

Doctoral thesis

Doctoral theses at NTNU, 2022:85

Anne Strand Alfredsen Larsen

Healthy Hospital Projects

Improving hospital projects' front-end phase

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
Faculty of Engineering
Department of Mechanical and Industrial
Engineering



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Science and Technology

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PREFACE

This thesis has been written to fulfil the requirements to qualify for the degree of Philosophiae Doctor (PhD) at the Norwegian University of Science and Technology (NTNU), Faculty of Engineering, Department of Mechanical and Industrial Engineering. The research project was undertaken under The Research Council of Norway's Public Sector PhD Scheme (OFFPHD), where funding is provided partly by the Research Council of Norway and partly by the PhD candidate's employer, in this case Møre and Romsdal Hospital Trust.

In my professional life, I have worked in the health sector for several years, first as a medical physicist and leader, and then for the last nine years in administrative disciplines as a strategic adviser. At the start of my career, I was fortunate to be involved in the planning and building of a new cancer department in Ålesund. I found this work very inspiring and learnt a lot from these processes, gaining valuable experience for further work. In 2012, I started working as a strategic adviser in Møre and Romsdal Health Trust, where I was involved in the front-end planning of a new hospital. Planning a hospital is a complex process, which requires skills and expertise across many disciplines. Not least, the planning processes involve multiple stakeholders, often with different views and thoughts and ways of approaching this complex task. Early on, I experienced that there was a need for more formal knowledge on project management in these processes, and I got the opportunity to attend a course in project management at NTNU, which I found very interesting and useful. Through this work, I also came across literature and studies on projects' front-end phase.

From my experience, there was a lack of formal knowledge of the handling and impact of the front-end phase with all its facets on a project's progression and outcome, staged in demanding interfaces between the diversity of stakeholders, hospitals' daily operations, politics and society at large. At an operational level, the planning process was supported by public guidelines for front-end planning

of hospital projects, which also have been revised during recent years. However, the more I read about the front-end phase, the more I realised that additional knowledge of this phase should be obtained due to its impact on strategic project success, in addition to the expressed need for more knowledge of this phase in general as seen from an academic point of view. Hence, the motivation for this thesis came from the experienced and expressed need to obtain better knowledge of the front-end phase and its inherent constituents in order to improve planning processes and strengthen the odds of achieving project success. The audience for this research is both different practitioners engaged in in the planning processes (i.e. planners, hospital employees and other important stakeholders), decision-makers and scholars within the field of project management.

The research was conducted from September 2017 until November 2021, during which I have been engaged in a 25 per cent position for my employer, while working 75 per cent on the research project.

The presented thesis is paper-based and built on four individual papers, which are published in international journals with a referee scheme (peer review system). I am the main author of all four papers. This corresponds to the Faculty of Engineering's supplementary regulations pertaining to thesis requirements.

ACKNOWLEDGEMENTS

This thesis marks the end of my doctoral journey that started four years ago. Several people deserve attention when coming to this point, for providing motivation, support, knowledge and helping me in many ways.

First, to my supervisors. My sincere gratitude goes to my always calm and positive main supervisor Professor Bjørn Andersen. Thank you, Bjørn, for keeping with me through these years, sharing your extensive knowledge and experience, providing steady guidance and invaluable support and feedback so that this thesis became a reality. My heartfelt thanks also go to my never resting co-supervisor, Associate Professor Anniken Th. Karlsen. Thank you, Anniken, for sharing your knowledge and experience, for providing motivation and valuable feedback, high spirits and nice humour, and for cheering me on during this process. Many thanks also to MD, Associate Professor Jo-Åsmund Lund, who kindly agreed to fill the role as project manager for this PhD project, and who has been my co-supervisor at Møre and Romsdal Hospital Trust. Thank you for good advice, and for providing interesting perspectives on my research.

I have had the pleasure to collaborate with knowledgeable people during the work with this thesis, including Professor Nils O.E. Olsson and Dr. Gro Holst Volden, with whom I have co-authored two of the papers. Thank you for your kind collaboration and time, valuable insights and for sharing your knowledge. It has been educative and fun working with you.

I would also like to thank my employer Møre and Romsdal Hospital Trust for giving me the opportunity to go through with this project, which has been jointly funded by the Research Council of Norway. Many thanks also go to my colleagues in Ålesund at the Department of Health Service Development and at the Research Department.

Without willing respondents, this research would not be possible. I am very grateful to all respondents that have spent valuable time with me, supplied me

with information, shared experiences and provided insights into their everyday work.

Furthermore, I would like to thank my colleagues in Trondheim: Professor Antoine Rauzy, Associate Professor Bassam Hussein, Associate Professor Jan Alexander Langlo and Associate Professor Nora Johanne Klungseth for sharing your knowledge, good advice and being available for questions. To my fellow PhD students: Thank you all for nice workshops and interesting discussions and insights into your work. Special thanks to Dr. Haavard Haaskjold with whom I studied the first couple of years – thank you for good discussions and help along the way. Fortunately, we have been two PhD students in Ålesund working on project management, and I would like to express my warmest thanks to Kristina Nevstad, my Ålesund fellow. Thank you for sharing ups and downs, for fruitful discussions and help, good lunches and what has become a friendship over the years. This journey would not have been the same without you.

I would also like to thank the administrative staff at NTNU for their kind help and assistance, and Hilde Mentzoni Andersen at Andersen Translations for professional proofreading. Thanks also to graphic designer Torun Hunnes at Torunsen design, for helping me draw the kaleidoscope models.

Also, huge thanks to all my dear friends for reminding me of my social life, being patient and supporting!

A special thank you goes to my brother, Professor Knut Alfredsen, who through his considerable knowledge and experience has provided me with good advice, support and helpful suggestions along the way. He actually was a triggering factor for this project, and encouraged me to go through with it. He has also provided me with a place to stay when in Trondheim, and he has served many delicious meals. Many thanks also to my other brother, Professor Jo Arve Alfredsen, who also has shared his experiences, good advice and support along the way and who, together with my sister-in-law Margarita, kindly provided me with nice coffee and a place to stay when in Trondheim. I also want to express

my gratitude to my dear parents, my mother Helen and my late father, Hermod. Thank you for teaching me the joy of learning and the value of hard work. Thank you for helping out when the time schedule has become tight, in which my mother-in-law, Synnøve, also has been an important success factor. Thank you so much!

Last, but definitely not least, my deepest and most heartfelt thanks to my favourite crew: my sons Eivind and Amund, and my husband Endre. Without you and your invaluable support, this thesis would not have been a reality. Thank you so much for keeping with me through busy times, cheering me on and bringing sanity and a sense of everyday into my life.

Ålesund | Trondheim, November 2021

Anne Strand Alfredsen Larsen

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SUMMARY

Development of healthcare services is a societal responsibility often appearing as major public projects. Project complexity due to the projects' socio-political role, multiplicity of stakeholders with diverging views, timelines, costs and organisational issues contributes to making the planning processes demanding tasks. Adding to the complexity, hospital projects also show a duality, being both a construction project and an organisational transformation project, and they are set in a rapidly changing environment connected to medical, technological and demographic development. The projects often have a long lifetime expectancy and represent large investments and changes to established welfare systems with a considerable societal impact. This makes strategic project success depending on front-end planning performance crucial. Unfortunately, major public projects have gained a bad reputation for being unsuccessful, which may be explained by insufficiencies in the projects' front-end phase. Despite its role in achieving project success, the front-end of projects is insufficiently understood. Nor is complexity in project management clearly defined. To achieve success and release values and benefits of a project, project management has to broaden project conceptualisation.

The purpose of this research has been to explore the front-end phase of Norwegian hospital projects to gain a deeper understanding of the planning processes, and thus provide more knowledge to enable improvement and further strengthen the odds of project success. By means of an exploratory and iterative three-step approach, within which each step contained a central research question (RQ_c), the undertaken research has aimed at answering the following questions:

- **RQ_{c1}:** *Which prominent challenges can be found in Norwegian hospital projects' front-end planning?*
- **RQ_{c2}:** *Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects' front-end?*

- **RQ_c3:** *How can Norwegian hospital projects' front-end phase be improved?*

The thesis consists of two parts, where Part I is a summary of the conducted research, the theoretical background and key findings, and where Part II comprises the four individual papers upon which the thesis is built.

The RQ_cs were further detailed through the studies reported in the four individual papers. The research has been iterative and dynamic, thus contributions from each paper do not link to one specific RQ_c. The dynamic research approach also made it possible to pursue emerging topics along the research process that have required attention due to their assumed importance for front-end performance. The undertaken research is mainly qualitative, comprising case studies, document studies and interviews. The fourth study was a mixed methods study, where interview results were used to compose a questionnaire to further expand and emphasise initial findings.

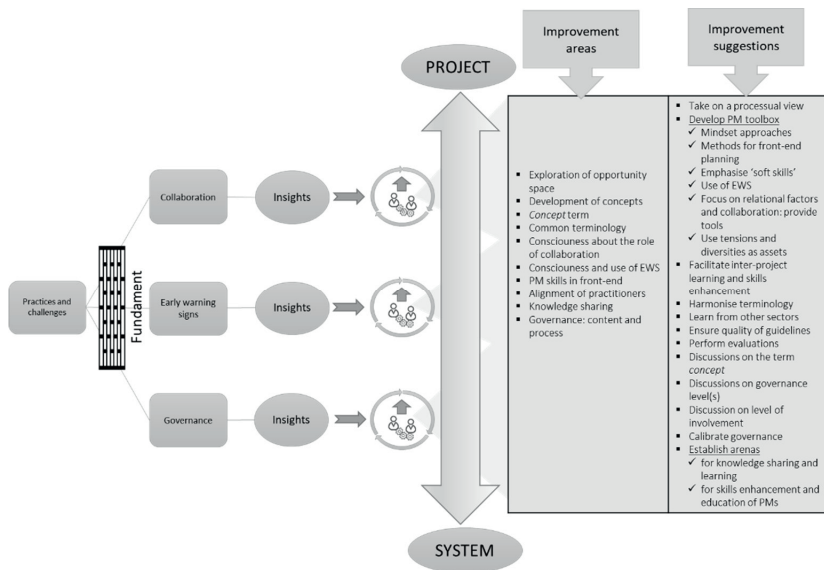
The first research question (RQ_c1) is mainly addressed in paper I, but also papers III and IV contributed to elucidating prominent challenges for front-end planning. Paper I is based on a document study of five Norwegian hospital projects' front-end documents. The study set out to explore current practices and challenges in front-end planning and how current planning comply with public guidelines, and established an empirical foundation which was further elaborated in subsequent studies. Findings indicated that the projects conscientiously follow public guidelines and adhere well to the expected content. However, some shortcomings were identified, mainly relating to the planning process, the exploration of the opportunity space and the elaboration of concepts. Paper III looked into governance arrangements and quality assurance schemes in state-owned enterprises and compared these to the more established State Project Model. Identified challenges comprised the ability to keeping a holistic, societal perspective when elaborating concepts, an experienced distancing to the political level even if decisions in these projects should be truly political decisions, and practical or structural issues relating to

the quality assurance arrangements. Examples of such issues are the closeness between the external quality assurers and the projects that may compromise the impartiality needed in these processes, narrow time frames and parallel arrangements. Challenges identified in paper IV are connected to early warning signs, which provide information on future or incipient issues that might affect the project. Early warning signs may be categorised into four categories: (i) *Structure and tools*, (ii) *Context and frame factors*, (iii) *Management* and (iv) *Relational factors and properties*, and are perceived as a useful tool for the front-end planning processes. However, the concept is understood differently, and efforts should be made to raise consciousness on how to detect and handle these signs.

The second central research question (ROc2) is mainly addressed through papers II and IV. Paper II reports from a study looking into collaboration in hospital projects' front-end, which is a vital activity considering the multiple stakeholders found in these projects. The study suggested collaboration be viewed as a process, comprising four descriptive categories: (i) *Context*, (ii) *Structures*, (iii) *Means* and (iv) *Catalysts*. The categories should be considered at different times in the planning process to initially make collaboration happen and then make collaboration work, further reflecting the processual nature of collaboration. Leaning on the established categories, the paper presents a conceptual framework for collaboration that may serve as a practical guide for front-end planners. Paper IV emphasises early warning signs as a means for keeping track of front-end performance. The identified early warning signs comprise both hard and soft issues confirming findings from other studies. An important message was that processual approaches to identifying early warning signs are considered more useful than the actual established indicators. This also indicated that there is a need for harmonising the understanding and terminology of this concept among different project participants, and that this process has a value in itself.

All papers contributed to answering the third central research question (ROc3), pertaining to how the front-end phase of Norwegian hospital projects can be improved. The identified challenges or shortcomings provide a beneficial point of departure for improvement, and may be viewed at a challenge-perspective scale, that is from the project perspective to the system perspective. The scale should be perceived as floating, meaning that independent of emerging perspective, the challenges may affect both outcomes in that perspective and also outcomes in other perspectives.

Thus, based on the findings and insights gained from the four studies on which this thesis is built, improvement areas and improvement suggestions can be summarised as follows:



Taken together, the contributions from the papers provide insight into the front-end through several angles, which is considered a necessary approach to manage coping with the growing complexity and 'plurality' found in today's major projects.

The contributions of this research aim at bridging the research gap relating to the general lack of understanding of the front-end phase. Providing more understanding and insight into the front-end phase of hospital projects should enable improvement of their performance and thus strengthen the odds of strategic project success. This will in turn provide savings for society and create sustainable solutions beneficial to society at large, and patients, relatives and hospital employees in particular. The undertaken research also looks into research gaps in the front-end at a more detailed level, pertaining to the understanding of relations and interactions among multiple stakeholders through exploring collaboration, and how, from a system perspective, projects can be improved and supported to achieve successful outcomes through appropriate governance and, finally, how early warning signs may serve as a tool for front-end improvement.

The theoretical contributions of this thesis add to the general knowledge of the front-end phase by exploring and providing insights into different aspects considered important for front-end performance. This advances general understanding, which further makes it easier to handle front-end complexity.

The practical contributions of this thesis comprise further insight into the front-end phase of hospital projects by creating awareness of current challenges that should be taken into consideration in front-end planning. Practical approaches to managing collaboration, providing appropriate governance and handling early warning signs are provided. These approaches are aimed at decision-makers, planners and other practitioners in these processes to help front-end performance on the road to healthier hospital projects.

The findings of this thesis are only a small and preliminary step to establish further understanding of the front-end phase of hospital projects in order to facilitate improvement for the purpose of successful outcomes. More work is needed, and all studied topics may be further researched following diverse trajectories. Further improvement requires additional knowledge, which calls for more research on this topic.

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SUMMARY IN NORWEGIAN

Investeringar og drift av helsetenester utgjer ein betydeleg del av det norske statsbudsjettet generelt, og av sjukehus og spesialisthelsetenester spesielt. Ofte vert investeringane organiserte som prosjekt, og desse prosjekta er i seg sjølve kostnadskrevjande og har også store ringverknader for samfunnsutviklinga generelt. Såleis er det viktig at ein lukkast med prosjekta både på kort og lang sikt. Vidare er sjukehusprosjekt komplekse på fleire måtar, til dømes ved å ha mange interessentar med ulike syn på kva prosjektet er og kvar ein skal ende opp, lange tidslinjer, høge kostnader og organisatoriske utfordringar. Eit sjukehusprosjekt representerer også ofte ein dualisme i form av å vere *både* eit byggeprosjekt og eit organisasjonsendringsprosjekt, i tillegg til at prosjekta må forhalde seg til raske kontekstuelle endringar som følgje av medisinsk, teknologisk og demografisk utvikling.

Sidan sjukehusprosjekt har lang levetid, er det viktig at prosjektet er vellukka på lang sikt. Strategisk prosjektsuksess fordrar relevante og berekraftige løysingar, og prosjektstrategien vert forma i prosjektet sin tidlege fase. Dette gjer denne fasen av prosjektet til ein særskild viktig del av eit prosjekt. Store prosjekt har tidvis fått eit dårleg rykte på grunn av overskridingar både når det gjeld kostnader og tid. Mykje av forklaringa på dette skuldast nettopp ulike manglar i prosjektet sin tidlege fase, som trass i si viktige rolle for strategisk vellukka prosjektsresultat, ikkje er godt nok forstått slik stoda er i dag. Den tidlege fasen er elles krevjande grunna mykje uvisse og lite tilgjengeleg informasjon, og krev derfor ei anna form for prosjektleiing enn den 'klassiske prosjektleiinga' ein til dømes kjenner frå prosjektutføring. Ein prosjektleiar i den tidlege fasen bør ha ei brei tilnærming til prosjektet for å auke sjansane for eit strategisk vellukka resultat.

Målet med denne avhandlinga er å utforske norske sjukehusprosjekt sin tidlege fase for å få ei djupare forståing og bringe fram meir kunnskap om denne fasen, som vidare vil vere med på å auke sjansane for vellukka prosjektsresultat, både

på kort og lang sikt. Konkret skal avhandlinga svare på tre sentrale forskingsspørsmål:

- **RQ_{c1}:** *Kva for tydelege utfordringar finn ein i tidlegfaseplanlegging av norske sjukehusprosjekt?*
- **RQ_{c2}:** *Kva innsikt får vi gjennom å (empirisk) utforske desse tydelege utfordringane i norske sjukehusprosjekt sin tidlege fase?*
- **RQ_{c3}:** *Korleis kan vi forbetre norske sjukehusprosjekt sin tidlege fase?*

Avhandlinga er sett saman av to delar, der første delen er ei oppsummering av det gjennomførte forskingsprosjektet med teoretisk bakgrunn, hovudfunn og teoretiske og praktiske bidrag, medan den andre delen inneheld dei fire individuelle forskingsartiklane avhandlinga byggjer på.

Dei sentrale forskingsspørsmåla vart vidare detaljerte i studiane rapporterte i dei fire ulike forskingsartiklane. Ein har søkt å svare på forskingsspørsmåla gjennom ei eksplorativ og iterativ tilnærming. Dette har gitt mogelegheit til å etterfølge emne som synest viktige for den tidlege fasen av prosjektet etter kvart som ein har fått ny innsikt. Dette har også ført til at svara på forskingsspørsmåla kjem frå ulike kombinasjonar av dei ulike studiane. Forskingsprosjektet har i hovudsak nytta kvalitativ metodikk gjennom casestudier, dokumentstudiar og intervju. Den fjerde studien nytta kombinert metodikk, der intervjudata vart nytta til å lage eit spørjeskjema for vidare utdjuing av funna.

Svaret på det første forskingsspørsmålet blir i hovudsak gitt i studien rapportert i artikkel I, der noverande praksis og utfordringar i sjukehusprosjekt sin tidlege fase er studerte. Men også studiane av prosjektsstyringsordningar i statseigde selskap i artikkel III og tidlege varslingsignal i artikkel IV, bidreg til å setje lys på tydelege utfordringar i den tidlege fasen. Funna viser at ein har utfordringar knytte til planleggingsprosessen, utforsking av mogelegheitsrommet og utarbeiding av konsept. Når det gjeld prosjektstyringsordningar, ser ein at å ha eit breitt samfunnmessig perspektiv

ved utarbeidinga av konseptuelle løysingar er ei utfordring. Vidare ser ein ei viss distansering mot det politiske nivået trass i at avgjerslene som takast i prosjekta er av politisk karakter. Kvalitetssikringsordningane som følgjer prosjekta er også vurderte i denne studien og samanlikna med Statens prosjektmodell, som er meir etablert enn ordningane for statseigde selskap. Kvalitetssikringsordningane fortonar seg noko annleis enn for Statens prosjektmodell, då dei er mindre i omfang. Vidare er nærleiken til dei eksterne kvalitetssikrarane større, noko som vidare kan kompromittere objektiviteten som er eit viktig element i eksterne kvalitetssikringsprosessar. I studien knytt til tidlege varslingsignal peika funna på at desse signala, som kan hjelpe til med å vere 'føre var' i dei komplekse planleggingsprosessane, kan kategoriserast som strukturelle, relasjonelle, leiingsrelaterte eller kontekstuelle. Det er ei utfordring at omgrepet 'tidlege varslingsignal' er fragmentert, og ein ser at bruken av dei er deretter. Ein treng å gjere prosjektmiljøa meir medvitne kring dette temaet, og på kva måte dei tidlege varslingssignala kan identifiserast og nyttast til det beste for prosjektet.

