technology may help them, to make them more confident [...] The process is time consuming because we have to instruct and train the employees and the users in how to use the technology, over, and over, and over again. They need to be confident and trust the technology.

Thus, it was not only the technology itself that played a role. The ergo therapist framed social aspects of this process as well by suggesting that the human actors should work closely to motivate and help each other through the innovation process. An inter-municipal project leader in a medium sized cluster gave an example of how some of their night shift healthcare personnel's frustration was transformed after getting used to the new technology. In the beginning the employees expressed their frustration:

For instance, when we introduced the electronic door lock system, the employees gave up straight away. They said: "what kind of rubbish is this? I'll give this new system a try, but I don't really think it'll work."

After some time, however, the employees experienced that they saved time and worked more efficiently when using the technology. The inter-municipal project leader described how the same night shift personnel were now the biggest enthusiasts of the new technology:

When the technical unit in the municipality had their holiday period this summer, several users that were meant to have the new electronic door lock system had to wait for it to be set up. Thus, our employees had to use the old door lock system when visiting our users. They kept complaining: "I can't wait for the new system to be set up, the old locks are so annoying!"

Thus, frustrated employees were one challenge that affected the innovation process at the municipal level. The last example showed how some employees became more positive toward the technology. However, this was not the case in all municipalities. To change the employees' views was time consuming and many municipalities had to work hard to turn negative views into positive views, and sometimes the employees did not change their view at all. Moreover, the municipalities often experienced technical errors with the assistive technologies which contributed to the negative views of the technology.

The example of frustrated employees illustrates the complexity of the innovation process as both social and technical factors affected the process. This example suggests that a socio-technical approach was needed in order to encourage employees to go through this innovation process (Jasanoff et al., 2002). On the one hand, the actors needed to focus on optimising the technical systems and structures, in order for the technology to work properly. On the other hand, the process required human actors to work in new ways, acquire new knowledge and cooperate with both other humans and the technology.

6.1.2 Lack of Resources

Another challenge several municipalities mentioned during the workshops was *lack of resources*. Lack of resources was believed to affect the innovation process negatively, and often the participants expressed in frustration, like an inter-municipal project leader in a small cluster did: "We often lack resources". However, what types of resources did the municipality lack? In one of the workshops I asked a consultant in the municipal e-health group and the inter-municipal project leader in a large cluster what they meant by lack of resources. The inter-municipal project leader explained how limited resources such as *time* mitigated the innovation process:

You are dependent on setting off time in your schedule. However, our schedules are already completely full. To me, I get the feeling that we are treading water. We don't have the opportunity to work as well as we want, or as we should have in between every meet-up we have. We don't have enough time, it is a shame.

Thus, some of the actors framed time as a resource they lacked. They experienced that due to lack of time it was difficult to complete the tasks needed to maintain the progress. However, time, was not the only resource the municipalities experienced a lack of. An inter-municipal project leader in a small cluster described how lack of human resources in small municipalities affected the process:

We often lack resources and have a great amount of work. In small municipalities, the same people have to do all kinds of jobs, and they are often involved in several project groups. On top of that, they are also responsible for the daily operation of their units and institutions.

This inter-municipal project leader framed *people* as a resource the municipalities lacked. Especially, in smaller municipalities because there are less people working in these municipalities. Thus, the knowledge and experiences of a few become more valuable and the same people may have to be involved in multiple projects. This affected how much time the employees could spend on each project. A general manager in a care home in a small municipality also expressed frustration due to similar reasons:

At the moment, I have three on-going projects beside my "normal" job. I feel like I can't dedicate myself enough to all the projects. It is never enough time. At the same time, assistive technology is so important, and we know we depend on it to meet future demands. But we feel like we can't prioritise it because of all the other tasks. What are we supposed to leave out? In the end of the day, it's all about the daily operation of our units and about providing high quality service to our inhabitants.

Frustrated employees and lack of resources were two examples of aspects and challenges that were framed by the actors involved in the project groups. Some municipalities had to deal with these challenges when carrying out the Testing and Distribution Project. These challenges could affect the progress negatively and the project groups were responsible to work to solve such challenges continuously throughout the process. One reason why this was the project groups' job, is because the actors in the municipalities knew the structure and organisation of the municipalities, they knew what resources they lacked and their own employees. Therefore, the municipalities themselves were responsible for the operationalisation at the municipal level and to drive the process locally. But what happened if the challenges were too complex and too difficult to solve for the municipalities on their own?