Det andre forskingsspørsmålet er knytt til å skape vidare innsikt i den tidlege fasen. Den andre artikkelen i denne avhandlinga tar føre seg samarbeid, som er ein essensiell aktivitet i den tidlege fasen på grunn av alle interessentane som skal handterast. Funna indikerer at samarbeid bør sjåast på som ein prosess, der ulike faktorar slår inn til ulik tid, først for å få samarbeid til å skje, og vidare for å få samarbeid til å fungere. Artikkelen presenterer eit rammeverk for samarbeid i denne fasen av eit sjukehusprosjekt som kan tene som ein praktisk guide for planleggarar og andre involverte. Vidare fann ein gjennom studien rapportert i artikkel IV, at tidlege varslingsignal er eit nyttig og velkome verktøy i den tidlege fasen av prosjekt. Varslingssignala er av både 'mjuk' og 'hard' karakter, som stadfester tidlegare funn. Eit viktig poeng i denne samanhengen, er at prosessen knytt til å identifisere og diskutere indikatorar for tidleg varslings ofte opplevast som meir nyttig enn indikatoren i seg sjølv.

Dette peikar igjen på behovet for harmonisering av forståing av omgrepet og terminologien gjennom felles diskusjonar og meningsutvekslingar.

Når det gjeld det tredje og siste forskingsspørsmålet, knytt til korleis den tidlege fasen kan forbeistrast, gir alle studiane indikasjonar på kva som er gode kandidatar i så måte. Å studere utfordringar eller manglar i dagens planleggingsprosess tener som eit nyttig utgangspunkt, og har vidare vorte nytta til å etablere ein skala for utfordringar i ulike perspektiv, som spenner frå prosjektet i seg sjølv til systemet prosjektet er ein del av. Avslutningsvis skildrar avhandlinga både forbeistringsområde og forbeistringsforslag som kan vere med på å optimalisere tidlegfaseplanlegginga av sjukehus. Samla sett gir funna meir innsikt i korleis den tidlege fasen utspelar seg sett frå fleire vinklar, noko som er naudsynt med tanke på kompleksiteten og pluralismen ein finn i dagens prosjekt.

Dei overordna funna frå denne avhandlinga gir eit bidrag til å tette forskingsgapet ein finn knytt til kunnskap om store, offentlege prosjekt sin tidlege fase. Ved å auke kunnskapen om sjukehusprosjekt sin tidlege fase, aukar ein sjansane for å forbetre utføringa av denne, og vidare for å oppnå strategisk suksess. Strategisk vellukka sjukehusprosjekt er viktige både for samfunnet generelt og for pasientar, pårørande og tilsette i sjukehusa spesielt, og blir til gjennom utforming av berekraftige og relevante løysingar som står seg over tid.

På eit meir detaljert nivå gir funna innsikt i tema som er viktige for utføringa av den tidlege fasen, og som også har etablerte forskingsgap. Kunnskap om relasjonar og interaksjonar mellom interessentar veit ein for lite om i den tidlege fasen, og dette er studert gjennom å granske korleis samarbeid fortonar seg i denne konteksten. Prosjektstyringsordningar kan støtte og forbetre prosjekta gjennom å finne eit passende nivå og innhald i desse, noko som ikkje er godt nok kjent for statleg eigde selskap. Vidare veit ein også lite om korleis tidlege varslingsignal kan nyttast til forbeistring i denne fasen av eit prosjekt.

I teoretisk samanheng bidreg funna i denne avhandlinga til å utvide etablert teori og litteratur på feltet, som vidare er fordelaktig for å handtere kompleksiteten som finst i prosjekta. I praktisk samanheng gir funna ei oversikt over nokre av utfordringane ein finn i den tidlege fasen til sjukehusprosjekt, som vidare er eit nyttig utgangspunkt for forbedring. Dei fire forskingsartiklane har alle praktiske tilnærmingar til korleis ein betre kan forstå og handtere den tidlege fasen, og er tiltenkt både praktikarar, planleggarar og dei som tek avgjerder i planleggingsprosessen.

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ABBREVIATIONS

EWS	Early Warning Signs
LHA	Local Health Authority
MPC	Making Projects Critical
NHCA	Norwegian Hospital Construction Agency
OECD (DAC)	Organisation for Economic Co-operation and Development (Development Assistance Committee)
OS	Opportunity Space
PM	Project Management
QA	Quality Assurance
RHA	Regional Health Authority
RPM	Rethinking Project Management
RQ	Research Question
SOE	State-Owned Enterprise
SPM	State Project Model
STC	Systematic Text Condensation
UK	United Kingdom

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DECLARATION OF AUTHORSHIP

Paper ID	Paper	Declaration of authorship
Paper I	Larsen, ASA, Karlsen, A Th., Andersen, B, 2020: <i>'Hospital project front-end planning: Current practice and discovered challenges'</i> Published in: Project Leadership and Society, Vol. 1: 100004; 2020 https://doi.org/10.1016/j.plas.2020.100004	The PhD candidate is first author. The PhD candidate collected all data from five projects' front-end documents. The PhD candidate performed data analyses and wrote most of the paper.
Paper II	Larsen, ASA, Karlsen, A Th., Andersen, B, Olsson, NOE, 2021: <i>'Exploring collaboration in hospital projects' front-end phase'</i> Published in: International Journal of Project Management, Vol 39(5), 2021 https://doi.org/10.1016/j.ijproman.2021.04.001	The PhD candidate is first author. The PhD candidate is responsible for data collection through 13 interviews. The PhD candidate performed data analysis and wrote most of the paper.
Paper III	Larsen, ASA, Volden, GH, Andersen, B, 2021: <i>'Project governance in state-owned enterprises: The case of major public projects' governance arrangements and quality assurance schemes'</i> Published in: Administrative Sciences, 11(3); 66; https://doi.org/10.3390/admsci11030066	The PhD candidate is first author. Data collection and data analyses done by GHV/BA. The PhD candidate contributed to discussions and wrote main parts of the paper.
Paper IV	Larsen, ASA, Karlsen, A Th., Lund, JÅ, Andersen B, 2022: <i>'Assessment of early warning signs in hospital projects' front-end phase'</i> Published in: International Journal of Managing Projects in Business, Vol. ahead-of-print, No. ahead-of-print; https://doi.org/10.1108/IJMPB-06-2021-0156	The PhD candidate is first author. The PhD candidate is responsible for data collection through 13 interviews and a survey. The PhD candidate performed data analysis and wrote most of the paper.

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Part I

Theoretical background and key findings

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1 INTRODUCTION

In this chapter, the background and motivation for this thesis are discussed, and the central research questions that have guided this work are presented.

1.1 Background

Worldwide, there is an increase in societal development undertaken as major public projects, and the growth of project work is recognised for different sectors and industries (Winter *et al.*, 2006, Flyvbjerg, 2014, Svejvig and Andersen, 2015). Furthermore, projects have become constantly larger in scope and monetary terms (Flyvbjerg, 2014). Project management (PM) plays an important role in global value creation (Bredillet, 2015). This can be concluded both from World Bank data (The World Bank, 2021), where in 2019 24.5 per cent of the world's GDP was gross capital formation, and further from estimations showing that between 20 per cent and 30 per cent of the global economy is viewed as project based depending on a country's emerging economy (Turner *et al.*, 2013, Walker and Lloyd-Walker, 2016).

In general, public projects have gained a bad reputation due to cost overruns, time delays and poor value for money (Morris and Hough, 1987, Flyvbjerg, 2014, 2017, Volden, 2019b), even if this also is sometimes considered an exaggeration, at least when looking at the transport sector (Love and Ahiaga-Dagbui, 2018). Encouraging results on public project performance especially at an operational level are also seen in a Norwegian context (Volden, 2018). However, the perception of unsuccessful project performance has gained a foothold in the project community, and Flyvbjerg (2014) described this by the iron law of megaproject management: '*over budget, over time, over and over again*', (Flyvbjerg, 2014, p. 6, Flyvbjerg, 2017). The experienced project failures, seen both in a short- and long-term perspective, may be explained by insufficiencies in the projects' front-end phase, which is crucial for achieving strategic project success (Samset, 2010, Volden and Samset, 2017a, Williams *et al.*, 2019a). The front-end phase is where decisions that severely affect a

project's outcome are made, characterised by uncertainty and lack of information (Samset, 2010). Further, in this phase of the project, changes come at the lowest cost and there is still time to adjust or correct the project to ensure a successful outcome, or terminate the project at an affordable cost (Klakegg *et al.*, 2010, Volden and Andersen, 2018). Thus, knowledge of this project phase is important for project performance. Unfortunately, although the front-end's role in achieving project success is acknowledged, it is insufficiently understood (Williams *et al.*, 2019a).

Development of healthcare services in the form of hospital projects is a societal responsibility. In Norway, investments into and operation of health services constitute a considerable part of the state budget in general ($\approx 2\%$ in 2019), and of the budgets of hospitals and specialist healthcare in particular. Towards 2024, investments in hospital projects with an expected cost exceeding NOK 500 million, amount to almost NOK 58 billion (Norwegian Ministry of Health and Care Services, 2019). Projects of this size are further obliged to provide a concept study report and are subject to external quality assurance to ensure quality-at-entry before being presented to the Ministry of Health and Care Services as basis for a loan application. Front-end planning of Norwegian hospitals is regulated by public guidelines containing a stage-gate project model, which has been revised over the years. A simplified version of the current project model (revised in 2017) is illustrated in Figure 1.1.

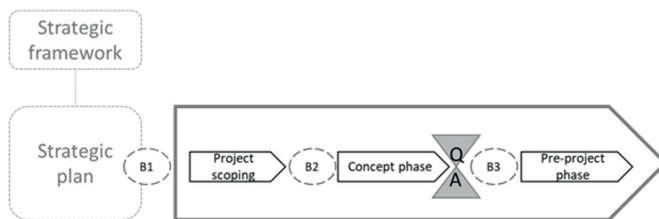


Figure 1.1 Stage-gate model for Norwegian hospital projects (adapted from NHCA), where B1, B2 and B3 represent decision points

In addition to being large investments, hospital projects often have a long lifetime expectancy and represent changes to established welfare systems with considerable societal impact. This makes strategic project success crucial, which further is dependent on front-end planning performance. Moreover, project success is a compound measure which is ambiguously defined (Hussein *et al.*, 2015, Pinto, 2016), and it is perceived differently among people and seems to be dependent on personal preferences (Shenhar *et al.*, 2001, Klakegg, 2009, Samset, 2010). However, the perception of success has evolved over the years, and according to Samset (2014), success should be viewed in both an operational, tactical and strategic perspective. This means considering both the project *output* and the project *outcome*. The project output typically pertains to time and cost, i.e. the operational perspective, while the project outcome relates to project performance in the tactical and strategic perspective. In a tactical perspective, the project's relevance and impact are important measures, while in the strategic perspective, a project's success is assessed according to its sustainability and long-term value creation (Williams and Samset, 2010).

Furthermore, hospital projects are complex in many ways regarding both size, costs, timeline, number of stakeholders, organisational issues, management and leadership issues, societal impact, governance, etc. (Glouberman and Mintzberg, 2001, Mintzberg and Glouberman, 2001, Eeckloo *et al.*, 2007, Snowden and Boone, 2007, Samset *et al.*, 2014, Ernst & Young, 2016, Samset, 2017, Fréchette *et al.*, 2020). Given this complexity, the planning processes for this type of facilities are demanding regarding both the multiple issues to be covered and the large amount of resources needed.

In 2011, the Office of the Auditor General of Norway investigated the Norwegian Health Authorities' property management (Office of the Auditor General of Norway, 2011). The investigation highlighted the importance of the role of buildings in supporting quality and effectiveness in the performance of healthcare services, and furthermore the challenging conditions in Norwegian healthcare facilities. The investigation found that the basis for making decisions

on new hospitals in Norway was insufficient. The investigation also found that the formal guidelines used in the front-end planning of Norwegian hospital projects were partially inadequate. Experience from the sector shows that there is a gap between the use of the theoretical recommendations and good practice as presented by for example Samset (2010), and the practical front-end planning performance. Other authors also recognise the importance of the front-end phase and the challenges of hospital projects (Elf and Malmqvist, 2009, Bygballe, 2010, Elf *et al.*, 2012, Elf *et al.*, 2015).

This thesis addresses an important research gap that, when narrowed, could contribute to improving the front-end planning of hospitals, and thus strengthen the odds of strategic project success. This would provide savings for society and create sustainable solutions that benefit the society at large, and patients, relatives and hospital employees in particular. The general lack of understanding of the front-end (e.g. Williams *et al.*, 2019a) despite its role in achieving strategic project success, represents a research gap that the undertaken research will contribute to closing. Additionally, the research contributes to clarifying how to 'do the right project' (Williams and Samset, 2010). Furthermore, research gaps are also detected for hospital projects in particular, and the research aims at addressing and exploring these to gain a deeper understanding of the planning processes undertaken in the hospital sector in order to provide improvement suggestions.

1.2 Personal motivation

My background from healthcare services, as both a medical physicist and a leader for several years and then as a strategic adviser, is part of the fundament of this work. One of my first tasks as a strategic adviser was to participate in the front-end planning of a new hospital in a region with a turbulent history, which was kind of a brutal debut. Experiencing a growing sense of lack of knowledge and tools to handle this complex situation, I turned to literature in the field, which I found very interesting, and which made me very curious. I both wanted and needed to learn more, motivated by the heavy and complicated processes I

experienced in practice, and by the demanding, yet interesting interactions between project, stakeholders, politics and society. I was also triggered by discovering the role the front-end phase plays in project progression and performance, and was quite keen to gain more formal knowledge of this phase. This made me wonder how we could make the front-end phase and its importance more visible and, further, how we better could face the front-end phase on our road to 'healthier hospital projects'.

Furthermore, the degree of expected and necessary involvement and engagement from my fellow workforce at the hospital, the many workhours spent by those with a clinical background facing difficult topics and discussions, motivated me to attempt to find ways to improve the current planning practices aiming for successful results, both for patients and hospital employees. The planning processes are time-consuming, time that otherwise could be used clinically, and it is of great importance to use the allocated time efficiently and gather experiences and clever ideas to transfer to similar projects. One should also bear in mind that even if it is regarded as valuable and exciting to be an actual part of hospital planning, the potential demanding and exhausting discussions should not be underestimated. These pertain particularly to issues relating to allocation-localisation, dimensions and resources, which emerge and are inevitable in the planning process. There is also a large potential for learning from each other among different hospital projects, and possibilities for learning from projects in other public sectors, where trailing research is systematically performed.

Based on my experience, a good basis for enabling improvement is knowledge acquisition. This includes knowledge regarding where 'the shoe pinches' for those involved and what they need, knowledge of existing theoretical approaches and recommendations, knowledge of the project and its context, and knowledge of how this could be used in practice. The discipline of medicine, or medical physics for that matter, is evidence based, and approaches to treatment or diagnostics rest on existing knowledge and literature, randomised

trials and rigorous scientific methods. Although differences exist and the medical and administrative disciplines are not directly comparable, based on my experience the administrative disciplines in a hospital have a potential for improvement when it comes to approaching challenges/tasks in a similar fashion. I strongly believe that we should strive to perform our reviews, make our decisions, write our reports, and plan and organise our work based upon established knowledge to a wider extent. Moreover, research on these processes should be undertaken in order to evolve and improve our practices.

Thus, my personal motivation for this thesis is twofold: first, to contribute to the improvement of front-end planning by facilitating interactions between practitioners and theory by means of better tools for planning resting on a theoretical foundation, and second, on a more general level, to contribute to increased consciousness regarding knowledge-based procedures and practices for the administrative disciplines.

1.3 Research approach

Throughout this research project, attempts have been made to consider the studied projects as part of a larger whole, due to hospital projects' societal impact. This is illustrated (for projects in general) in Figure 1.2 (which is part of the overall research approach illustrated in Figure 1.3), adapted from Samset (2010). Here, the project and its life cycle are shown in a wider context and as part of a process reaching for a goal beyond the project output, and furthermore having a purpose viewed in a long-term societal perspective. This also corresponds to Morris' (2013) 'Management of projects', where the front-end is included in the PM approach, emphasising *both* effectiveness *and* efficiency and taking the interactions with business and the general environment into account (i.e. the project's context).

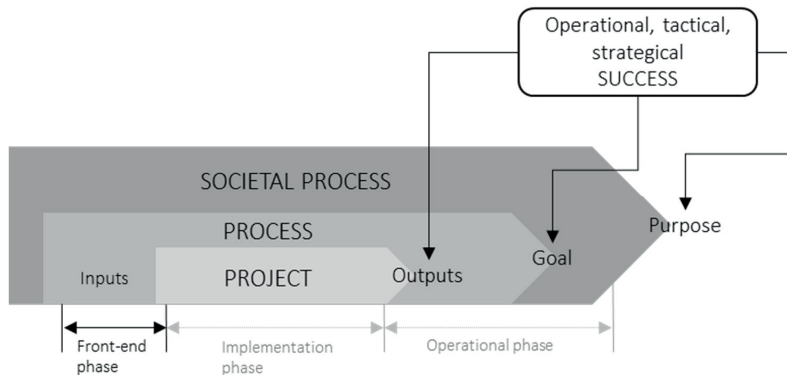


Figure 1.2 The project as part of a larger whole (partly adapted from Samset (2010, Figure 3.3, p. 29))

The purpose of this work has been to explore hospital projects' front-end phase in order to gain a deeper understanding and subsequently enable improvement of the planning processes aiming for project success. To enable improvement, more knowledge should be gained, and a convenient place to start was by establishing a wider understanding of current practices and challenges in the planning processes. This was done in order to establish an empirical foundation, and to further elaborate on this to finally being able to provide implications for improvement.

The research undertaken in this thesis rests mainly on an interpretive research paradigm, and follows qualitative methodology in order to explore hospital projects' front-end phase. An exploratory approach allows for being open to changes and new directions throughout the research process. This enables gaining a deeper insight into a phenomenon, and provides a valuable flexibility, which further enables the researcher to pursue and elaborate on emerging topics that appear as important for the subject being researched. This approach is reflected through the broad central research questions (RQ_c) and furthermore by pursuing topics of importance and interest that emerged in the initial rounds of research.

The three central research questions are expressed as follows:

- **RQ_c1:** Which prominent challenges can be found in Norwegian hospital projects' front-end planning?
- **RQ_c2:** Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects' front-end?
- **RQ_c3:** How can Norwegian hospital projects' front-end phase be improved?

The central research questions and main purpose were further detailed in four individual papers on which this thesis was built, as summarised in Table 1-1.

Table 1-1 Individual papers' contribution to RQ_cs

PAPER	PURPOSE	CONTRIBUTION TO RQ _c
I: Hospital project front-end planning: Current practice and discovered challenges	Investigate current practice and challenges in front-end planning of Norwegian hospital projects, and compare findings to theoretical recommendations. To establish an empirical foundation for further research.	1, 3
II: Exploring collaboration in hospital projects' front-end phase	To explore collaboration, which is an essential activity in hospital projects' front end.	2, 3
III: Project governance in SOEs: The case of major public projects' governance arrangements and quality assurance schemes	To enable a comprehensive description of different governance arrangements in State-owned enterprises, and further to compare these with each other and the State project model.	1,3
IV: Assessment of early warning signs in hospital projects' front-end phase	To explore early warning signs in hospital projects' front-end, and to provide a preliminary systematisation of the discovered signs.	1, 2, 3

The papers in many ways reflect the iterative approach taken in this research, and each paper addresses topics that relate to the overall purpose of the thesis. Thus, the individual papers contribute to answering the central research

questions through different combinations. The overall approach of this thesis is illustrated in Figure 1.3.

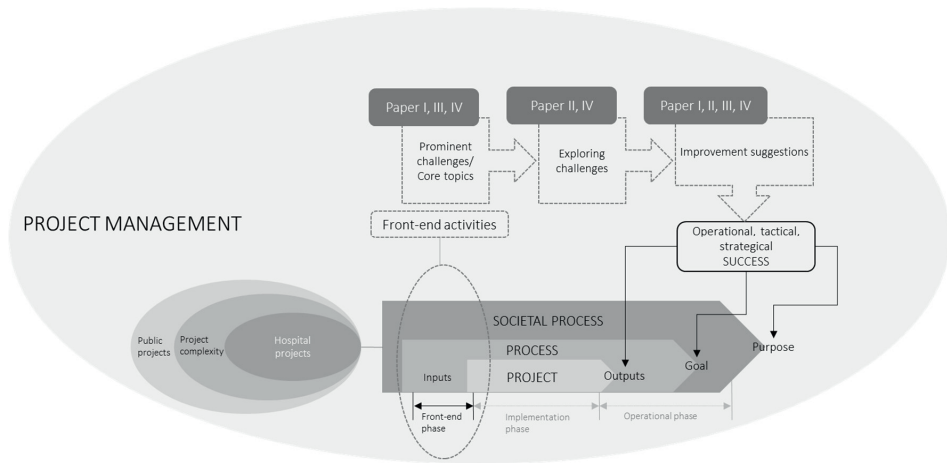


Figure 1.3 Overall research approach

Although the research approach was iterative and thus resulted in pursuits of topics that were not well established beforehand during the research process, the purpose of the work was maintained: to provide further insights into front-end planning of Norwegian hospitals and through these insights enable improvements aiming for project success, viewing the work through a project management lens. The pluralistic nature of project management also makes it possible to view the topics being researched from different angles, something which will be thoroughly discussed in chapters 2 and 4. For a novice researcher, this might seem overwhelming (which it did), but it also provides an opportunity to dig even deeper into the multifaceted universe of project management.

1.4 Thesis scope and limitations

The scope of this thesis is limited to the front-end phase of Norwegian hospital projects, including the external quality assurance, thus the pre-project phase is excluded (see Figure 1.4, dotted line). This represents the process from the

initial efforts, i.e. the ideation and construction of thought that will turn into concepts, and the further elaborations and decision processes leading to the conceptual choice, which is regarded as the single key decision that most likely has the largest impact on a project's long-term success (Williams and Samset, 2010).

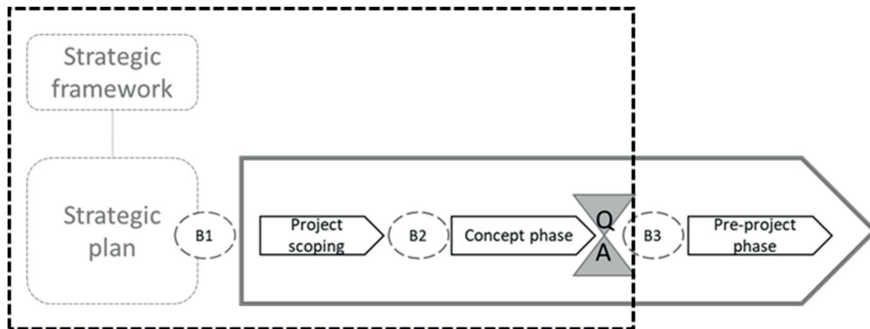


Figure 1.4 Illustration of thesis' scope

It should be emphasised that even if the thesis addresses hospital projects, which essentially are major public *investment* projects, there has not been an explicit economic focus in this work. The research focuses mainly on the planning process and its different parts, sub-processes and core topics, aiming to obtain more knowledge for the purpose of improvement of these processes on the road to successful outcomes. When discussing project success, the definition from Samset (2014) is used, claiming that projects have to perform at both an operational level, a tactical level and a strategic level to be truly successful. Project success is discussed mainly at the tactical and strategic level in this thesis.

The thesis is set in a Norwegian context only, and looks at projects with costs exceeding NOK 500 million. All studied projects are state-funded, and planning is based on the 2011 version of the guidelines. The guidelines were revised in 2017, but no projects were available within the time frame of this thesis that were both planned according to this version of the guidelines and had completed an external QA. However, the intention of front-end planning, and as

stated in the guidelines, remains the same. This makes insight into the planning processes based on the 2011 guidelines valuable to the objective of gaining more knowledge and further improving the planning processes.

The limitations affect possibilities for generalisations to other settings. However, there are indications that similar challenges are found in other countries and the theoretical recommendations supporting the work in this thesis are commonly accepted; hence, their value may be viewed in a wider context than the Norwegian.

Limitations to the research design and for each individual paper are discussed in section 4.7.

1.5 Thesis outline

This thesis consists of two parts, Part I: *Theoretical background and key findings*, and Part II: *Individual papers*. The individual papers were all submitted to international journals with a referee scheme (peer review system). Part I consists of seven chapters, and the purpose of these chapters is to connect the findings from the individual papers in order to make a contribution to the field larger than the sum of the contributions from each individual paper.

The first chapter is an introduction, where the background and motivation, research approach and research questions, thesis scope and limitations, and thesis outline are described. **Chapter 2** provides the theoretical background, where key literature for this thesis is reviewed, and the chapter sums up the research gaps for the current field. **Chapter 3** provides the research context by describing Norwegian hospital structure and hospital planning. **Chapter 4** provides the research methodology following the taxonomy of the research onion, as described by Saunders *et al.* (2019), reflecting the theoretical positioning and philosophical underpinnings of this work, approaches to theory development and research design, and finally elaboration on research quality and limitations. **Chapter 5** presents the findings from the individual papers, while **Chapter 6** presents the thesis' overall findings and discussions, by

answering the three central research questions asked in this work. **Chapter 7** provides the final conclusions and reflections, theoretical and practical contributions and avenues for further work/research. The thesis outline is shown in Figure 1.5.

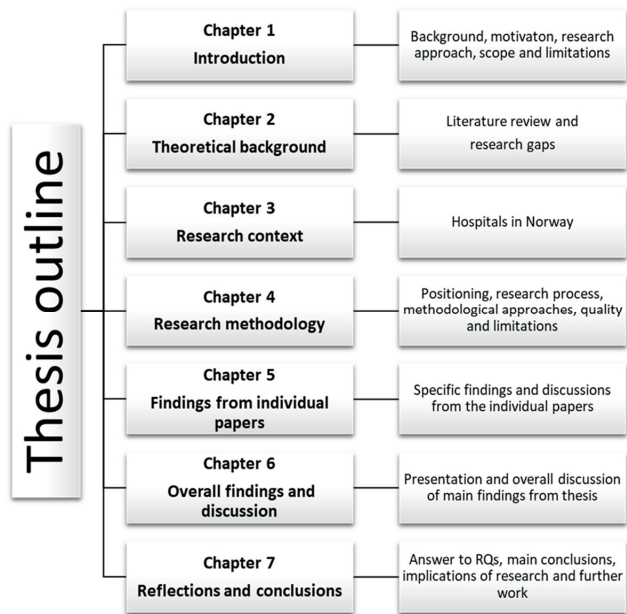


Figure 1.5 Thesis outline

2 THEORETICAL BACKGROUND

This chapter provides the theoretical foundation on which this thesis is built. The key topics presented are mainly viewed through a project management lens, and touch upon different strains of project management (PM) literature, although emphasised differently.

The chapter starts with some general reflections on the evolution and discussions of PM, emphasising elements considered relevant as a basis for the perspective from which to view this research (the 'PM bar' in Figure 1.3). Then, perspectives on project success are looked into, followed by a section describing public versus private projects, where emphasis is placed on the public sector due to Norwegian hospital projects being mostly public undertakings. Regional health authorities (RHAs), which are State-owned enterprises (SOEs), own Norwegian hospitals, thus this kind of organising is reviewed. Further, the project front-end phase is described, serving as the main frame for this research. In this section, important issues of the front-end (i.e. decision-making, the project concept and front-end appraisals) are described and reflected upon in the context of this research. In the following, theoretical recommendations for front-end planning are described. The next section describes characteristics of the hospital and hospital projects, highlighting the complexities found in these settings, which affect the front-end phase and planning efforts. Then, theoretical underpinnings for the core topics investigated in this thesis are presented. The core topics are prominent front-end topics that emerged during the research, and constitute collaboration and stakeholder management, project governance and governance frameworks and, finally, early warning signs. Finishing this section, research gaps are described. The chapter outline is illustrated in Figure 2.1.

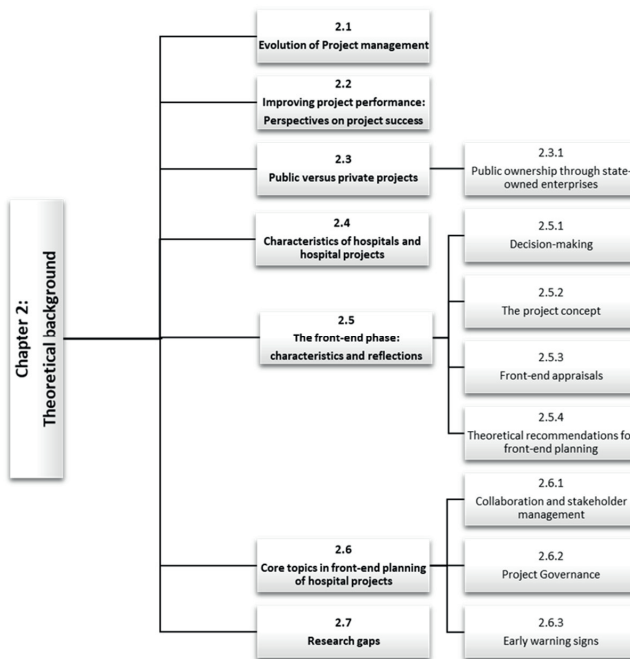


Figure 2.1 Chapter outline

2.1 The evolution of project management

Disagreements among stakeholders on what a project really *is*, are one of the main reasons for unsuccessful projects (Morris, 2013, Ika and Bredillet, 2016). Defining what a project really *is* represents a persistent challenge, much due to projects' 'versatility'. Thus, a project is seen as a polysemic concept (Boutinet, 2001, as cited in Ika and Bredillet, 2016), which is a source of misunderstandings with potential and experienced adverse consequences (Ika and Bredillet, 2016). That is why Ika and Bredillet (2016) proposed that how we look at a project is not arbitrary. Multiple definitions of a project exist (by for example the Project Management Institute, International Project Management Association and the International Organization for Standardization), but due to its polysemic nature, it is also questioned if such

definitions will help in curing confusion and ambiguity and help professional practice (Ika and Bredillet, 2016).

The conceptual base of PM was primarily dominated by instrumental perspectives (Svejvig and Andersen, 2015, Walker and Lloyd-Walker, 2016). However, this view on projects has been challenged, and a tipping point in project evolution is observed from 2006 onwards (Svejvig and Andersen, 2015, Walker and Lloyd-Walker, 2016). Indeed, new thoughts and criticism of the current view on projects had been proposed prior to 2006, but the legitimised radical change and what Walker and Lloyd-Walker (2016) described as a shift in paradigm became markedly visible from 2006 onwards. This appeared as a reaction to prior PM shortcomings in practice and the lack of improved project performance across different sectors (Winter *et al.*, 2006, Svejvig and Andersen, 2015, Walker and Lloyd-Walker, 2016). According to Walker and Lloyd-Walker (2016), the observed change or shift resulted especially from three different research clusters: *the Rethinking Project Management* (RPM) initiative in the UK, the *Making Projects Critical* (MPC), also in the UK, and the *Scandinavian School* of PM. Common to these initiatives was the need for meeting the criticism levelled against PM at that time. The RPM network aimed at drawing equally on practitioners when extending the PM research agenda, which corresponds to the praxeological reasoning suggested by Bredillet (2015). Five directions for future research were suggested by RPM, shifting the focus in PM towards:

- Theory about practice
 - from the simple life cycle model of projects towards complexity theory
- Theory for practice
 - considering projects as social and not instrumental processes
 - focusing on value creation rather than product creation
 - broadening the conceptualisation of projects
- Theory in practice

- considering practitioners as reflective practitioners rather than trained technicians

The primary intention of the MPC initiative was to extend the discussions on PM by including wider social science perspectives and prioritising critical perspectives on projects (Hodgson and Cicmil, 2016), paving the way for different views than that of the functionalist tradition of PM, thus opening up for wider understandings of the topic. The thoughts following the Scandinavian School of PM were brought into life in the mid-1990s, taking a project organising perspective on PM. During the Scandinavian School's development over the last 20 years, projects were also viewed as services delivering values and benefits rather than things (Walker and Lloyd-Walker, 2016). The evolution of PM is illustrated in Figure 2.2.

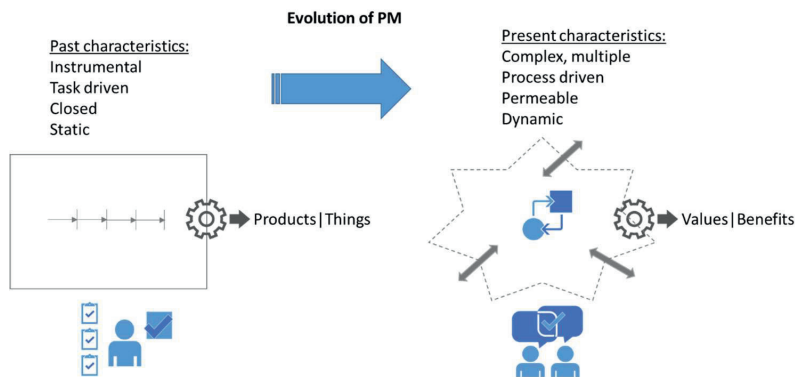


Figure 2.2 Evolution of project management

In the last two decades or so, the world has experienced several large disruptions, most recently in terms of the COVID-19 pandemic, which caused the world to change. The latest IPCC¹ report on climate change (IPCC, 2021) also shows that our world faces challenges that need to be addressed in order to

¹ The Intergovernmental Panel on Climate Change - The United Nations body for assessing the science related to climate change

enable future sustainability, as do population growth and demographic changes. Projects are vessels for change and thus important assets for sustainable development (Huemann and Silviu, 2017). The global impacts affect the world of projects and require the project management community to reconsider how projects should be approached. Konstantinou and Müller (2016, p. 4) claimed that we need to adjust the ontology of projects from *'being tasks and processes that we know, can predict, and just need to apply correctly, by also positioning projects as phenomena at the crossroads of sociology and humanity to make sense of them'*. Thus, there is a need for viewing a project in its larger context; as part of a process and in a wider societal perspective, and not as a 'lonely project' (Olsson and Samset, 2006), as partly illustrated in Figure 1.3. Morris (2013) emphasised the need for focussing more on value enhancement and influencing the context, aiming for effective impact and addressing the major issues facing today's society.

Other dimensions in PM point at projects expressing both hard and soft sides, and that we need to move away from the mere instrumental perspective and enable the inclusion of the softer sides, such as human and societal perspectives. Further, coping with increasing complexity calls for adapted skills, mind-sets, and abilities to expand the understanding of limited PM practices. Projects have to relate to policymaking and political impact, being vehicles for change by informing policymakers and decision-makers both on a global and local scale. According to Morris (2013), projects need to be more outward-looking and relevant, considering the needs and challenges of both the owner/sponsor and society.

To summarise the implications of PM evolution into further research agendas, Walker and Lloyd-Walker (2016) pointed at:

- making complexity more fully recognised
- viewing PM as a social process
- gaining a broader understanding of value
 - e.g. more effort in projects' front-end

- the view of projects as a way of delivering strategy
- the value of reflective practitioners

2.2 Improving project performance: perspectives on project success

The evolution of projects referred to in the previous section also calls for discussions on how to consider projects' success. The assessment of project success has changed over the years, and the definition has remained ambiguous (Jugdev and Müller, 2005, Hussein *et al.*, 2015, Pinto, 2016). The need for looking at projects beyond the 'iron triangle' and in more strategic manners, is emphasised by e.g. Morris (2013). However, the perception of success or failure does vary from person to person and appears to be dependent on personal preferences (Shenhar *et al.*, 2001, Klakegg, 2009, Samset, 2010). Success is thus a compound measure, which makes actually measuring it a challenge.

The connection between success and personal opinions and feelings emphasises the need for common evaluation criteria to improve judgement consistency (Samset, 2010). When judging a project's outcome, users'/clients' acceptance and looking at long-term effects have become widely understood as a measure of project success (Samset, 2010, Pinto, 2016). Following Samset's (2014) thoughts on project success, a project needs to perform in three perspectives to be truly successful: *the operational, the tactical and the strategic*.

Operational project success, which essentially is *project management success*, refers to the delivery of an expected project output often connected to the 'iron triangle' of time, cost and quality (Williams and Samset, 2010). The tactical perspective should also be considered in a short-term perspective, but is broader in nature and includes meeting the formal goal, whether the project result is relevant and useful, and which impact/side effects can be seen. Strategic project success refers to the achievement of successful project outcomes over a project's life cycle (Jugdev and Müller, 2005) and connects to

long-term value creation and sustainability of the actual project result (Williams and Samset, 2010).

There are models for evaluating a project's performance. Cost-benefit analysis is a much used tool for evaluating value for money relating to public investments, but has some limitations regarding its usefulness for decision-making (Volden, 2019c). Other models for evaluation that are considered more holistic exist, such as the Five Case Model (UK) and the OECD DAC²-model (OECD model), or different sustainability assessment models.

Further references to evaluation of major projects in this thesis emphasise the OECD model and its criteria. This is the basis for evaluating major public investment projects in Norway following the State Project Model, and is also the point of departure for evaluating hospital projects following recent guidelines from the Norwegian Hospital and Construction Agency (NHCA).

The OECD model is goal-oriented and provides five criteria for evaluating a project's success: *efficiency, effectiveness, impact, relevance and sustainability* (Samset, 2010). These success criteria distinguish between the tactical and strategic performance, thus corresponding to levels of project success, i.e. the project management perspective of 'doing the project right' versus the societal perspective of 'doing the right project' (Samset, 2010). The model is also considered appropriate for early project appraisals (Samset, 2010, Samset and Christensen, 2017), which will be discussed in section 2.5.3.

2.3 Public versus private projects

Both in the private and public sector, projects are means for change and development. Projects are instruments for implementing both strategies and policies. When looking at projects as important tools for strategic decision-making, differences between the private and public sector can be described in

² Organisation for Economic Co-operation and Development (Development Assistance Committee)

line with Nutt (2006), in terms of environmental, transactional and process factors. Environmental factors comprise, among other things, the considerations of a multitude of stakeholders, collaboration instead of competition, limitations in autonomy and flexibility aiming for consensus, and the need to balance political demands and user needs in a public context. The political influence is more prominent in the public sector than in the private sector, and modifies strategic management (Ongaro and Ferlie, 2019). The transactional factors point at public scrutiny and the involvement of several actors in decision-making processes in the public setting, whereas private organisations mainly serve shareholders' aim of financial benefits. Furthermore, organisational processes are often seen as more comprehensive in a public organisation, due to multiple and changing goals, and due to conflicts that result from multiple stakeholders with different views and diffused power, which affect decisions.

In public projects, investment decisions are made on behalf of society and should ensure beneficial long-term project outcomes, both financially and developmentally. Public projects should provide value for money, defined by *social* benefit-cost analysis (Volden, 2019a). Thus, the projects need to cope with the broad societal context, and should be successful at an operational, tactical and strategic level (e.g. Williams and Samset, 2010, Samset and Volden, 2016a, Volden and Andersen, 2018), which also indicates that the traditional ideal technocratic planning model is unrealistic (Christensen, 2009).

2.3.1 Public ownership through State-owned enterprises (SOEs)

Norwegian hospitals are wholly owned by the State and organised in Regional Health Authorities (RHAs), which are a type of State-owned enterprises (SOEs). This type of SOE (several categories exist) is classified as a 'category 3 company', which is a non-competing company for which the Norwegian State has sectoral objectives. SOEs were established to encourage more rational and efficient decisions, due to growing public deficits and a belief in private sector superiority over the public sector in terms of efficiency and the need to

reorganise in order to facilitate growing cooperation between private and public sectors as a result of structural transformations (Grossi *et al.*, 2015, Rentsch and Finger, 2015). Additional reasons for establishing such enterprises are change of markets, the desire to improve effectiveness and efficiency and to provide better services, the need for a clearer division of responsibility between owner (ministry) and management, and political considerations involving the transference of responsibility and decision-making to enterprises in order to unburden political responsibilities (Statskonsult, 1998). SOEs are furthermore considered important means for sectors that are essential and strategically important to government (Bernier and Reeves, 2018).