6.2 Cluster X – The Cluster that Struggled and the Attempt to Solve it

In one case, a consultant from PA and a senior advisor from KS decided to intervene and take action due to lack of progress in one of the clusters. I will refer to this cluster as Cluster X. Cluster X was one of the largest clusters when it came to number of municipalities represented in the cluster. Normally, the municipalities in a cluster entered the Testing and Distribution Project at the same time. The municipalities sent an application to the county administration, and if they were accepted, they entered the programme. However, Cluster X consisted of two groups of municipalities. One group which entered the

programme in 2017, and one group which entered the programme in 2018. The two groups were meant to operate in two separate clusters. However, due to large geographical distances, a high number of small municipalities (population size) and of practical reasons they were merged into one cluster.

During the workshop it was evident that Cluster X faced multiple challenges. Firstly, the progress varied greatly between the municipalities. For instance, some municipalities could be in the *insight* phase where they had to work on needs assessment, while others could be in the *service development* where they had to work on new service operation models. This made it difficult for the consultant from PA to facilitate workshops that all the municipalities would benefit from, as they were in different stages of the innovation process. In fact, some of the projects stopped completely. An inter-municipal project leader described the situation:

We [the inter-municipal project leaders] haven't heard from some of the municipal project leaders. We have tried to contact them, but they are not always responding. If the municipalities don't hear from us, then, they do nothing. When they [the municipalities] sent the application to enter the programme, they committed themselves to go through with it. They have received the funding and support (economic and external advising), therefore, they have no excuses not to carry out the project.

The inter-municipal project leader was frustrated and also pointed out how internal re-organisations in the municipalities, poor management and geographical distances affected the progress. On the other hand, it was also emphasised that many of the municipalities worked well and showed progress. Due to the challenges in this cluster, the two inter-municipal project leaders, the consultant from PA and the senior advisor from KS decided that a new plan was needed to improve the progress and to account for the problems in this cluster.

A couple of days later, the consultant from PA provided an alternative plan. Instead of facilitating workshops with municipalities that were in different phases, the municipalities were divided into four groups based on their progress. Each group of municipalities would receive relevant advices, support and tasks based on what stage in the process they had reached. The plan was still based on the stages and content in Toolbox A, the Roadmap for Service Innovation. However, it was meant to be adapted to the situation in Cluster X, and to the progress of each municipality. This plan was initiated some weeks after I had finished my data collection. Therefore, I cannot discuss or, draw conclusions on whether this local adaption was successful or not. On the other hand, I will argue that this is an example which illustrates that the actors in the Testing and Distribution Project tried to be dynamic and flexible to account for local challenges and differences that occurred during the innovation process. In this way, the actors could not simply follow the ideas of linear innovation processes (Fagerberg, 2005), like following pre-defined stages to succeed. The process had to be adapted, and in this case, re-framed, to account for local differences.

6.3 Overflows and Locally Embedded Processes

The two examples related to *lack of resources* and *frustrated employees* demonstrate the complexity of the Testing and Distribution Project. There were social and technical aspects, multiple actors and several potential challenges which affected how the process was carried out at the municipal level. The three programme members and PA could not predict all the challenges at the municipal level, nor what challenges would affect the different

municipalities, nor to what extent the challenges would affect the municipalities. The overall framings, the two toolboxes and the workshops, could not account for all the local challenges. I will categorise the local challenges as *externalities* (Callon, 1998) as they were not part of the overall framings. Therefore, the innovation project was exposed to a potentially large number of externalities which could overflow the overall framings. I will argue that some of externalities overflowed the overall framings when the project was carried out at the municipal level, as illustrated in the two examples.

Hence, when the Testing and Distribution Project was operationalised at the municipal level it had to deal with multiple challenges in the municipalities. The challenges varied between the municipalities and affected the process in various degrees. To overcome these challenges, the process had to be adapted to each municipality, and the role of the municipalities became crucial, as they knew themselves best and therefore were best suited to overcome the challenges. This illustrates the importance of locally embedded innovation processes.

Moreover, I will argue that the Testing and Distribution Project represented what Callon (1998) presented as a *hot situation*, because of the complexity which was illustrated when I examined how the process was carried out at the municipal level. Hot situations are complex and difficult to frame because there are so many factors affecting the process and overflows are likely to occur. Could this be a reason why the innovation process in the public sector involved numbers of externalities which overflowed the overall framings? If so, I will argue that the Testing and Distribution Project represented both Callon's (1998) *approach one*, where framing is the norm and overflows are leaks, and *approach two* where overflows are the norm and framings are not.