Although the SOEs manage important public interests, they largely run their own investments, and decision-making processes happen at political arm's length. Their owners (i.e. ministries) define their goals, which may or may not reflect broad, societal objectives, and which may require that decisions involving political aspects are elevated to the political level. Thus, the governance arrangements of SOEs represent trade-offs between the decentralisation and centralisation of decision-making, which should be handled with caution. Such distancing may affect how agency officials pay attention to political principals (Overman, 2016), also considering that too much identification with an organisational sub-unit might lead to decisions that benefit the sub-unit rather than the larger organisation (Simon, 1944).

2.4 Characteristics of the hospital and hospital projects: perspectives on complexity

Hospitals are complex organisations comprising a multitude of different activities, professionals and mind-sets organised differently (Glouberman and Mintzberg, 2001, Mintzberg and Glouberman, 2001, Fréchette *et al.*, 2020). Healthcare organisations are identified as complex systems, and making changes to these systems is challenging (Aubry *et al.*, 2014). In addition, hospital projects are both construction projects and organisational transformation projects (Gordon and Pollack, 2018, Fréchette *et al.*, 2020). This

point of departure makes hospital projects complex at several levels, carrying multiple paradoxes (Aubry *et al.*, 2014). Organisational, structural and managerial complexity due to e.g. multiple and heterogenic stakeholders (Pauget and Wald, 2013, Aubry *et al.*, 2014, Särkilahti, 2017, Aubry and Lavoie-Tremblay, 2018), as well as uncertainties and pace connected to future medical, technological and demographic development (Bayer *et al.*, 2007, Eeckloo *et al.*, 2007, Ernst & Young, 2016, Särkilahti, 2017), as well as the projects' socio-political position and inherent decision-making processes (Eeckloo *et al.*, 2007, Särkilahti, 2017, Aubry and Lavoie-Tremblay, 2018), make these projects challenging to run. Coping with project complexity calls for further understanding of the more informal mechanisms embedded in the complexity (Cicmil and Marshall, 2005, Bygballe *et al.*, 2016, Bygballe and Swärd, 2019).

Complexity in PM is not clearly defined, and complexities are found in many forms (Geraldi *et al.*, 2011, Müller *et al.*, 2011, Daniel and Daniel, 2018). To enable improvement of complex systems, such as hospital projects' front-end, both structural and dynamic complexity should be considered, affecting project managers and decision-makers through the creation of unpredictability (Daniel and Daniel, 2018). Managing under uncertainty calls for organisational improvisation and the ability to model, experiment and learn in order to improve (Daniel and Daniel, 2018), or, as described by Snowden and Boone (2007), to probe, sense and respond. The most successful planning processes are experienced when commitment to management and planning happens simultaneously through experimentation and mutual learning (Elf *et al.*, 2015).

Showing a duality in terms of being both a construction project and an organisational change project, hospital projects demand the integration of different skills, knowledge and project perspectives. Managing such integration in the front-end phase, where uncertainty is high and information is scant, places demands on the project participants both on an individual and organisational level. Inter-organisational collaboration is associated with both risk and complexity, and collaborative efforts are associated with high failure

rates (Gulati *et al.*, 2012, Bygballe and Swärd, 2019). Efforts should be made to overcome these challenges in early project phases (Saukko *et al.*, 2020).

Skills required for managing complex projects go beyond those connected to PM, and beneficially combine with elements from change management (Olsson, 2008, Bygballe, 2010), especially in the projects' front-end and for the purpose of managing stakeholders (Gordon and Pollack, 2018).

The context is very important when designing organisations, since it shapes the organisation, and it should be described through a joint collaborative effort among project stakeholders (Aubry and Lavoie-Tremblay, 2018). The hospital organisation and project operate in pluralistic settings, characterised by diffuse power and divergent interests (Denis *et al.*, 2011, Aubry *et al.*, 2014). In such settings, strategy making is understood to be broadly participative compared to more hierarchical settings (Denis *et al.*, 2011). In a Scandinavian context, there is a pronounced tradition for user involvement as part of a strong democratic culture (Olsson, 2008, Eriksson *et al.*, 2015, Strand and Freeman, 2015). Involvement is a process that lasts throughout the front-end phase, and it is a key success factor both in hospital projects (Henriksen *et al.*, 2006, Olsson *et al.*, 2010), and for building design and briefing in general (Tzortzopoulos *et al.*, 2006, Olsson *et al.*, 2010, Elf *et al.*, 2012, Eriksson *et al.*, 2012, Eriksson *et al.*, 2015).

2.5 The front-end phase: characteristics and reflections - concepts, decision-making and appraisals

For major projects, an overall perspective on PM is to gain a broader view of projects (broaden the conceptualisation) (Winter *et al.*, 2006). This is an answer to some of the criticism raised against the instrumental approach to PM, and emphasises, among other issues, the importance of projects' front-end, a topic introduced by Morris around the 1990s (Walker and Lloyd-Walker, 2016). Morris (2009) argued that too often, too little time is invested in a project's front-end at the sacrifice of project definition, and he further held that in order

to create value and deliver benefits, PM has to be considered in a wider perspective than the mere execution-oriented one. More recently, a literature study by Williams *et al.* (2019a) stated that front-end literature is sparse, and despite the front-end's critical impact on projects' strategic success, it is not fully understood. This, together with the front-end's vital role in project performance served as motivation for delving deeper into this phase of a project, thus serving as a framing for this thesis.

Figure 2.3 shows the project as part of a larger process: formulated in the front-end phase, planned and executed in the implementation phase, and realised in the operational phase.

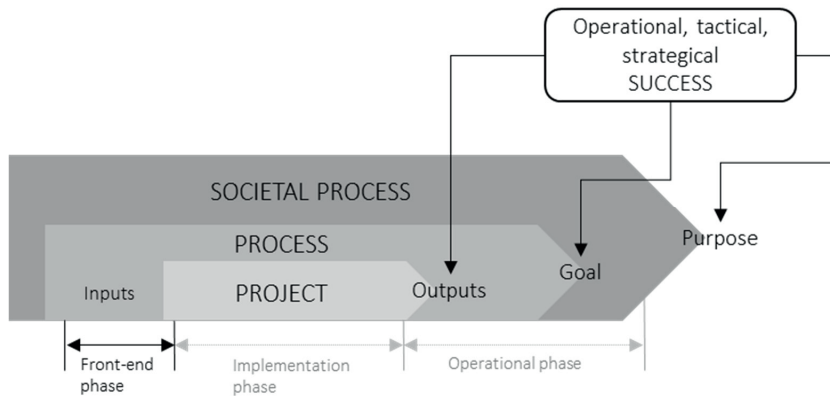


Figure 2.3 The project as part of a larger process

This represents a rather generic development cycle composed of stages, which distinguishes projects from non-projects (Morris, 2013). The progression through the phases is essentially linear, although iterations may be the case within the different stages, especially in the front-end phase of the project (ibid.). The traditional view of project work following an instrumental path is not suitable for the front-end of projects due to its characteristics, since the front-end has an 'organic' nature where creativity and exploration is needed to

fulfil its purpose and further form the basis for subsequent phases (Morris, 2013, Ika and Bredillet, 2016).

According to Williams *et al.* (2019b), a clear definition of the front-end is missing, as is a firm theoretical foundation. Williams *et al.* (2019b) highlighted that the definition of the front-end depends on how a project is defined. Further, it is pointed out that two major views are present: one where the front-end is regarded as the shaping part of the project, and one where the start of the project is seen only when the front-end is completed. However, in both views the importance of the front-end's role in achieving strategic project success is acknowledged. PM has an important role in the front-end, according to Edkins *et al.* (2013), who also pointed at differences between front-end managing and managing the execution part of the project. Managing the front-end requires more of an advisory and supportive approach from the project manager and being capable of providing a broad project perspective and focusing on stakeholders and the project owner/sponsor (Edkins *et al.*, 2013). The instrumental approach led by the need for project completion within time and budget becomes too narrow for the front-end, where long-term perspectives are vital (*ibid.*). In their review paper, Williams *et al.* (2019a, Table 1 p. 1139) have provided some front-end characteristics, or '*developments that need to occur before the project starts*', which are quoted here:

- *The initial idea emerges*
- *Complexity and underlying problems and needs ought to be analysed*
- *The first estimates of costs and benefits are made*
- *The stakeholders' preferences and incentives become visible*
- *There is very little information*
- *Uncertainty is at its highest*
- *The opportunity space is/should be explored*
- *The conceptual alternatives are carved out*
- *First estimates are refined*
- *Recognising stakeholders*

- *The situated project*
- *The foundation is laid and the main decisions are made*
- *'Quality-at-entry' can be secured*

Long-term success is viewed in terms of a project's strategic performance (Miller and Hobbs, 2005, Samset, 2007, Samset and Dowdeswell, 2009, Samset, 2014), which further underlines the front-end's importance, since project strategy is shaped in this phase. However, projects' front-end is characterised by high uncertainty levels, low levels of information, stakeholder recognition and knowledge of their interests and preferences (Williams *et al.*, 2019a), and under such circumstances, the outcome of rational analyses and planning is limited. Thus, the main challenge in the front-end phase boils down to obtaining a realistic overview of the situation in order to define an appropriate strategy and identify which requirements must be fulfilled for answering the need that initiated the project (Samset, 2010). In general, major projects require comprehensive approximations to elucidate the different aspects of the project. They also require the opportunity to create a flexibility that can handle unforeseen issues (Samset, 2010). The front-end phase therefore requires a project to be examined through different cross-cutting issues or lenses, including the economic/financial, institutional, socioeconomic, technological, environmental and political issues suggested in the OECD evaluation model (Samset, 2014), and also mentioned by Morris (2009).

In the following sections, some further insights and reflections regarding decision-making, concept elaboration and front-end appraisals are provided due to their role in the front-end phase, and as a result of the development of the research undertaken in this thesis.

2.5.1 Decision-making

The front-end calls for many decisions, which consequently exert a strong influence on a project's opportunity for strategic success (Samset, 2009, Samset and Dowdeswell, 2009, Haji-Kazemi *et al.*, 2012b, Elf *et al.*, 2015). Front-end

decision-making is especially important for projects' long-term success, as described by several authors and summarised by Williams *et al.* (2019a). Moreover, the decisions are made in complex and sometimes turbulent environments (Williams and Samset, 2010).

For public projects, Samset and Volden (2016a) pointed at several challenges caused by deficiencies in front-end analytical and political processes. Denis *et al.* (2011) brought the concept of 'escalating indecision' to our attention, describing perpetual strategic decision-making processes. When multiple actors with divergent views have to make decisions but are unable to arrive at a final agreement despite persistent decision-making efforts, their indecision will compromise project implementation (*ibid.*). Inherent structural and dynamic complexities create uncertainty and unpredictability influencing decision-making and thus PM (Daniel and Daniel, 2018). To curb the inherent complexity, it might seem tempting to create more predictability. However, in the front-end there is need for exploration, and one should be aware of the potential pitfall of transforming predictions into prescriptions losing focus on choosing the best solution, and eventually risk project failure (Samset, 2009).

To support decision-making and ensure project success, analytical and political deficiencies should be met through proper governance balancing proper systems, processes and tools (Turner *et al.*, 2013, Samset and Volden, 2016a). However, decision-making is also regarded as the link connecting governance and project performance (Turner, 2020a, b). Governance of projects is furthermore connected to organisational behaviour and human resource management (Turner *et al.*, 2013), which is in accordance with the need for considering what Williams and Samset (2010) referred to as social geography in these processes. Governance will be discussed in later sections.

2.5.2 The project concept

One of the main decisions to be made in the front-end is the choice of *concept*, a construct of thought meant to be the right solution to the expressed need, regarded as crucial for achieving strategic success in major public projects

(Williams and Samset, 2010, Klakegg and Haavaldsen, 2011, Samset and Christensen, 2017). A number of concepts should be elaborated in the front-end to ensure that all principal solutions are taken into consideration (Samset and Christensen, 2017). The concepts should have certain common features to meet the expressed need, but should be mutually exclusive, thus representing real alternatives.

Concepts are developed within the boundaries set by the demands of a number of sources, by needs and objectives and by political and analytical determinants, defining the 'Opportunity Space' (OS) (Samset *et al.*, 2013, 2014), illustrated in Figure 2.4.

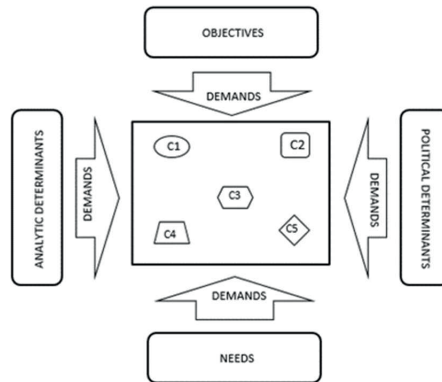


Figure 2.4 Illustration of the opportunity space, adapted from Samset *et al.* (2013, 2014)

Narrowing the OS too early by introducing constraints can be counterproductive. Deciding on a solution before the elaborations of alternatives are available does, however, appear to be quite widespread, according to e.g. Flyvbjerg (2014) and Samset *et al.* (2014). This was also found in the Auditor General of Norway's investigation of Norwegian Health Authorities' property management (2011), further indicating that the analytical approach is subordinate to political processes and non-rational considerations (Næss *et al.*, 2004, Samset *et al.*, 2009, Samset *et al.*, 2014, Samset and Volden, 2016b).

Flyvbjerg (2009) highlighted that the front-end is more susceptible than other project phases to what is referred to as ‘problematic behaviour’, that is e.g. early lock-in, groupthink, path dependence and overconfidence, which could compromise project preparation and performance. To counter these challenges, Flyvbjerg (2009) recommended using an outside view in early-phase planning to provide a necessary project concept reality check. This is based on the findings of Kahneman and Lovallo (1993).

Front-end design and performance are therefore important elements in increasing the odds of a strategically successful project. For instance, Miller and Hobbs (2005) found a strong correlation between strategic depth and project performance, while Dvir and Shenhar (2011) found that projects that have been evaluated as successful have prioritised front-end definitions, by e.g. creating a vision and selecting an onwards approach before being executed.

2.5.3 Front-end appraisals

The importance of front-end appraisals should be emphasised, since this may improve the selection of concept (Klakegg, 2010, Samset, 2010, Williams *et al.*, 2019a). Samset and Christensen (2017, p.3) suggested an early evaluation, i.e. before the project is initiated, to ‘clarify the major questions that will determine the terms of planning’, pointing at the higher success rate (80 %) for projects that were properly prepared than those that were not (35 %). The logical framework model (Figure 2.5) may be used for project concept appraisals, linking the project strategy (that can be influenced by project management) to uncertainties outside management control (Samset, 2010).

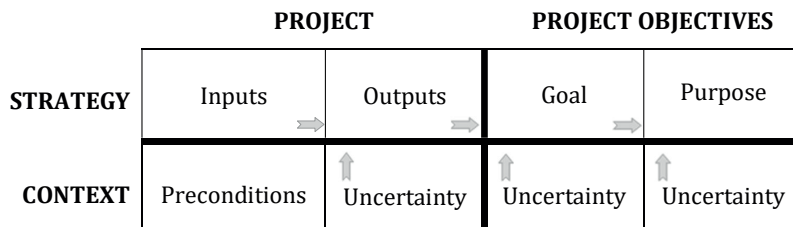


Figure 2.5 Logical framework model (adapted from Samset (2010))

The OECD model's five evaluation criteria (mentioned earlier in this section) are associated with the logical framework's objectives. The relationship between super-eminent objectives and project development is regarded as a challenge for project strategy and thus for the front-end decision-makers. This challenge, however, must be handled correctly if project success is to be achieved (Morris, 2009). The OECD model is primarily used for ex post evaluation, but according to Samset and Christensen (2017), these criteria essentially apply to ex ante evaluation as well. Even so, Samset (2010) highlighted that limitations in available information at the earliest point of a project make the efficiency, effectiveness and impact criteria less useful. Relevance and sustainability, on the other hand, may be evaluated with modest effort and, fortunately, these are the criteria that will determine a project's long-term (strategic) success (Samset, 2010).

In Norway, the Ministry of Finance established the State Project Model (SPM) in the year 2000, as a reaction to a series of negative experiences relating to major public investment projects (Volden, 2019c). The SPM, also termed the 'quality assurance scheme', aims at countering the problems and challenges experienced in major public projects that potentially lead to unfortunate project outcomes. However, as Norwegian hospitals are organised within SOEs, hospital projects, which constitute the main cases of this research, are not included in the SPM. However, by law, the RHAs must practice just as good quality assurance (systems) as those found in the SPM, and external quality assurance of the conceptual choice should be performed for investments exceeding NOK 500 million (Sykehusbygg HF, 2017).

The public hospital structure in Norway is more thoroughly described in section 3.1.

2.5.4 Theoretical recommendations for front-end planning

When highlighting theoretical recommendations for planning the front-end phase, we have drawn especially on the work of Samset (e.g. Samset, 2010) and a review paper from Williams *et al.* (2019a) which summarised the front-end

structure nicely, pointing out the preliminaries, the project purpose, analysis of concept and alternatives, and the assessment.

Early in the front-end phase, it is important to create a project perspective, to become familiar with the project's context and the project's socio-political standing. Williams *et al.* (2019a) stressed the importance of the project proposal and its contents, where among other things the project should be justified, and its feasibility should be accounted for. The project-triggering factors and needs should be assessed thoroughly, and there should be an alignment of needs, objectives and effects. Williams *et al.* (2019a) pointed to challenges in assessing the need for a major public project, given its inherent complexity and the difficult but important distinction between 'wants' and 'needs'.

The project objectives should be aligned with the organisational strategy, and the objectives and objectives hierarchy should be thoroughly elaborated. Objectives should specify the end situation, be specific, unambiguous, verifiable and measurable. Strategy analysis (e.g. Baccarini (1999), Samset (2010), Williams *et al.* (2019a)), linking the objectives hierarchy to inputs, outputs and outcome, is useful at this stage. Success criteria are also important means for defining the project, both on a tactical and strategical level.

The interests and needs of stakeholders should be carefully analysed to elucidate their expectations and to avoid stakeholder problems. This may be challenging, given stakeholder multiplicity and diverse perspectives in complex projects, it is nevertheless important for managing the front-end phase.

To develop a project concept, one should be starting without a fixed idea of the concept, seeking open and principal solutions and being flexible. One should take on an overall approach, by viewing the concept in its societal, technological, economic, institutional, environmental and political context. Furthermore, one should investigate which demands to attend to in order to

fulfil expressed needs, hence limiting the opportunity space between analytical and political determinants, objectives and needs, as illustrated in Figure 2.6.

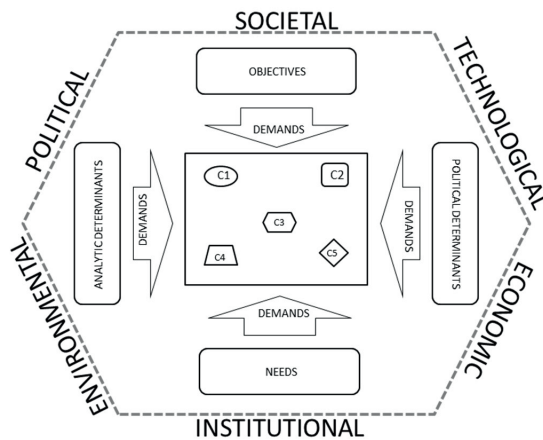


Figure 2.6 Taking an overall approach and exploring the opportunity space (defined by needs, objectives and overall demands) outlining the boundaries for concept elaborations; partly adapted from Samset et al. (2014)

Avoiding path dependency by creating concepts that are actually different solutions to the defined need, not just variations over the same ‘solution theme’ or continuations of the current solution, has proven essential. The inherent uncertainty of the front-end calls for deliberate and careful selection of information when developing concepts to avoid ‘analysis-paralysis’ (Samset and Volden, 2016a) and early lock-in (Flyvbjerg, 2014).

After concept decision, the concept should be thoroughly assessed concerning cost, profitability, timing and risk.

2.6 Core topics detected in hospital projects’ front-end environment

During this research, some topics have emerged that appear as especially important for hospital projects’ front-end performance. These topics emerged as a result of the first paper looking into current practices and challenges in hospital projects’ front-end (i.e. establishing an empirical foundation for

research), and during interviews with practitioners in the field. Even if the current research setting is hospital projects, the topics are quite generic and familiar issues in front-end planning of major public projects. Hopefully, the approaches and findings from the current setting will provide new insights and perspectives, and thus add to the overall understanding of the front-end phase for major projects. The theoretical basis for these topics is presented as follows: *collaboration and management of stakeholders, project governance and early warning signs* (see also Figure 1.3).

2.6.1 Collaboration and management of stakeholders

Complexity, management and interaction of multiple stakeholders are well-known challenges in major projects (Engwall, 2003, Cicmil and Marshall, 2005, Cooke-Davies, 2009, Dietrich *et al.*, 2010, Eskerod *et al.*, 2015, Flyvbjerg, 2017, Lenfle and Loch, 2017, Merschbrock *et al.*, 2018). Taking into account hospital projects' multiple stakeholder nature, collaboration becomes an essential part of the front-end phase. Collaboration is viewed as a stakeholder management strategy (Savage *et al.*, 2010, Aaltonen *et al.*, 2015), and as a human resource strategy (Bedwell *et al.*, 2012). Collaboration is not comprehensively defined, but in this work, the definition used by Bedwell *et al.* (2012, p. 130) is appropriate: '*... an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal*'.

Although regarded as fundamental for front-end managing (Edkins *et al.*, 2013, Williams *et al.*, 2019a) and project success (Baccarini, 1999, Tzortzopoulos *et al.*, 2006), managing stakeholders and their dynamics is not well understood for the front-end phase (Aaltonen *et al.*, 2015). Stakeholder management strategies are also important means for project managers in shaping and handling stakeholder dynamics and positions, in the front-end (Aaltonen *et al.*, 2015) and generally (Savage *et al.*, 1991, Olander and Landin, 2005). From a practitioner's viewpoint, collaboration is a characteristic of projects as complex social settings (Cicmil *et al.*, 2006, Bygballe and Swärd, 2019).

Stakeholder multiplicity and potential diversities in goal perception, interests and expectations challenge stakeholder handling (Smith and Lewis, 2011, Gordon and Pollack, 2018, Williams *et al.*, 2019a). Often, the front-end phase of public projects also involve major political and societal processes, considerably influencing the planning and decision-making processes (Williams and Samset, 2010).

Diversities or plurality may create tensions between organisations or individuals, such as multiple and competing goals, challenges to organisational identity following role change, a need for flexibility and an altering of stable routines (Smith and Lewis, 2011, Aubry *et al.*, 2014). Even if tensions on one hand are demanding to manage, and potentially harmful for project performance and outcome, they could, on the other hand, be an asset for the projects if harnessed (Smith and Lewis, 2011), and co-existence of order and conflicts are found (van Marrewijk *et al.*, 2016). van Marrewijk *et al.* (2016, p. 1747) also found that '*... complexity, ambiguity and uncertainty ... can drive collaboration in complex organisations*'. Smith and Lewis (2011) suggested paradox theory as an approach to cope with such contradictions, which are becoming more common in today's complex environments. Managerial implications of paradoxes is to view management as a process where paradoxes continually are rearranged (Cicmil and Marshall, 2005).

Pauget and Wald (2013) stressed different stakeholders' need for relational competence in complex surroundings. Projects need to be seen as social systems (Cicmil and Marshall, 2005) and people-oriented issues (Turner *et al.*, 2013, Gordon and Pollack, 2018) require attention. The need for understanding human relationships in order to manage collaboration is emphasised by several authors (Olsson, 2008, Bygballe, 2010, Pemsel *et al.*, 2010, Pauget and Wald, 2013, Bygballe *et al.*, 2016). Management in the front-end should enable a stronger focus on social and relational issues (e.g. building trust, mutual understanding), rather than the project itself (Pauget and Wald, 2013, Bygballe *et al.*, 2016, Matinheikki *et al.*, 2016, Merschbrock *et al.*, 2018), since the

significance of the social dynamics seen in such organisational settings is considered as important as structural dimensions (Turner *et al.*, 2013, Aubry *et al.*, 2014, Winch and Cha, 2020). Informal relations may bring different stakeholders closer, and may facilitate communication, which is crucial in complex environments, such as in hospital projects' front-end (Barlow and Köberle-Gaiser, 2009, Elf and Malmqvist, 2009, Bygballe, 2010, Pemsel *et al.*, 2010, Elf *et al.*, 2015, Kokkonen and Vaagaasar, 2018).

2.6.2 Project governance

In general, *governance* refers to the administrative and process-oriented elements of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organisation or territory, and whether through laws, norms, power, or language (Bevir, 2013). Governance can be defined on many levels, is found both in public and private sectors, comprises many fields (e.g. corporate, public, administrative), and is a relative concept, meaning that 'one size does not fit all' (Klakegg *et al.*, 2008). Moreover, governance should cover all organisational levels.

The framing of this thesis is Norwegian hospital projects, which are mainly public. Thus, the focus is on public governance. Hence, the complexity inherent in public organisations will affect governance regimes, making them more comprehensive and probably less effective than those in private organisations, where the overall aim is to maximise return on investment (Campbell *et al.*, 2010). Most of the governance literature originates from the private sector, but findings and recommendations are most likely relevant for the public sector as well. In fact, Frey (2006) claimed that possibilities exist for the private sector and corporate governance to learn from public sector governance by constraining managerial power through the division of power, rules and institutionalised competition, widening the extrinsic motivation to include more than monetary incentives, and by using goal-oriented intrinsic motivation as opposed to extrinsic incentives. Some studies on public governance exist, and focus on state-funded projects at country level in relation to political processes

and policy forming (Williams *et al.*, 2010, Klakegg *et al.*, 2016, Volden and Samset, 2017b), looking at overarching institutional arrangements established by central governments to ensure that projects succeed across different public organisations.

Project governance is a rather recent research topic in the project management community, and refers to the processes, systems and regulations that the financing party must have in place to ensure that projects are successful (Samset and Volden, 2016a). Initial theoretical contributions are mainly found after the year 2000, with a much-cited textbook by Müller published in 2009 (Müller, 2009). Klakegg *et al.* (2008) referred to a paper by Miller and Hobbs (2005, p. 47), where it says that: “*Project governance has only recently become an issue of importance in the project management community and literature. Over the last ten years there has been more interest in the governance of projects in general and the governance of large complex public projects in particular*”. Project governance can furthermore be seen as a subset of corporate governance (Müller, 2009), and concerns areas related to project activities that should ensure the alignment of the organisation’s project portfolio to its objectives (Klakegg *et al.*, 2008).

Project governance literature appears fragmented (Ahola *et al.*, 2014, Volden and Andersen, 2018). Among the different streams of literature dealing with project governance, a distinction is made between governance *of* projects and governance *through* projects (Williams *et al.*, 2010). This corresponds to levels of project success, as suggested by Samset (2010), which comprise the operational project perspectives (i.e. efficiency and cost compliance) versus the tactical and strategical perspectives (i.e. the extent to which the conceptual choice provides relevant and sustainable outcomes for society). The latter implies “doing the right project,” wherein, among other issues, dealing with complex decisions plays a major part (Williams and Samset, 2010).

Project governance frameworks

To ensure adequate quality-at-entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, and standards for quality review of key appraisal documents, regulatory frameworks are commonly used (Samset and Volden, 2016a). Several authors (e.g. Haanæs *et al.*, 2006, Narayanan and DeFillippi, 2012, Khan *et al.*, 2019) have suggested content requirements for such governance arrangements. A study by Haanæs *et al.* (2006) based on best practices from Norway and other countries, suggested that the minimum requirements for governance frameworks should be:

- *Clearly defined project phases*
- *Clearly defined decision points between the phases*
- *Quality assured basis for the decisions*
- *Simplicity*
- *A certain standardisation and common terminology.*

In addition, both Haanæs *et al.* (2006) and Narayanan and DeFillippi (2012) have emphasised the need to include quality assurance of the decision basis in governance schemes. This has also proven beneficial for project performance in a Norwegian context relating to the SPM (improvements both in cost management and in benefits of the systematic appraisal of conceptual solutions) (Samset and Volden, 2013). The selection and prioritisation of projects are furthermore seen as key issues in a project governance scheme, and are closely related to the organisation's portfolio management (Müller, 2009). Figure 2.7 shows a simplified illustration of a governance framework.

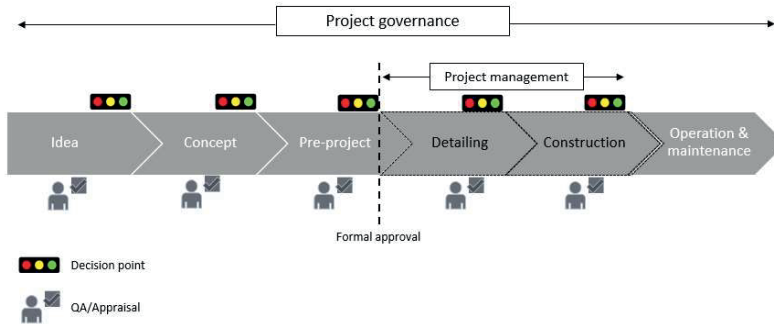


Figure 2.7 Simplified governance framework (adapted from Volden (2019c))

The complexity surrounding major public projects may also pose a challenge for quality assurance instruments, and thus there is a need for continuous improvement in order to remain effective (Williams *et al.*, 2010, Klakegg *et al.*, 2016). This further emphasises the need for governance regimes, with proper systems, processes and tools, that are able to meet these challenges (Turner *et al.*, 2013, Volden and Andersen, 2018, Khan *et al.*, 2019). Governance frameworks serve as a guide for navigating through the complex landscape that surrounds public projects, thereby strengthening the odds of success by creating predictability and a sufficient analytical basis for decision-making, and thus securing political control. However, there is no *guarantee* of improved decision-making through such systems (Christensen, 2011).

2.6.3 Early warning signs (EWS)

A project's earliest warnings often emerge one or two years before manifestation of the real problem (Andersen and Fagerhaug, 2002). Detection and action regarding these warning signals will enable project managers to be proactive and take preventive actions (Haji-Kazemi *et al.*, 2012a). Providing a system for detection and handling of the warning signals may serve as a valuable management tool for the front-end, as a remedy for decision-making in complex settings and thus implementation of strategies and policies (*ibid.*).

Early warning signs (EWS) are a type of performance indicators that allow you to keep *'your eyes on the road instead of looking in the rear-view mirror'* (Andersen and Fagerhaug, 2002). Similar to Ansoff's (1975) ideas on weak signals and responses to strategic surprises, EWS represent a proactive approach for responding to such surprises. Following the definition of Nikander (2002, p. 49), which builds on Ansoff's (1975) theory of weak signals, an early warning sign is *'... an observation, a signal, a message or some other item that is or can be seen as an expression, an indication, a proof, or a sign of the existence of some future or incipient positive or negative issue. It is a signal, omen or indication of future developments'*. Nikander (2002, p. 49) furthermore stated that these signals give information and *'... that the matter, phenomenon or issue on which information is received might come to pass in the future'*.

Identification of EWS is a beneficial starting point for the improvement of front-end planning processes (Nikander and Eloranta, 2001, Haji-Kazemi *et al.*, 2012b). Nikander and Eloranta (2001) also stated that although signal precision improves in time, the time for countermeasures decreases because the problem's moment of manifestation is not likely to be moved farther.

EWS can be detected through formal assessments, e.g. governance regimes (Klakegg *et al.*, 2010, Klakegg *et al.*, 2016). Such arrangements, however, do not capture less measurable signals, i.e. signals based on softer issues such as feelings, culture and other social and organisational behavioural aspects, making governance less effective (Klakegg *et al.*, 2010). Approaches to detect softer EWS are labelled 'gut-feeling' approaches by e.g. Williams *et al.* (2012), Klakegg *et al.* (2010) and Haji-Kazemi *et al.* (2013). Williams *et al.* (2012) further held that in order to take full advantage of the benefits incorporated in early warning management, both soft issues and hard issues (from formal assessments) should be considered. In addition, gut feelings are said to be especially important in complex situations, which is the case for hospital projects (many stakeholders, different perspectives, societal importance, cost

level, longevity, etc.), and for the front-end phase in general (Williams and Samset, 2010).

Although growing project complexity calls for flexible and adaptive project management, a study by Williams *et al.* (2012) showed that formal assessments actually increased with project complexity, suppressing gut-feeling approaches. Comprehension of complexity is one of the major problems for detecting EWS (*ibid.*). Later research indicates that governance of major public projects has developed, aiming to meet the different complexities surrounding such projects (Brunet and Aubry, 2016). This also mirrors the discussions regarding conventional project management's inadequacy in dealing with human and cultural relations (Nikander and Eloranta, 2001), and the need for understanding the more informal mechanisms and social aspects embedded in project complexity (Cicmil and Marshall, 2005, Bygballe and Swärd, 2019, Molaei *et al.*, 2019).

Moreover, EWS vary with project type and context and, assumingly, it will not be possible to make a universal list of EWS due to project context (Klakegg and Krane, 2015). For the same reason, an ultimate EWS predicting project failure cannot be found (Klakegg *et al.*, 2016), nor is it possible to find general models describing responses to EWS due to varying situations, according to Nikander and Eloranta (2001).

In general, it could be a challenge to know where to start looking for EWS (Williams *et al.*, 2012). Taking into account the inherent uncertainties and lack of information of the front-end, the starting point for finding EWS in this phase might be even more complex. Even if the research on EWS is scarce (Haji-Kazemi *et al.*, 2015), some efforts have been made to identify EWS in different projects and project phases. Preliminary readings during the work with paper IV made it possible to roughly categorise EWS from extant literature into eight categories: 1) *Goals, objectives, concept*, 2) *Scope, data, input*, 3) *Competence, skills*, 4) *Time, cost, quality*, 5) *Roles, organisation*, 6) *Relational*, 7) *Stakeholders* and 8) *Management, tools*. Several authors (Lorange and Nelson, 1987, Keil and

Robey, 1999, Giegerich, 2002, Kappelman *et al.*, 2006, Bresnen, 2007, Klakegg *et al.*, 2010, Philip *et al.*, 2010, Williams *et al.*, 2012, Haji-Kazemi *et al.*, 2013, Ling *et al.*, 2013, Philip *et al.*, 2013, Olsson and Spjelkavik, 2014) have elucidated these issues, and the categories include a different number of EWS. A detailed overview can be found in paper IV.

2.7 Research gaps

The previous sections have provided a basis for the theoretical underpinnings for this research aiming for improvement of hospital projects' front-end phase. A project is a polysemic and pluralistic concept (Ika and Bredillet, 2016), which makes it possible to pursue research on this topic in many ways. This became clearer during the initial/preliminary literature studies and further when establishing the empirical foundation and status quo of front-end planning of Norwegian hospital projects. The inherent complexity of hospital projects also added to the diversity, and gave grounds for several angles of research. The lack of dedicated front-end literature as described by Williams *et al.* (2019a), and also by Elf and Malmqvist (2009), and Elf *et al.* (2012), served as a fundamental motivation and provided a natural starting point, especially considering the front-end's role in achieving project success. Additionally, conversations with practitioners, discussions with peers and subject matter experts and through attending PhD courses in combination with personal experiences, topics emerged that deserved further attention.

Understanding the relations and interactions among hospital projects' multiple stakeholders stood out as an important issue early on, wherein *collaboration* plays an important role. Although regarded as fundamental for front-end managing (Edkins *et al.*, 2013, Williams *et al.*, 2019a) and project success (Baccarini, 1999, Tzortzopoulos *et al.*, 2006), managing stakeholders and their dynamics is not well understood for the front-end phase (Aaltonen *et al.*, 2015).

Decisions made up front in a project are important to ensure successful outcomes (Klakegg *et al.*, 2010, Samset and Volden, 2016a, Williams *et al.*,

2019a), and given the front-end's susceptibility to 'problematic behaviour' (Flyvbjerg, 2009), it would be beneficial to possess means or tools that can help or even improve decision-making. At the front-end, *EWS* serve as such a mean; however, the research on *EWS* is scarce (Nikander and Eloranta, 2001, Haji-Kazemi *et al.*, 2012b, Haji-Kazemi *et al.*, 2015). Further empirical research specific for sectors and project types looking into *EWS* variations, and further studies of the impact of complexity in such situations, is called for (Williams *et al.*, 2012).

Viewed from a system perspective, which in a way encompasses the aforementioned issues, appropriate governance regimes help improve processes and systems affiliated with the project and give proper direction on the road to successful projects (Samset *et al.*, 2006, Locatelli *et al.*, 2014, Volden and Andersen, 2018). Thus, knowledge of *governance* is important for improving project outcomes and a remedy for improving the poor track record of public projects. However, *project governance* has only recently gained interest as an important topic in this way, and literature appears fragmented (Ahola *et al.*, 2014, Volden, 2019c). Furthermore, Norwegian hospitals are organised in SOEs, which are hybrid organisations and in which both commercial and societal objectives should be considered, thus differing from both the private sector and ordinary public agencies (Nasir, 2017). There is a call for more knowledge of SOEs in general (e.g. Grossi *et al.*, 2015, Bernier and Reeves, 2018). Although Norway made early efforts aimed at countering unfortunate results for major public projects by means of the SPM, major projects undertaken in Norwegian SOEs are not included in the SPM. Hence, there is limited knowledge of how project governance is performed in this setting. In addition, there is limited knowledge regarding the QA element in governance arrangements in general, and in SOEs in particular, also representing a research gap.

The iterative research approach used in this thesis shows signs of the many facets of a project, its front-end phase and its context, and will be thoroughly

discussed in chapter 0. The emerging topics have elucidated research gaps connected to the front-end, and by exploration of these, I aim at providing further understanding of the front-end phase in the current context. I believe as such that viewing the emerging topics from different angles where the aim is to describe them and analyse their potential interactions, constitutes the most beneficial approach for obtaining a better understanding of the front-end phase of hospital projects with all its facets. Thus, a suitable model and metaphor would be to see this as through a kaleidoscope, which first has to be assembled to enable the study of interactions of topics and emerging patterns to expand and strengthen our understanding.

The core topics mentioned earlier in this section represent the mirrors in the 'front-end' tube. By looking into the kaleidoscope through a project management lens and by turning the tube to enable looking at the topics from different angles, multiple shapes appear, and different perspectives are projected by means of the interactions between the topics. This will in turn, hopefully, contribute to more knowledge of hospital projects' front-end phase, and thus add to the general understanding of this phase, aiming at overall improvement. The kaleidoscopic model is illustrated in Figure 2.8.

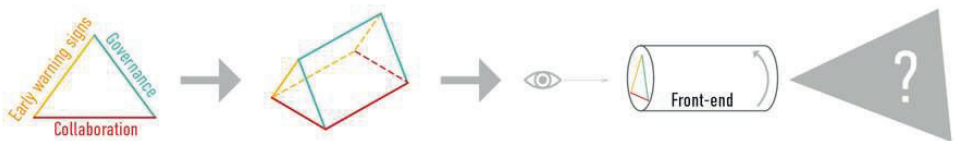


Figure 2.8 Assembling the kaleidoscope

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3 RESEARCH CONTEXT

This research is set in a Norwegian context. In Norway, the Norwegian State has the overall responsibility for providing specialised healthcare services to its citizens. Thus, healthcare services are mainly public, comprising both somatic and psychiatric services in hospitals and other institutions.

As mentioned earlier, healthcare investments comprise a large amount of the Norwegian state budget (≈ 2 per cent), and investments in hospital projects amount to almost NOK 58 billion towards 2024 (Norwegian Ministry of Health and Care Services, 2019). Even higher estimates exist for technical and structural investments not taking demographic increase or future needs connected to other developments into account (Ernst & Young, 2016). Today's specialist health services administer a total area of 4.9 million m², making it the Norwegian State's largest property owner (Ernst & Young, 2016) and the lag in maintenance is considerable (Larssen, 2011, Consulting Engineers' Association, 2015, 2021). According to the Norwegian Consulting Engineers' Association (2015, 2021), the level of investments is 20 per cent lower than actually needed, and actions should be taken to keep the negative trend from continuing.