Approach one was present in this project as the innovation processes needed some overall framings. During my time conducting field research, actors from PA, KS and the Norwegian Directorate of Health highly recommended the municipalities to follow this plan and these stages. This, I interpreted as a way the actors tried to stabilise the framings of the plan in this innovation process. In chapter 4, I explored the organisation of the project which focused on transdisciplinary problem solving and diverse knowledge production. In chapter 5, I argued that the knowledge produced in the Test phase resulted in the development of three central tools which worked as overall framings of the project. Without any framings, and plans for the operationalisation, it could be difficult to facilitate a national innovation process. These framings included, for instance, stages the municipalities should follow in order to implement assistive technologies, all municipalities would receive advising through the process and they worked in clusters that attended workshops to allow knowledge transferring and knowledge production. Thus, the overall framings were needed to organise a national innovation process in the public sector which all municipalities could accomplish. These framings were the norm and had to be followed. There were no room for overflows, for example that municipalities deviated from the plan by not following the stages or not attending the workshops.

On the other hand, I will argue that the Testing and Distribution Project also represented the second approach. As explored in Chapter 6, the project involved many aspects and challenges at the municipal level which affected the process. These factors had to be accounted for and led to reframing of the process. For instance, as the example of Cluster X illustrated, and that each municipality focused on challenges relevant to their own municipality. Some of the aspects were the same, while other aspects varied between the municipalities. The workshops allowed actors in the municipalities to meet in a problem-

solving environment (Nowotny et al., 2003) where they could discuss the challenges and receive support from the consultants in PA.

By using the second approach, where overflows are the norm, the innovation process could be locally adapted to account for different challenges in each municipality. This may be important in order for innovation processes to be flexible, able to account for and deal with various challenges that may occur in complex and hot situations like this project represents. In this case, the local challenges and overflows forced the innovation process to be locally adapted. This also emphasises the importance of the role of the municipalities in this innovation process, as they knew themselves best. Thus, the external actors, like the consultant from PA could provide advises, but the actors from the municipalities would have to solve the challenges themselves.

6.4 Summary

In this chapter I explored how local challenges and differences affected the overall framings of the Testing and Distribution Project. I gave two examples of challenges and aspects that existed at the municipal level which in various degrees affected the process. Firstly, I illustrated how aspects such as *frustrated employees* and *lack of resources* challenged the municipalities at the municipal level when operationalising the project. Then, I gave an example of an even more complicated situation in Cluster X, where multiple factors challenged the cluster as a whole, leading to a re-organisation of the process. I argued that the project needed overall framings which all the municipalities could follow. On the other hand, the project also had to be adapted locally as local differences and challenges had to be accounted for. The municipalities themselves played an important role in solving these challenges locally.

7 Conclusions and Future Inquiries

The public sector in Norway are facing multiple complex challenges that will escalate the next years and decades. Research on innovation processes that could help improving this sector and maintain high quality services to Norway's inhabitants is important. My aim was to add to this knowledge and more specifically, give input on how innovation can be understood in the healthcare sector. In my thesis I have explored one example of an innovation process in the public sector, the Testing and Distribution Project, which involved the introduction of new technology and changes to the healthcare services in Norway. The aim of the project was to test and then implement assistive technological solutions to all Norwegian municipalities. I explored this project by investigating my main research question which was: How do actors facilitate and carry out an innovation process involving the implementation of assistive technology?

I have applied two theories from the academic field of Science and Technology Studies, *Mode 2 theory* and *Framing theory*, and several methodological approaches. These were qualitative methods such as, shadowing, qualitative observations and in-depth interviews. I analysed the empirical case by combining the following empirical and theoretical questions:

- How was the Testing and Distribution project organised—and how did the organisation affect the knowledge production in this innovation process?
- How did different actors shape and facilitate the project—and how was it framed to facilitate knowledge transferring and a national innovation process?
- How did the municipalities affect how the project was carried out in practice—and how did local challenges and differences affect the project and the framings of the project?

In chapter 4, I examined the organisation of the Testing and Distribution Project to see how it affected the knowledge production. I found that the organisation facilitated transdisciplinary problem solving, both in the collaboration between the three programme members and the consultancy firm, and at the municipal level in the project groups. This led to diverse knowledge production which is believed to be important when trying to solve complex challenges in today's society.

In chapter 5, I explored how actors worked to shape and facilitate the Testing and Distribution project. My findings suggested that the transdisciplinary organisation of the project and the knowledge produced in the Test phase were used to develop three tools, the two toolboxes and the workshop. The three tools were used to frame the project in order to facilitate knowledge transferring. Furthermore, the tools helped enabling a national innovation process as all municipalities had to follow certain stages and processes described in the toolboxes, and attend the workshops.