Several Norwegian hospital projects have commenced in the last 10-20 years, constituting a unique opportunity for studying the planning of hospital projects of different sizes and scope, and in different settings. Several authors and entities highlight the need for knowledge, innovation and reasonable use of resources in the planning processes (Larssen, 2011, Office of the Auditor General of Norway, 2011, Pauget and Wald, 2013, Consulting Engineers' Association, 2015, Norwegian Ministry of Health and Care Services, 2015, Ernst & Young, 2016).

3.1 Public hospital structure in Norway

The structure of Norwegian public hospitals consists of regional and local levels. Four Regional Health Authorities (RHAs): Helse Nord RHA, Helse Midt-

Norge RHA, Helse Vest RHA and Helse Sør-Øst RHA (Figure 3.1), are formal owners of different Local Health Authorities (LHAs) that consist of one or more hospitals of different sizes and services. The RHAs derive their funding from the Norwegian Ministry of Health and Care services (Ministry) following the Norwegian Parliament's allocation resolutions. By law, RHAs have the superior responsibility for all investments needed in the hospitals in their area.



Figure 3.1 Regional Health Authorities (RHAs) in Norway

The LHAs should elaborate on local requirements for healthcare services through a strategic plan stating the need for investment projects. When investment projects exceed NOK 500 million, there is a governmental demand to employ the national competence hub for hospital planning and building, the Norwegian Hospital Construction Agency (NHCA), founded by the Ministry in

2014. The NHCA is owned by the RHAs and provides services connected to development, planning and execution of construction projects and facility management aiming for joint benefits for the Norwegian health sector.

3.2 Hospital planning in Norway

The Norwegian Directorate of Health published the first guidelines for hospital planning in 2006 (The Norwegian Directorate of Health, 2011). The guidelines describe and recommend how the planning process for investment projects in the health authorities should be performed. The guidelines have developed over the years. The overall objective, which is to ensure sufficient quality in front-end planning and to support sound decision-making in hospital projects has, however, remained unchanged. The front-end should clarify whether the solution for an identified need or problem includes investments in buildings (The Norwegian Directorate of Health, 2011). There should also be a clarification of framework conditions and different solutions should be searched for. The 2011 version of the guidelines presents a process for front-end planning described as a gateway model divided into several phases (idea phase, concept phase and pre-project phase), see Figure 3.2. Gateways/decision points connect the different phases and decide whether the project may be continued into the next phase. Through the phases, possible principal solutions to the defined need should be identified, including both operational and structural solutions. A professional basis should be developed that establishes a sufficient degree of certainty of which is the right alternative, the right alternative being the one that best meets the expressed goals within the given framework conditions (The Norwegian Directorate of Health, 2011). The alternatives are to be assessed in terms of the defined goals and purposes and in terms of criteria partly derived from these and partly from the guidelines. Reports from the idea and concept phases are usually based on a number of sub-elaborations, which cover most of the many aspects of hospital planning. The reports are important documents that form the basis for passing the planning models' gateways.

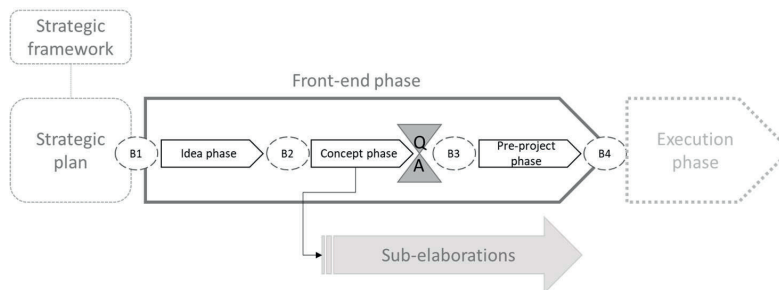


Figure 3.2 Stage-gate model 2011 guidelines (adapted from The Norwegian Directorate of Health (2011))

At present, Norwegian hospitals are planned using guidelines issued by the NHCA in 2017, which are a revised version of the 2011 guidelines. The 2011 guidelines were evaluated by the NHCA in 2015, based on 10 finished projects and interviews with practitioners. This led to a new version of the gateway model, presented in Figure 3.3. The planning process still builds on a stage-gate model, but the project scoping is more explicit in the planning process, which means that e.g. decisions on localisation should be made before entering the Concept phase. Furthermore, the Concept phase is divided into two steps. In Step 1, all options are evaluated and one is chosen (B3A), then the chosen option is further elaborated and detailed. The strategic plan is more emphasised, and separate guidelines for this plan have been developed. The evaluation performed in 2015 stated that depending on the content of the strategic plan, it should be considered to either omit or change the content of the Idea phase. A change would entail reducing the content to becoming an initial activity mainly aiming for delimitation of a specific project, and further the formulation of the Concept phase's mandate.

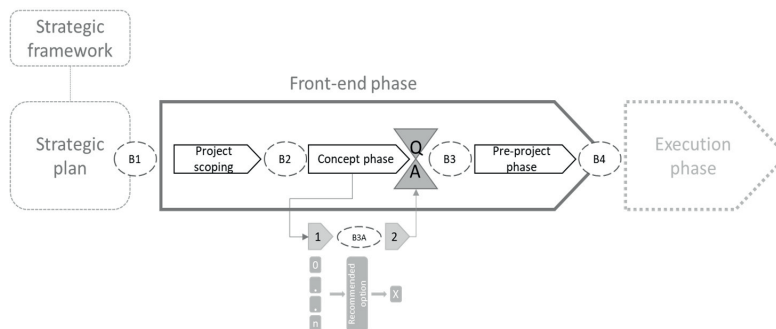


Figure 3.3 Front-end planning according to the NHCA 2017-guidelines, adapted from NHCA (Sykehusbygg HF, 2017)

For projects exceeding NOK 500 million, it is obligatory to carry out an external quality assurance (QA) based on Concept phase elaborations. The QA may be performed either as a point assessment or as a parallel assessment, where in the latter case external consultants follow the planning process along the way, assessing documents available at the time, receiving updates as soon as these are finished.

Based on reports elaborated in the Concept phase and in the QA, investment decisions are made at the regional level. Finally, the reports are presented to the Ministry, and serve as the basis for an application for loan and approval according to legislation.

The organisational structure of the planning process varies among Norwegian hospital projects. In a broad outline, project organisations comprise internal stakeholders from both the LHA, serving as senior user coordinators or as members of different stakeholder groups, and representatives from the NHCA, as well as architects and consulting engineers. The composition of the different stakeholder groups may vary, but they comprise mainly hospital employees from different disciplines (both medical and technical), patient representatives, representatives from the local municipalities, different spokespersons for hospital employees, and personnel safety representatives.

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4 RESEARCH METHODOLOGY

The following chapter presents the research methodology for this thesis. This includes the research questions addressed in this work, and the research design chosen to enable answering these questions. However, to enable suitable approaches to answering the research questions, the philosophical position to the undertaken research should be clarified. Thus, the section starts with exploring *why* the research is undertaken, followed by the introduction of the central questions initially asked. Then some reflections on the theoretical positioning are given, followed by a description of the research process, introducing the 'research onion', a taxonomy developed by Saunders *et al.* (2019), which serves as a main basis for describing the approaches made, together with the work of Creswell (2014). Then, the philosophical underpinnings are presented, followed by the approach to theory development. The inner layers of the research onion constitute the research design, that is the framework for the collection and analysis of data (Saunders *et al.*, 2019). In the end, some reflections regarding the quality of research and its limitations are provided, before a final summary of the research approach is given. Figure 4.1 shows the outline of this chapter.

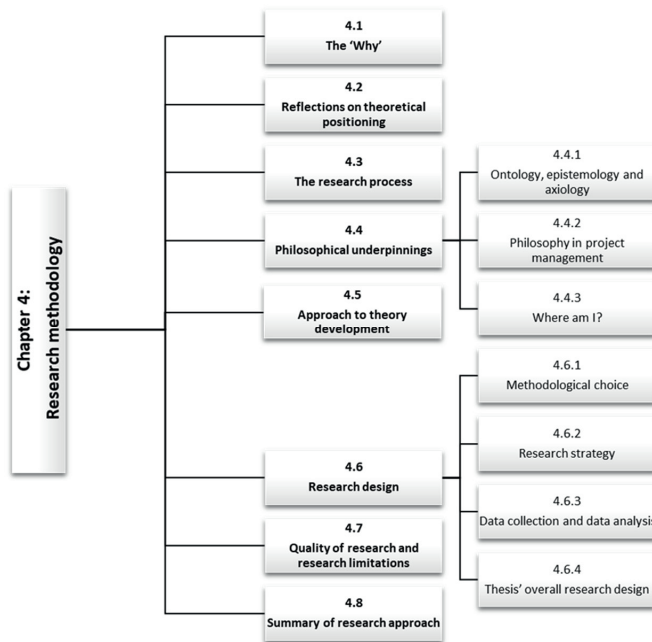


Figure 4.1 Chapter outline

4.1 The 'Why'

Reflecting on *why* the present research is undertaken is an essential part of a study, expressed, according to Creswell (2014), through a study's 'purpose statement'. According to Holden and Lynch (2004), the '*Why research*' question calls for a philosophical solution in order to find out '*How to research*', which is often solely related to practical matters. So why should the current study be undertaken? In the following sections, the *why* is elaborated on and a purpose statement is formulated. The philosophical underpinnings for this research are given in section 4.4.

Generally, the front-end phase of major projects is insufficiently understood (Williams *et al.*, 2019a), and major public projects have gained a bad reputation due to cost overruns, time delays and poor value for money (Morris and Hough, 1987, Flyvbjerg, 2014, 2017, Volden and Andersen, 2018, Volden, 2019b).

Hospital projects make no exception. Thus, there are many reasons for seeking to improve such projects. Considering the front-end's role for achieving strategic project success, the need for more knowledge on this topic is salient for enabling improvement. This, together with personal experience from the front-end planning process, served as a fundamental motivation for this thesis. Hence, the purpose of this work was to explore hospital projects' front-end to obtain more knowledge on the topic, aiming for improvement of the planning process. This implied developing a deeper understanding of the research area rather than solving a specific problem, not aiming for any generalisation but rather provide reflexivity and transferability. To gain further insight into the research area, a three-step approach was chosen (Figure 4.2). The three steps comprised one central question (RQ_c) each (Creswell, 2014).

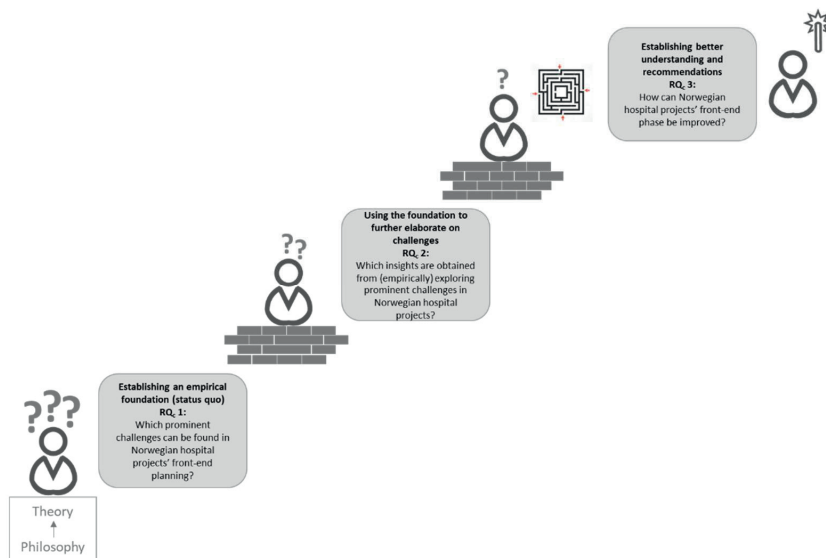


Figure 4.2 Three-step approach

The first step implied establishing an empirical foundation by exploring the status quo of Norwegian hospital projects' front-end, hereby uncovering prevailing challenges. Building on this foundation, prominent challenges were

explored to obtain more insight and to seek solutions for meeting these challenges. Drawing on the obtained knowledge, important areas for front-end performance in hospital projects were highlighted. This further constituted a starting point for improvement efforts and supportive tools for navigating through a complex and uncertain environment. The central research questions (RQ_c) are presented as follows:

- **RQ_{c1}:** *Which prominent challenges can be found in Norwegian hospital projects' front-end planning?*
- **RQ_{c2}:** *Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects' front-end?*
- **RQ_{c3}:** *How can Norwegian hospital projects' front-end phase be improved?*

The three central questions were further explored through four individual papers, which will be described in in later sections.

4.2 Reflections on theoretical positioning

Winter *et al.* (2006) have claimed that there is no single theoretical base from which to explain and guide the management of projects, which is also stated by Morris (2013) (quoting Koskela and Howell (2002)), and Niederman *et al.* (2018). According to Morris (2013), PM knowledge is pluralistic, as asserted also by Bredillet (2015). Various theoretical approaches exist that operate on the individual PM level and for PM as a whole. As Creswell (2014) described, theory serves the purpose of a lens for observing the inquiries made. Keeping in the field of optics, and considering the form of research undertaken during this PhD project, the research may be viewed as through a kaleidoscope, as outlined in section 2.7, in Figure 2.8. Here, the research framing (i.e. the front-end) constitutes the tube containing several mirrors (different topics). When looking into the tube, through a PM lens, a variety of different patterns and symmetries can be seen. These changes as the tube is being rotated, illustrating that viewing the front-end from different angles provide different

optics/images. Still, dependencies exist between the different topics (mirrors' reflections), which creates the observed patterns and symmetries. This metaphor attempts to describe the aim of the current research, which is to identify the manner in which different topics interact as a way of exploring and providing insight and further pave the way for improvement of the front-end of hospital projects. Figure 4.3 illustrates the kaleidoscopic model for this thesis.

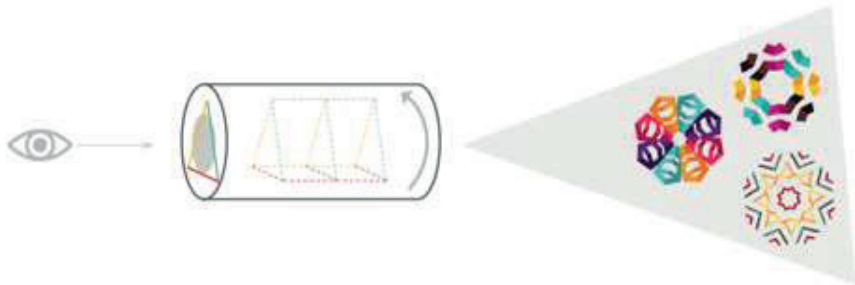


Figure 4.3 Kaleidoscopic model

The kaleidoscopic metaphor finds support in e.g. Bredillet (2015), and Konstantinou and Müller (2016), when considering the philosophical underpinnings of project management. Any theory is developed from a philosophy (Konstantinou and Müller, 2016), and the philosophical underpinnings of PM have become a subject of discussion over the years. Several philosophical perspectives may be appropriate, leaving us with a potential kaleidoscope of different philosophies and thus different theories. Also, Williams *et al.* (2019b) pointed to Winter and Szczepanek (2017), who discuss images of projects, encouraging an approach that is pragmatic and reflective, viewing projects from multiple perspectives. They proposed seven core images of projects as a way of viewing projects from different perspectives. These are *a social image, a political image, an intervention image, a value creation image, a development image, an organisational image and a change image*, which are not to be seen as 'one correct image for a certain project' but rather as useful approaches for creating better understanding of a project and

thus taking appropriate actions. Bredillet (2013) argued for a 'praxeological' style of reasoning when studying PM, which involves '*building on interpretation and hermeneutics of living and historical discourse and narrative as a way to address the inherent complexity of any organization and society*' (Bredillet, 2013, p. 83). The kaleidoscopic perspectives are embedded in this type of reasoning, which aims at linking theory and practice, corresponding to the view of practice being a valuable point of departure for developing new philosophies and approaches to work (Konstantinou and Müller, 2016). This will be further discussed in later sections.

4.3 The research process

According to Saunders *et al.* (2019), research can be defined as a systematically undertaken process with a clear purpose of finding out about things. The research process contains all steps from the research idea is born until a project report/thesis has been completed and future research and plans are reflected upon. In the previous section, the purpose of this research was described and the central research questions were presented. Saunders *et al.* (2019) have introduced the 'research onion', illustrating the majority of components of the research process, showing the issues underlying the choice of data collection techniques and analysis procedures, see Figure 4.4.

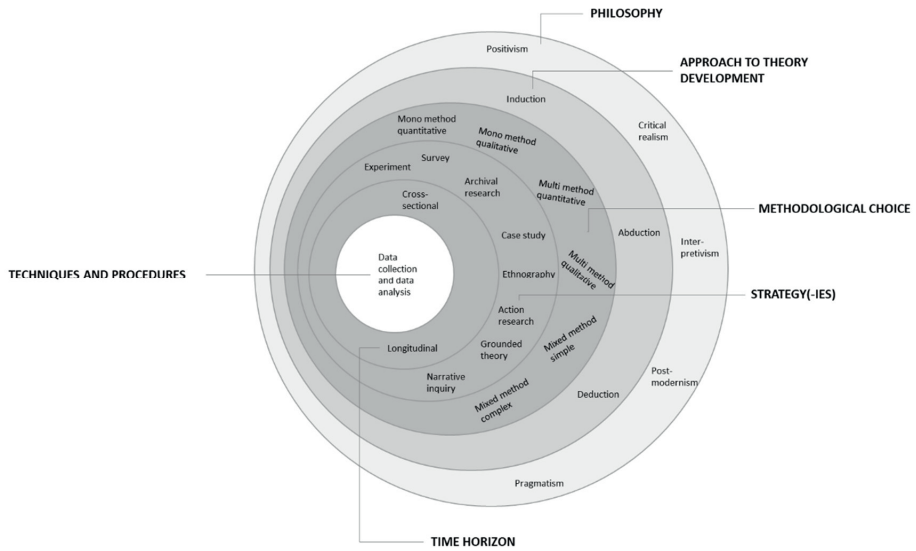


Figure 4.4 Research onion (redrawn from Saunders et al. (2019))

According to Creswell (2014), three interacting components are involved in the research approach: philosophical worldviews, designs and research methods, which should all be addressed when planning a study. This is quite similar to Saunders et al.'s (2019) approach, where the term *research design* comprises the methodological choice, strategy(-ies) and time horizon. This is illustrated in Figure 4.5. Saunders et al. (2019) encouraged the researcher to reflect on his or hers beliefs and assumptions, on how these relate to major existing research philosophies, and on the research design.

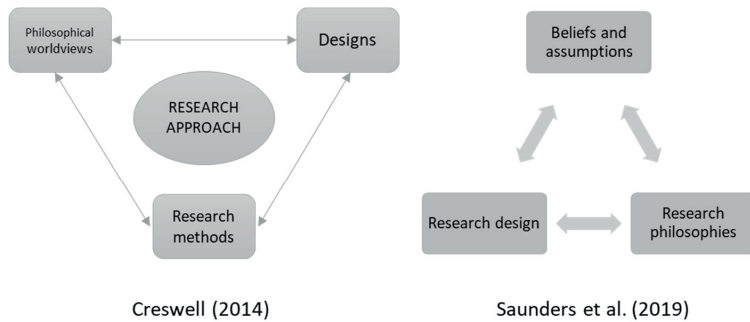


Figure 4.5 Research approach (adapted from Creswell (2014), and Saunders et al. (2019))

In what follows, in using the taxonomy of the ‘research onion’ (Saunders *et al.*, 2019), the steps in the research process are explained, from the philosophical underpinnings of this work to the methods of data collection and analysis.

4.4 Philosophical underpinnings

The researcher should reflect his or hers beliefs and assumptions and relate these to existing research philosophies (Saunders *et al.*, 2019). Although philosophical ideas often seem hidden in research, they are important to identify due to their influence on research practices, and they furthermore help explaining the chosen research approach (Creswell, 2014). The term research philosophy refers to a system of beliefs and assumptions about the development of knowledge (Saunders et al., 2019) and has been interpreted in different ways in literature (Creswell, 2014). Creswell (2014) used the term worldview, meaning ‘*a basic set of beliefs that guide action*’ (defined by Guba (1990, p.17), in Creswell (2014)), while others call these beliefs paradigms, epistemologies and ontologies or broadly conceived research methodologies.