In chapter 6, I examined how local challenges and differences affected the project and the framings of the project. By exploring how the project was carried out at the municipal level, I found that there existed a great amount of challenges and differences which affected the process in various degrees. I gave two examples of challenges which affected the process negatively. I argued that these challenges overflowed the overall framings of the project. Thus, the municipalities had to handle these local challenges which required hard and time-consuming work. Then, I gave an example of a more complex challenge in Cluster X where multiple municipalities struggled. The challenge led to a re-framing of the process as the consultant from PA, the inter-municipal project leaders and the senior advisor from KS

decided to reorganise the process to account for the different progress in this cluster. Thus, I illustrated the importance of flexibility and of locally embedded process when facilitating and carrying out an innovation processes in the public sector.

7.1 Implications for Future Innovation Processes

What implications can my findings have for future innovation projects in the public sector? I mentioned in chapter 3 that my thesis only explored *one* innovation process. Therefore, my findings cannot be generalised to all innovative processes in the public sector. On the other hand, in chapter 1, I described how researchers (Holmen & Ringholm, 2019; Ringholm, Teigen, & Aarsæther, 2013) and various groups in society (EC, 2010; EC, 2011; OECD, 2010; White Paper 7, 2008–2009; UK Department for Business, Enterprise and Regulatory Reform, 2008) call for new knowledge on how innovation processes in the public sector unfolds, to better understand what characterises these processes, how they are organised, operationalised and accomplished. In my thesis I tried to contribute to this by producing knowledge on how the process of implementing assistive technology was facilitated and carried out.

I will argue that the Testing and Distribution Project has lived up to the some of the expectations the Ministry of Health and Care Service (White Paper 29, 2012–2013) and Ministry of Local Government and Modernisation (2019) had on how to go through an innovation process to solve complex challenges in today's society. From chapter 1, I described the expectation, which was to use new technology, to be innovative, to be able to change and to work together across sectors and organisations. In this project new assistive technologies were introduced, and the project was an innovation which aimed to change the health and care services in Norway. This could indicate that the actors involved in the Testing and Distribution Project found it relevant to follow the guidelines provided by the Norwegian Government. But what are the benefits of doing so, and may there be some negative implications too?

7.1.1 Is Transdisciplinary Knowledge Production and Knowledge Transferring a Form of Quality Control?

Firstly, the actors in this project followed the ideas posed by the Ministry of Local Government and Modernisation which resulted in *knowledge production* and *knowledge transferring*, two key aspects in this innovation process. In order to allow for this, the Testing and Distribution Project focused on transdisciplinary work in the cooperation between the program members and the consultancy firm (PA, the Norwegian Directorate of Health, the Norwegian Directorate of eHealth and KS) and on the municipal level in the project groups. The actors constantly tried to produce new knowledge during this process. But why were new ways of organising the production of knowledge so important? One reason could be that this was an innovation process which implies that it involves, for instance, a new idea, new ways of working or new ways to deliver a service (Albury, 2005; Skjølsvold, 2015). In other words, the actors involved may not have been familiar with the process, and therefore, all actors had to learn as they went along with the project. This could apply to other innovation processes in the public sector as well. Since this was a national innovation process, the knowledge produced had to be shared and transferred so more actors could learn by the mistakes and the successes of the other actors. Thus, the importance of creating spaces or arenas, like the workshops, where such knowledge can be shared, may be a key aspect of innovation processes in the public sector.

On the other hand, there might be positive and negative outcomes of the transdisciplinary organisation which aim was to facilitate fruitful knowledge production and knowledge transferring. In one way this organisation of the innovation process may have been a form of quality control. The aim of the project was to integrate assistive technology in the municipalities to increase the quality of the service. When many actors are involved there could be different opinions of what quality is (Nowotny, Scott, & Gibbons, 2003, p.186). For example, is it increased quality for the end-users (e.g. older adults), increased quality for secondary users (e.g. employees), or increased quality of the technology used in the healthcare services? By including actors from different sectors, disciplines and who represented different perspectives, I will argue that the transdisciplinary organisation worked as a quality control to try to account for the different actors' opinions of what quality is. Moreover, this could allow such innovation processes to be *socially robust* as the process can be accepted by multiple actors (Nowotny, Scott, & Gibbons, 2001).