Following Saunders et al.’s (2019) taxonomy, the terms ontologies and epistemologies are used, but also the term research paradigm, here defined as a ‘*... set of basic and ‘taken-for-granted’ assumptions which underwrite the frame of reference, mode of theorising and ways of working in which a group operates*’

(Saunders *et al.*, 2019, p. 140). By looking deeper into these aspects, it becomes easier to identify with the proper research philosophy.

4.4.1 Ontology, epistemology and axiology

According to Saunders *et al.* (2019), three types of assumptions can be used to distinguish research philosophies: *ontology*, *epistemology* and *axiology*. **Ontology** refers to what we consider realities, **epistemology** to what we consider acceptable knowledge and how we communicate this to others, while **axiology** refers to the role of values and ethics.

Ontology and epistemology are also found in Guba (1990) when looking into paradigms as a basic set of beliefs that guides action, relating to questions regarding the nature of reality (ontology) and the nature of the relationship between the knower and the known (epistemology). A researcher's ontological stance thus shapes the search for understanding, while epistemology, by considering how we learn about our world, shapes the methods chosen (Creswell, 2014). Guba (1990) also included the methodology aspect when describing paradigms, as in how to go about finding out about knowledge.

According to Saunders *et al.* (2019), the assumptions that characterise different philosophical stances can be viewed over a continuum of two extremes: *objectivism* and *subjectivism*, and also in a political-ideological dimension: *regulation* and *radical change*.

Objectivism detaches the social actors from social reality, meaning that a social phenomenon is independent of the people associated with it (Saunders *et al.*, 2019). The objectivist approach uses principles from the natural sciences (Holden and Lynch, 2004), ontologically leaning towards realism, searching for one true reality expressing a worldview based on concrete and stable structures (Holden and Lynch, 2004, Saunders *et al.*, 2019). Epistemologically, objectivists seek facts and truth through measurable and observable phenomena, aiming for law-like generalisations (Saunders *et al.*, 2019), and references to subjective issues are considered meaningless (Holden and Lynch,

2004). The objectivists' axiological stance is to be free of values and detached from research participants in order to retain the notion of independence between the social actors and social reality, thus preventing the introduction of bias into the research.

Subjectivism differs from objectivism by asserting that the social actors' perceptions and actions constitute social reality (Saunders *et al.*, 2019). Ontologically, a subjectivist view denotes that involved social actors create social reality, which suggests that reality may be seen as a social construction (Holden and Lynch, 2004). Thus, there is no underlying, mutual reality for parties involved beyond the created, and multiple realities exist (Saunders *et al.*, 2019). Epistemologically, the subjectivist seeks the opinions of social actors through written, spoken or visual contacts as knowledge sources (Saunders *et al.*, 2019). The subjectivist is interested in social actors' narratives to understand the different social realities. The subjectivist researchers are furthermore unable to detach themselves from their own values when using acquired data, hence the axiological stance is value-bound and reflexive (Saunders *et al.*, 2019).

The **regulation perspective** maintains the need for regulation of societies and human behaviour and seeks improvement within existing conditions, while the **radical change perspective** wishes to challenge status quo and established conditions by looking into other possibilities and alternatives (Saunders *et al.*, 2019).

For organisational analysis, the combination of the objectivism-subjectivism scale and the regulation-radical change scale, gives rise to four paradigms (Figure 4.6), according to the works of Burrell and Morgan (Saunders *et al.*, 2019).

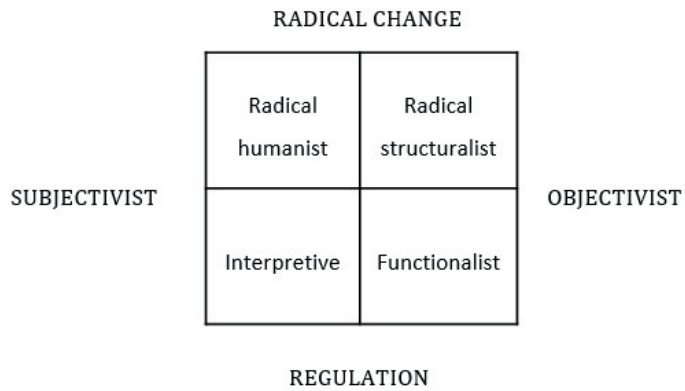


Figure 4.6 Research paradigms, redrawn from Saunders *et al.* (2019)

Burrell and Morgan (as cited in Saunders *et al.*, 2019) asserted that the four paradigms carry mutually incompatible assumptions, thus they cannot be combined. However, this has been debated over the years and is often referred to as the ‘paradigm wars’ (Saunders *et al.*, 2019). For example, Gioia and Pitre (1990) saw paradigmatic dimensions as continua, and suggested that the boundaries between the paradigms are permeable to a certain extent and are better conceived as *transition zones*.

4.4.2 Philosophy in project management

As recently as in 2010, Bredillet (2010) asked if anybody had found a paradigm out there for project management, arguing that this is missing, together with a theoretical foundation and clear epistemological positioning (cf. section 4.2), thus constituting a barrier for an effective understanding of the field. PM’s inherent pluralism has made it challenging to establish a common paradigm for research (Bredillet, 2010).

The multiple perspectives found in the world of PM justify a diverse and kaleidoscopic philosophical approach (Bredillet, 2015, Konstantinou and Müller, 2016). The different approaches discussed over the last two decades highlight the need for bringing in the social perspectives, importance of

practitioners, complexity, value creation and broader conceptualisations as opposed to the instrumental and narrow views on projects that initially prevailed (Svejvig and Andersen, 2015, Walker and Lloyd-Walker, 2016). However, several authors emphasise that this is to be regarded as an evolution of PM and not as a replacement of former PM approaches, making room for both the instrumental views and the more recent approaches to philosophical underpinnings and thus theories (Konstantinou and Müller, 2016, Walker and Lloyd-Walker, 2016). Accordingly, there is not one best way of approaching the field of PM; it is rather a matter of creating understanding through different perspectives, including both the social perspective, actions and practice (Bredillet, 2015).

Consequently, Bredillet (2010, 2015) argued that PM rests on different paradigms, and he suggested an integrative perspective which embraces the ontological continuum and suggests an epistemic integration, where creation of knowledge needs to include and integrate both classic approaches and the more 'fuzzy' aspects. He further argued for a 'praxeological' style of reasoning that balances philosophical approaches and the pluralistic perspective; an approach that goes beyond the 'Theory-Practice' divide and studies humans' actions and conduct. This may create a common ground for practitioners and researchers, leaning on 'praxis' in which theory and practice are integrated at the point of intervention. In the praxeological view, the practitioners and researchers become 'praXitioners', that is agents working together to get 'the job done', and who are flexible regarding the methodological choices at hand (Bredillet, 2015). By taking this view, Bredillet (2010, 2015) claimed to address the poor track record of projects, pointing at the importance of the interaction between theory and practice in developing the field of PM.

Projects and process

Changes in philosophy are observed due to the changes in the world of projects. The instrumental views, in which projects are regarded as unique undertakings within given limits, are sometimes seen being replaced by processual views,

emphasising e.g. social interactions and embracing change (Konstantinou and Müller, 2016). Projects are more often viewed as parts of a larger whole, adopting an outward-looking view and thus placing the project in its wider context, which represents a philosophical approach different from the 'lonely project' perspective (ibid.).

Increasing interest in studying projects processually has been observed (Langley, 2021). Process theory, which actually should not be perceived as a theory but rather as a form of conceptual framework, focuses on sequences and their interactions, inherent time intervals and outcome(s) (Niederman *et al.*, 2018). This way of studying PM is appropriate because such a theoretical lens may explain and predict '*how and why temporally evolving phenomena unfold over time*' (Bizzi and Langley, 2012, p. 225, as cited in Niederman *et al.*, 2018).

Further efforts aimed at exploring projects using a process ontology can be found in a Project Management Journal special issue from 2020, in which process studies of project organising are looked into, and where the editorial (Sergi *et al.*, 2020) proposed that the potential of process thinking advancing project research is just in its infancy. It is further claimed that process thinking is an ontological position '*concerned with how to understand reality and on what to focus on in order to produce knowledge. Its core tenet is that the world is in a continual process of becoming, rather than in a state of being*' (Sergi *et al.*, 2020, p. 4). Accordingly, process thinking emphasises the 'ongoingness' rather than stability, seeing stability as something that has to be produced (Sergi *et al.*, 2020). Further, Sergi *et al.* (2020) highlighted that process ontology lets us investigate what happens when working *with* projects rather than *in* projects, corresponding to approaches aiming to understand the lived experience of projects. Langley and Tsoukas (2017, p. 21), were also quoted in the editorial:

'At the end of the day, a shift towards a process approach to organizations, and social life more generally, is aligned with a new understanding of doing social science—one that is not so much obsessed with establishing statistical generalizations as concerned with elucidating the complexities

of agency through which much in social and organizational life is accomplished. Becoming aware of process is becoming aware of the vitality of life itself.'

The processual view of projects further implicates the use of qualitative methods to capture the 'ongoingness' by means of engaging in the lived experiences of the actors involved in the projects (Sergi *et al.*, 2020).

Looking to Ika and Bredillet (2016) and their thoughts on '*The metaphysical questions every project practitioner should ask*', it is suggested that project practitioners may alternate between different metaphysical worldviews depending on the project phase. This could entail taking a *process/becoming* view during the front-end and a *thing/being* view during project execution, due to the characteristics of the different phases, thus the authors stated that '*it is more a matter of relative importance than an 'either/ or' alternative*' (Ika and Bredillet, 2016, p. 98).

4.4.3 Where am I?

Positioning oneself within a philosophical worldview is by many experienced as a challenge, due not only to an unfamiliar way of thinking but also to a somewhat confusing terminology. This has been, and partly still is, my experience as well. However, taking a philosophical stance whereby one reflects on one's beliefs and assumptions when contributing to develop new knowledge is important. A researcher's philosophical perspective influences the shaping of research questions, the chosen methodology and the following interpretation of data, thus raising consciousness about these issues is crucial for performing credible research (Saunders *et al.*, 2019).

The necessity of taking a philosophical stance is also emphasised by Holden and Lynch (2004), who maintained that the methodological choice should be consequential to the philosophical stance and the investigated phenomenon rather than leading the research. Furthermore, they held that the '*How to*

research' question requires much more than practical answers, meaning that there is a need for answering the '*Why research*' question philosophically.

Being a PhD student is a journey and a process where knowledge and competence are continually being gained. While not actually describing PhD students, Schommer (1998, p. 557) stated that: '*... the more education adults obtain the more likely they are to believe that knowledge is highly complex and constantly evolving*', which I find to be very descriptive of my personal journey through the PhD landscape. The ability to take multiple perspectives when studying PM may serve as both a curse and a blessing for a novel researcher; in my experience I must admit that finding my way has been a challenge. Bredillet (2015) described it as finding one's way through the Broceliande forest, and other authors have also pointed out confusion and frustrations both due to the distancing language used and due to the fact that the same terms and concepts describe different things (e.g. Klakegg (2016), Rapley (2018), Saunders *et al.* (2019)). However, as time has gone by, the pondering and reflections that come with this has hopefully helped me mature as a researcher. However, I still sense a certain discomfort when throwing myself into this part of research.

During my work, I have grown to appreciate the opportunities that come with the multiplicity/diversity found in the project management domain, something which makes it exciting and educative. I find the reflections regarding the need for more diverse approaches to the field in order to mirror its pluralism and thus utilising the theory-practice gap, rewarding. The philosophical underpinnings of the papers reflect my PhD journey, thus leaning on both an interpretive as well as a pragmatic paradigm.

The relatively poor track record of major projects and the role of the front-end phase in achieving strategic project success are parts of the starting point for this thesis. Given a lack of understanding of the front-end phase in general, and for hospital projects in particular, the overall objective of this research was to obtain more insight into the front-end of hospital projects to enable subsequent improvement of performance. Thus, this research sought both to understand

and, based on this understanding, provide knowledge that may enable improvement.

To increase the understanding of front-end planning of Norwegian hospital projects, there was a need for establishing deeper insight into this complex topic. Consequently, the research was carried out under an interpretive paradigm, where the purpose '*is to create new, richer understandings and interpretations of social worlds and contexts*' (Saunders *et al.*, 2019, p. 149). This positioning also made it possible to take advantage of many years of experience in the field, corresponding to the interpretivist transactional epistemology and its axiological foundation. Then, as I progressed through the field, more knowledge was accumulated and further progress was achieved due to an incremental understanding of the main research topic. The pluralistic view of projects eventually became clearer to me, showing a growing relevance and fit to the research. The fourth study of this thesis was undertaken under a pragmatic worldview, using a mixed methods approach as this was regarded as the best way of answering our research question.

In what follows, I mainly draw on definitions used by Saunders *et al.* (2019) when looking into the assumptions of the philosophical underpinnings for the current research. When looking into pragmatism, the views of Goldkuhl (2012) are also used for clarification.

Interpretivism is subjective, and interpretivists see the nature of reality (ontology) as complex, rich and socially constructed, and this complexity should not be reduced through law-like generalisations since we then risk losing the rich insights into humanity (Saunders *et al.*, 2019). Interpretivists deal with this complexity by collecting what seems meaningful for their research participants. How this is done, depends on different strands, most notably: phenomenology (focussing on participants' lived experiences), hermeneutics (focussing on cultural artefacts) or symbolic interactionism (meanings emerge from interactions between people, focussing on observing and analysing this interaction; see also the following elaboration of

pragmatism). Moreover, the researcher is part of what is being researched, resulting in the researcher's own interpretations, values and beliefs constituting an important part of the research process. The researcher should, however, be empathetic and make an effort to understand from the research participants' point of view.

The core of **pragmatism** is actions and change; actions are the way of changing existence (Goldkuhl, 2012, Saunders *et al.*, 2019). The pragmatist nature of reality is regarded as being complex and rich, reality is seen as the practical consequences of ideas, or, as Goldkuhl (2012, p. 139) put it: '*the essence of a pragmatist ontology is actions and change; humans acting in a world that is in a constant state of becoming*'. Knowledge created from this stance is not restricted to understanding (as opposed to the interpretive stance) but can be viewed as constructive, that is both as prescriptive, normative and prospective (Goldkuhl, 2012). The research aims at contributing to practical solutions to inform future practice (Saunders *et al.*, 2019, p. 151), and the research problem drives the research and thus allows for 'all means and methods' in solving this problem.

The distinctions between the two paradigms can be viewed in Table 4-1, as described by Saunders *et al.* (2019).

Table 4-1 The interpretive and pragmatic philosophical positions (reproduced from Saunders et al. (2019), pp. 144-145)

	Ontology	Epistemology	Axiology	Typical methods
Interpretivism	<ul style="list-style-type: none"> • Complex and rich • Socially constructed through culture and language • Multiple meanings, interpretations and realities • Flux of processes, experiences and practices 	<ul style="list-style-type: none"> • Theories and concepts are too simplistic • Focus on narratives, stories, perceptions and interpretations • New understandings and worldviews as contribution 	<ul style="list-style-type: none"> • Value-bound research • Researchers are part of what is researched (subjective) • Researcher interpretation is key to contribution • Researcher being reflexive 	<ul style="list-style-type: none"> • Typically inductive • Small samples • In-depth investigations • Qualitative methods (but a range of data can be interpreted)
Pragmatism	<ul style="list-style-type: none"> • Complex, rich and external • 'Reality' is the practical consequence of ideas • Flux of processes, experiences and practices 	<ul style="list-style-type: none"> • Practical meaning of knowledge in specific contexts • 'True' theories and knowledge are those that enable successful action • Focus on problems, practices and relevance • Problem solving and informed future practice as contribution 	<ul style="list-style-type: none"> • Value-driven research • Research initiated and sustained by researcher's doubts and beliefs • Researcher is reflexive 	<ul style="list-style-type: none"> • Following research problem and research question • Range of methods: mixed, multiple, qualitative, quantitative, action research • Emphasis on practical solutions and outcomes

Other differences, as stated by Goldkuhl (2012), include the role of *understanding*, which has a role in itself in interpretivism, whereas in pragmatism it is seen as instrumental in change of existence. However, similarities between the two paradigms do exist, and some schools of research even fuse them (e.g. symbolic interactionism). From comparisons of the two paradigms, Goldkuhl (2012) stated that they share ontological assumptions summarised as '*meaningful action based on evolutionary social interaction*'

(Goldkuhl, 2012, p. 142). Furthermore, looking at information systems research, Goldkuhl (2012) pointed out the mixing of these paradigms, which he attributed to a *practice turn* in the field. He highlighted the relationship between understanding and change, and stated that '*A good understanding of the world created in a pre-assessment may be useful for preventing or conducting actions*' (Goldkuhl, 2012, p. 142).

Mixing paradigms has been debated. However, it seems as if the gradually accepted notion of pluralism in the field of PM has led to an acceptance of leaning on different paradigms. Biedenbach and Müller (2011) pointed to a trend of multi-method research and an underlying pragmatist epistemology. Research in the PM community has been criticised for lacking relevance for practitioners, which is partly explained by an imbalance in perspectives between researchers and practitioners. Where researchers encounter narrow theoretical perspectives when studying a topic, the practitioner has to cope with many perspectives simultaneously (Joslin and Müller, 2016). Joslin and Müller (2016) argued that using multiple perspectives in research simultaneously will provide more comprehensive understandings, which may turn out to be more relevant for practitioners by coming closer to their reality. They further argued that this implies triangulation of philosophies and thus methodological triangulation on the epistemological level.

The theory-practice gap is also referred to by Bredillet (2015), who, as mentioned earlier, argued for a 'praxeological' style of reasoning as a way of creating new ways of seeing projects, balancing philosophical views and pluralistic perspectives.

Thus, I return to the kaleidoscope and the need for coping with PM's inherent pluralism. To overcome the shortcomings in the outcome of projects, we need to make room for comprehensive views when handling the pluralism inherent in projects. Moving beyond the theory-practice gap and thus providing relevant research for practitioners, I believe we need to avoid narrow perspectives and thus predictable research results irrelevant for practice. This underlines the

value of enabling triangulation on the philosophical level in addition to the more established methodological triangulation. Although the research in this thesis builds on philosophical underpinnings that show similarities and where triangulation may thus have a rather humble effect, I believe that it is valuable to look at hospital projects both as an interpretivist and as a pragmatist to embrace the need for both understanding and for implementing action to enable improvement.

4.5 Approach to theory development

A researcher's dominant philosophy will influence the approach to theory development, however, there is no rigid divide between the two (Saunders *et al.*, 2019). The research undertaken in this thesis combines an interpretivist and pragmatist approach, thus the approach to theory development has been both inductive and deductive. Combining the inductive and deductive approach, i.e. moving back and forth between the two, is defined as an abductive approach. However, in the absence of well-established theories and abundant empirical data, and in encountering scarce knowledge of hospital projects' front-end, the approach to theory development for this thesis was mainly inductive. This entails that theory follows data, rather than the opposite (Saunders *et al.*, 2019). In what follows, the approaches to theory development in each paper are described.

Paper I is a descriptive, multiple case study using front-end documents as a data source, aiming to gain insight into the content of these essential documents, reflecting what is perceived as important or necessary content in order to make front-end decisions. The documents further illustrate the nature of the planning process, thus providing a genuine representation of the topic and facilitating a deeper understanding of context and processes. Even though recommendations for front-end planning are scarce, some have been developed over the years, which provided a useful lens for interpreting potential shortcomings in the front-end documents. The interpretations and use of personal experience in the field lean on interpretivism, thus implicating an

inductive approach to theory development. However, one could argue that given the use and comparisons to theoretical recommendations, an abductive reasoning is used.

In paper II, the method used for interpreting our interviews implied an inductive approach, however, the link to findings from the literature studies provided a lens for this interpretation (Malterud, 2001), and was also used as a primary template for the coding procedure. This balanced data openness and the need for some initial structure, partly reflecting topics from the interview guide and literature review (King *et al.*, 2002, King, 2004, Fereday and Muir-Cochrane, 2006).

In paper III, document reviews and interviews from five different SOEs were used to explore and describe the respective enterprises' governance regimes and quality assurance procedures. Consequently, the approach to theory development was inductive.