However, will a more transdisciplinary organisation and composition of actors increase the chances of success, or will too many cooks spoil the broth? My point is that to some extent it is important to involve actors from different sectors and disciplines to solve complex challenges by creating socially robust knowledge. At the same time, if too many actors are involved, it could be time-consuming and difficult to enrol everyone, and to make everyone pull in the same direction. Not to mention, the costs of organising and operationalising such a complex innovation process. Mode 2 theory, which I have used in my thesis has been criticised for its lack of focus on the economic aspects (Skjølsvold, 2015). As I have not focused on this aspect in my thesis, to explore the economic aspects of the Testing and Distribution Project in a future research project could be interesting as some researchers list the economic aspect as a barrier to innovation in the public sector (Albury, 2005, p. 55). Framing theory could bring an interesting addition to this. How does the expenses of being involved in this project affect the municipalities, could other ways of organising and operationalising the project have reduced the costs, and is it worth the costs in the long run?

7.1.2 Flexible and Dynamic to Account for Local Differences

Secondly, another key aspect of Testing and Distribution Project was the balance between the overall framings which had to be stabilised in order to facilitate a national innovation process and at the same time to be flexible and dynamic in order to account for local differences and challenges. In this public innovation process, multiple innovations took place, because no municipalities went through the exact same innovation process. Each municipality had its own innovation process within the overall framings, and the premises to succeed on implementing assistive technology varied between the municipalities. For instance, each municipality had different resources available to accomplish the process (e.g. time and human resources). Thus, I will emphasise the importance of being dynamic and flexible in order to adapt to local challenges and differences when going through innovations in the public sector. My findings support Røhnebæk and Lauritzen's (2019, p. 198) findings which also emphasised the importance of locally embedded processes when an innovation process takes place in different municipalities.

However, as I found in my analysis, innovation processes may involve many factors, like social and technical aspects which make it difficult to locally adapt the process. It requires thorough work, it is time-consuming and difficult as multiple challenge have to be dealt with, and what happens if innovation processes in the public sector are not locally adapted?

Could this lead to more resistance toward the process and work as a barrier to successfully accomplish innovation processes in the public sector?

7.2 Looking Ahead

Based on my analysis, I have argued that the Testing and Distribution Project has tried to frame the challenges the Norwegian Government has on how to solve complex challenges in the public sector by involving multiple actors' opinions and experiences into the frame. However, if the project followed the expectations, or the guidelines, on how a public innovation process should be facilitated and carried out, should we not expect to look back on it in some years as a successful innovation process? Even though this process was organised and operationalised in a way which reflects the expectations, there were many challenges in this process. For instance, local differences and challenges in the municipalities, and to enrol all actors involved, like the frustrated healthcare workers. Moreover, the process was time-consuming, and many municipalities have only just started the process of integrating assistive technologies rather than having fully integrated it in their municipalities in 2020, which indeed was the main aim of the project (Norwegian Directorate of eHealth, 2019; Norwegian Directorate of Health, 2012). Suggesting that, even this way of organising and operationalising innovations in the public sector will meet challenges due to the complexity of such processes. Indeed, just before submitting my thesis, we are seeing the rise of a global pandemic that might put everything on its head. Importantly, this thesis was written prior to COVID-19, which as of writing looks to be one of the "hottest overflows" the healthcare sector has ever experienced in modern times.

However, maybe the organisation and operationalisation of how to carry out the implementation of assistive technology focusing on transdisciplinary problem solving, diverse knowledge production, and to be dynamic and flexible, better enable actors to deal with the complexity? Moreover, to locally adapt innovation in the public sector of contemporary and future, hot and cold situations?

But what happens when the Testing and Distribution Project finishes in the end of 2020? Right now, in April 2020, no one knows what will happen, or what direction the project will take when 2020 comes to an end. The Norwegian Directorate of Health, Norwegian Directorate of eHealth, KS and PA are discussing and planning the future development of the process. Therefore, there are some unanswered questions. As this process requires continuous and thorough work and many municipalities have only started the process, what will happen if the overall framings are removed after 2020? For instance, if PA does not facilitate workshops, or the project leaders and senior advisors of KS stop following the progress in the municipalities to make sure they keep on track. Maybe the municipalities are too dependent on the overall framings, or will they be able to continue to work in transdisciplinary groups, create new knowledge and create arenas where they can meet and share new knowledge to remain the progress?

Moreover, it would be interesting if future research could explore the process of implementing assistive technology in some years, to examine whether or not the municipalities succeeded and which factors were crucial and which were not. For instance, was the transdisciplinary organisation and knowledge production, and the attempts and focus on locally embeddedness important, or should the process have been operationalised differently? And if the municipalities succeed in implementing assistive technology what effect will this have on solving the challenges in the healthcare sector related to the

projected lack of healthcare personnel and the ageing population? It will be interesting to follow the development of this innovation process in the public sector.

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