In paper IV, both inductive and deductive approaches were employed, as this study leans on a pragmatic paradigm using a mixed methods study design, following a sequential, exploratory approach aimed at obtaining more understanding of the early warning phenomena in hospital projects' front-end phase. Interviews were analysed as described for paper II, and findings were used to develop a questionnaire and perform a survey.

4.6 Research design

The research design describes the plan for how the research questions are to be answered (Creswell, 2014, Saunders *et al.*, 2019). Following the research onion taxonomy, it should say something about the choice of method, data sources and research strategy, time horizon and techniques and procedures for data collection and analysis.

This thesis builds on four individual papers detailing front-end topics appearing as important for front-end performance. The three central research questions asked in this thesis (see section 4.1) aimed at providing more holistic

answers than those discussed in each individual paper, thus attempting to ‘paint a broader picture’ of hospital projects’ front-end phase. The individual papers were initially based on experience and fundamentals detected when analysing front-end documents (paper I), and also on topics that emerged from the initial analyses, interviews and conversations with project practitioners which were considered crucial to front-end performance. Moreover, PhD courses and discussions with colleagues have also been a part this process. Each individual paper comprised one or more research question(s), as shown in Table 4-2.

Table 4-2 Research question(s) in each individual paper

PAPER	RQ
I: Hospital project front-end planning: Current practice and discovered challenges	<p>RQ1: <i>How does front-end planning of Norwegian hospital projects correspond to official guidelines’ expectations of contents and intentions?</i></p> <p>RQ2: <i>Considering recommendations derived from extant theory, which, if any, shortcomings can be identified in the front-end planning of Norwegian hospital projects?</i></p>
II: Exploring collaboration in hospital projects’ front-end phase	<i>How can we understand collaboration in hospital projects’ front-end?</i>
III: Project governance in SOEs: The case of major public projects’ governance arrangements and quality assurance schemes	<p><i>To explore governance arrangements in SOEs, the study aimed at gaining more insight into the following topics</i></p> <ul style="list-style-type: none"> • <i>A description of different SOEs’ arrangements’ and their purpose, especially on how external QA is organized and performed;</i> • <i>Actors and roles, including their political aspect;</i> • <i>The arrangements’ scope and cost and time efficiency.</i>
IV: Assessment of early warning signs in hospital projects’ front-end phase	<p>RQ1: <i>What is the status quo of EWS in hospital projects’ front-end in hospital projects?</i></p> <p>RQ2: <i>Which signals may serve as EWS for the front-end of hospital projects?</i></p>

In the following, the research designs are elaborated on.

4.6.1 Methodological choice

This thesis is mainly based on qualitative studies (papers I-III), the main purpose being to establish more knowledge of hospital projects' front-end phase for further improvement, thus the purpose of the research is exploratory and descriptive (which is also considered as an extension of exploratory research according to Saunders *et al.* (2019)). The aim of the study is not to generalise, but rather obtain a deeper understanding of the topic by studying 'what is happening', in which qualitative methods are the best choice (Sergi *et al.*, 2020). According to Saunders *et al.* (2019), exploratory research presents research questions, comprising 'What' and 'How', and aims at clarification or deeper understanding of a topic or phenomenon. Saunders *et al.* (2019) also held that exploratory research may start as a broad approach becoming narrower as the research progresses. This is also true for this thesis, where the point of departure was to establish a broad foundation for the status quo of hospital projects' front-end phase, and then pinpoint and explore essential topics that emerged as the knowledge base grew and more insights were obtained. This also led to the use of mixed methods in Paper IV, following a sequential, exploratory approach in order to both explore and systematise a topic (in this case early warning signs) (Creswell, 2014). The use of multiple methodological approaches reflects the pluralism of the PM field, and the use of mixed methods is welcomed as a way to address confirmatory and exploratory questions simultaneously providing 'stronger inferences and a greater assortment of divergent views' (Cameron *et al.*, 2015, p. 101).

Qualitative approach: Papers I-III

The interpretive stance taken in this research calls for the use of qualitative methods. The nature of our central research questions and the detailed research questions found in the individual papers are mainly explorative. The qualitative approach lets us explore and understand how individuals capture the research topic and values interpretation of the subjective meanings set in the subject's natural setting (Creswell, 2014, Saunders *et al.*, 2019). As Creswell

(2014) described, data are analysed inductively, building from particulars to general themes while the researcher makes his/hers interpretations, emphasising the individual meanings and seeking to render the complexity of the studied topic. Following the research onion taxonomy, this research has used both mono-method qualitative studies and multi-method qualitative studies. Paper I, for example, is based solely on document studies, whereas papers II and III use both documents studies and interviews to answer the corresponding research questions. Another characteristic of qualitative approaches is semi-structured methods, where the flexibility to adapt to the current situation is kept, thus fitting its naturalistic setting. Sampling of research objects (i.e. documents, respondents) is often purposive.

In addition, the role of the researcher is not objective, meaning that the researcher is not independent from the research objects (Saunders *et al.*, 2019). In our research, we also took advantage of the researchers' many years of experience in the field, which corresponds to the interpretivist transactional epistemology and its axiological foundation (Denzin and Lincoln, 2018, Lincoln *et al.*, 2018, Saunders *et al.*, 2019).

Mixed methods approach: Paper IV

During the research process, it became clear that exploring the role of EWS in hospital projects' front-end might be a fruitful approach for improvement. EWS could serve as a tool for supporting project participants, perhaps especially project managers, in adjusting their ongoing activities in order to fulfil project objectives both in the short-term and long-term perspective, thus aligning the project outcomes to the organisation's strategy. Our preliminary idea was that approaches for handling EWS in hospital projects' front-end were scarce. To enable further understanding of the topic, we started out by exploring and describing the status quo of the use of EWS in hospital projects' front-end, and proceeded to look into which signals might serve as EWS in the front-end.

Mixed methods research carries the assumption that the research question is best answered by collecting both qualitative and quantitative data, and by

focussing the attention on the research problem (Creswell, 2014). The philosophical assumptions guide the data collection and analysis and the subsequent mixing, and often take a pragmatist position (Saunders *et al.*, 2019).

Hence, the setting for paper IV called for a mixed methods design. We wanted to both explore the current status of this topic, and also use these findings to develop an instrument (i.e. a questionnaire) to enable more specific results regarding which signals were considered important and to what extent different signals could be used in hospital projects' front-end phase. Accordingly, a sequential, exploratory approach was followed, i.e. using different data collection methods in order to answer the research questions (Creswell, 2014, Saunders *et al.*, 2019). Some challenges are present in this approach, including focussing on the appropriate findings from the qualitative part of the study, and the sample selection for both phases of research (Creswell, 2014). The research approach is illustrated in Figure 4.7.

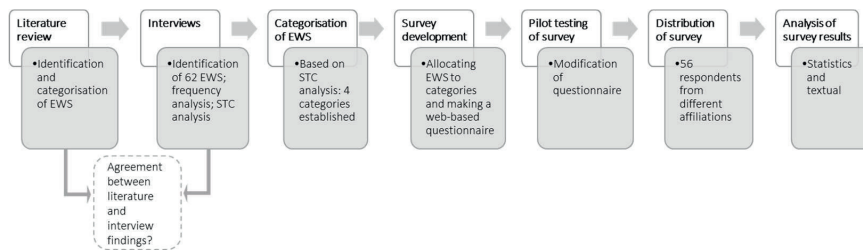


Figure 4.7 Overview of applied mixed methods approach

4.6.2 Research strategy

The research strategy is the plan describing how to answer the defined research questions, and it serves as the methodological link between the research philosophy and tools for data collection and analyses (Saunders *et al.*, 2019). The choice of strategy is guided by the research questions and objectives, but also by practical issues such as time and available resources (ibid.). Research strategies are not mutually exclusive and may be combined within studies, which is demonstrated in this thesis and described in what follows.

Following the research onion taxonomy, the strategies used in this thesis comprise *archival/documentary research*, *case study*, *narrative inquiries* and a *survey*.

Archival/documentary research

For all papers, an archival/documentary research strategy was used mainly as a supplement to other research strategies. All studies used front-end documents (e.g. reports from different planning phases, external quality assurance reports, minutes from board meetings, official planning guidelines), which are publicly available documents that should be of such a quality that they could serve as a decision-making basis for managers and government. The documents furthermore illustrate the nature of the planning process, thus providing a genuine representation of the topic, consequently facilitating a deeper understanding of context and processes. The front-end documents provided a basis for both the case study approach in paper I and for the narrative inquiries performed in connection with papers II and IV. Paper III made use of the studied enterprises' project models in addition to using a narrative inquiry to provide a deeper understanding of how governance is performed in state-owned enterprises.

Case study

Papers I and III used a multiple case study strategy, in paper I to gain better understanding of Norwegian hospitals' front-end planning looking into five different hospital projects, and in paper II to study governance arrangements in five SOEs and the State Project Model. Case studies are in-depth studies of a phenomenon in its real context, where understanding of the context is fundamental (Saunders *et al.*, 2019). For paper I, the purpose of the case study was to investigate front-end planning practices in five projects (cases) in light of formal guidelines and widely accepted theoretical recommendations, and to compare the cases to each other in order to find common features and further compare the findings to external quality assurance reports. For paper III, the purpose was to seek deeper insights into the governance arrangements in the

SOEs. The applied descriptive case study strategy provided a methodological link to the interpretivist underpinnings, using an inductive approach by identifying patterns from these cases, revealing practices and challenges. These were then compared to existing literature, and thus extended our general understanding of the researched topics.

Narrative inquiry

The narrative inquiry strategy should be used when the researcher wants to gain insight into a topic through a respondent's complete story and not through fragmented data gained from specific interview questions (Saunders *et al.*, 2019). Papers II-IV all set out to further investigate and elaborate on hospital projects' front-end phase, seeking answers to research questions starting with 'how', serving an exploratory purpose. Data were obtained from semi-structured interviews, allowing the respondents to provide rich and comprehensive descriptions of the topic studied and providing us as researchers with the possibility to probe the statements and gain deeper insights into the topic in question.

Survey

Paper IV employed a mixed methods methodology, where a survey instrument was created based on findings from qualitative interviews. We aimed at investigating which EWS exist in hospital projects' front-end and how these can be accommodated to improve front-end planning. Thus, the purpose was exploratory and descriptive, which suits the choice of a survey strategy. The survey strategy also provides the possibility to use descriptive statistics (Saunders *et al.*, 2019), which further helped us systematise the discovered EWS from the interviews, giving relatively concrete hints on which signals were perceived as being more important to project performance. This served as a good starting point for further analyses and testing of the discovered EWS.

4.6.3 Data collection and data analysis

The core of the research onion contains the data collection and data analysis (Saunders *et al.*, 2019). The following section describes the different approaches to data collection and analysis used in the four papers.

Document studies

As described in the previous section, different documents were an important source of information for all papers. Document analysis is an efficient and cost-effective means of research, and one that is suitable for qualitative case studies (Bowen, 2009), as was the case for papers I and III. Documents provide broad coverage, which is a benefit given the complexity and long planning timelines of hospital projects (*ibid.*).

Paper I used documents as the main data source, comprising official guidelines and front-end documents. Front-end documents are publicly available documents, and were obtained from the LHAs'/RHAs' websites. All documents studied were approved by local and/or regional boards and had undergone the political processes required prior to final decision. The front-end reports are essential in hospital project decision-making processes, and are required to include content of such a quality that project conclusions can be drawn, which also is stated by Elf *et al.* (2012). In Norway, applications to the Ministry of Health and Care Services from the RHA for project financing are based on the concept phase report and the report from the external quality assurance. The role of the reports in the planning processes also mean that they are vital to subsequent project outcome assessment, and they therefore play an important role in the continuous improvement of planning processes (Elf *et al.*, 2012).

A template was made for analysing the front-end documents based on the official planning guidelines' content expectation. The template was used to assess whether and to what extent the projects fulfilled these expectations by asking several categorising questions for each expected topic and further evaluating the cases' coverage. The questions were mainly categorised by either

C (covered), *P* (partly covered) or *NC* (not covered), but sometimes a \pm scale was employed to provide nuances. The answer *N/A* (not applicable) was also utilised. A written summary was prepared for each question, to allow for further discussions among the authors and for reasons of comparison. A numerical value was assigned to each categorisation for each case, and further totalled for each main topic for each case and viewed against a 'fully covered' scenario in order to illustrate the cases' relative compliance with the guidelines. It should be emphasised that this only provided a very rough visual overview of the extent of coverage. The external quality assurance reports were finally read and summarised, and our findings were compared to the comments of the external quality assurance teams. Topics displaying common features or other noticeable characteristics were then sorted and analysed.

For paper III, documents from each governance scheme were studied, including SOEs' project governance models with inherent guidelines, reports from external quality assurers, and minutes from board meetings or other decision-making entities in which reports are used as part of the decision-making basis. The documents were accessed by contacting SOEs directly, using information provided by a designated reference group when needed. The analysis of the governance schemes' formalities were compared by using tables, looking at organisational issues and timelines and other aspects characteristic of the respective arrangements. This revealed the schemes' similarities and actual differences related to the schemes' content, performance and process.

Interviews

Papers II, III and IV are all based on interviews. We used semi-structured interviews with open-ended questions with the possibility to change the questions' order, thus providing the required flexibility and ability to adapt to the situation (Saunders *et al.*, 2019). The objective was not to quantify results but rather to get descriptions of the topic with different nuances/perspectives (Kvale and Brinkmann, 2015). Open questions aim to give the respondents the opportunity to speak freely and delve deeply into parts of the topic when they

have thorough insight, meanings or experiences to share (Tjora, 2012). Semi-structured interviews also provide possibilities for permitting digressions in order to explore different angles of the main topic not envisioned by the interviewer in advance (Tjora, 2012).

The interview setting and approach to data analysis are slightly different for papers II and IV, and paper III, respectively. Interviews performed for papers II and IV covered two topics (collaboration and early warning signs) and used the same sample of respondents, while paper III reports from interviews with respondents somehow associated with state-owned enterprises where the sample of respondents is different and the data analysis is differently performed. For paper IV, the results from the interviews were also used to develop a questionnaire.

The different papers' approaches are described below.

Papers II and IV

Respondents were recruited using a sampling strategy based on both convenience and judgement (Marshall, 1996, Saunders *et al.*, 2019), interviewing persons that had approximately the same role in the different projects, constituting LHAs and RHAs, and the NHCA. The respondents from the NHCA answered primarily from a specific project point of view. However, this did not exclude the possibility for them to compare or share experiences from other projects as a means of shedding light on the planning processes. We also encouraged the respondents to suggest other respondents based on their experience and knowledge of the field; this is known as a 'snowballing' approach (Tjora, 2012).

Interviews were conducted using audio recording, with one researcher serving as the main interviewer in all interviews. All respondents agreed in advance to the presence of two or three researchers during the interview. Several interviewers called for a structured interview schedule, which was managed by jointly discussing the interview guide and the technique in order to strengthen

reliability. One researcher transcribed the interviews by carefully listening to the recordings at slow speed and writing down everything that was said. Afterwards, while listening to the recording at normal speed, the completed transcriptions were read and checked.

Wanting to gain deeper insight into the phenomenon of interest, we based our data analysis on Malterud's Systematic Text Condensation (STC) method (Malterud, 2011). This method is inspired by phenomenological ideas, and offers a pragmatic and iterative approach, and a process of inter-subjectivity, reflexivity and feasibility while maintaining methodological rigour (Malterud, 2011, Malterud, 2012). STC is a descriptive and explorative method for analysing qualitative data focussing on participants' meanings and experience, which was suitable for this study (ibid.). The method is used in a range of qualitative research (Sari *et al.*, 2017), and is considered structured and well-defined (Sagsveen *et al.*, 2018). Several of the qualitative studies using STC belong to health sciences, which was appropriate both for the study and the thesis scope.

The method implies an inductive approach; however, prior to data analysis we made a literature study to create a reference frame for the analysis. This served as viewing the data through an interpretive lens (Malterud, 2001), and also as a template for the coding procedure. This balanced data openness and the need for some initial structure, partly reflecting topics from the interview guide and literature review (King *et al.*, 2002, King, 2004, Fereday and Muir-Cochrane, 2006). Consequently, we did not use a purely inductive approach applying both theory-driven and data-driven codes. The interview transcripts were coded using the template of theory-driven codes and simultaneously assigning inductive codes that emerged from the text. When new codes emerged, previous coded transcripts were re-analysed in light of the new codes, keeping in mind that it is important that the a priori codes are flexible and open to minor or major modifications, and can even be deleted as the analytical process progresses (King *et al.*, 2002). The analytic process thus took an iterative form,

adding emerging codes from the transcriptions to the theory-driven codes, and re-coding previous transcriptions accordingly. All data were coded using NVivo software version 12 (QSR International, 1999-2018). Analysis of the complete set of codes made it clear that some codes were more or less interrelated, and hence could be grouped into preliminary categories. Text assigned to each code in each category was read and the content condensed in order to make the most essential features of the studied phenomenon emerge. Our professional point of departure, in our case project management in the front-end of projects, are known to influence these features (Malterud, 2011). Further analysis of the condensed contents of the different categories lead to a final clustering into main categories serving as the studies' main findings.

Paper III

In this study, respondents were recruited using purposive sampling (Marshall, 1996, Saunders *et al.*, 2019). The external quality assessors that were included should be familiar with at least two of the studied governance arrangements. Potential respondents were also suggested by contacts in the state-owned enterprises. The interviews were performed after document studies, and the

interviews were also used to clarify uncertainties from these studies. The research steps are shown in Figure 4.8.

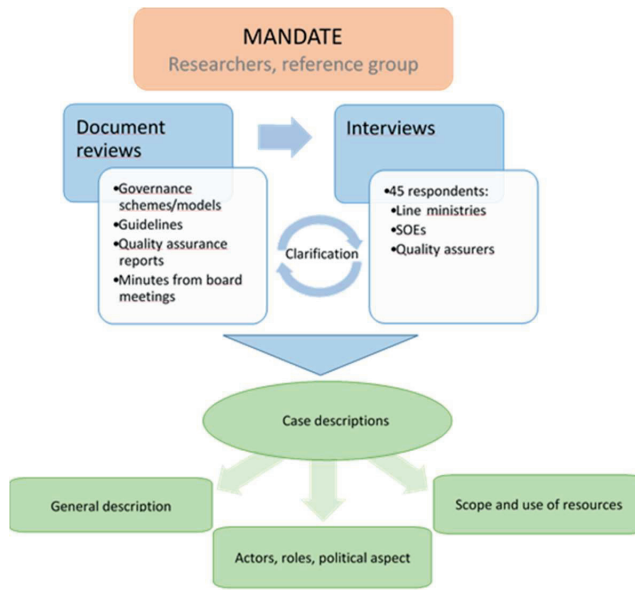


Figure 4.8 Research steps paper III

The interviews were not audio recorded, but two or more researchers were always present, where one made detailed notes.

The interviews were analysed by coding the respondents' different statements, and further by clustering similar statements, following Creswell's (2014) procedure for data analysis and interpretation:

1. *Organise and prepare data for analysis*
2. *Read and look at all data reflecting on the overall meaning*
3. *Start the coding process, establish categories and terms*
4. *Generate detailed descriptions, using codes and terms to establish themes for analysis (reducing categories), which represent major findings*

5. *Advance how the description and themes will be represented in the qualitative narrative*
6. *Interpret the findings and results, comparing them to existing theory; do the findings confirm or diverge from current theory? The findings can also raise new questions.*

The findings from the interviews partly helped to clarify or supplement the findings from the document study, but topics emerged that we did not find in the document study and enabled us to gain deeper insight into the aforementioned findings and thus the quality assurance process. All respondents were offered the opportunity to read through and check the interview notes, but the majority were satisfied with just reading and commenting on case descriptions in a final report.

Questionnaire

The mixed methods approach chosen for the study reported in paper IV emphasised the qualitative data from the semi-structured interviews. The interview findings, together with a literature review and document studies of front-end documents, formed the basis for development of a questionnaire aiming to further elaborate and enable a preliminary systematisation of early warning signs in hospital projects' front-end phase. The questionnaire was divided into three parts: (1) *Respondents' demographic information*, (2) *Generic questions regarding perception of EWS*, and (3) *Respondents' rating of specific EWS in established EWS categories*, according to a five-point Likert-type scale going from 'Not Experienced' to 'Very Important'. The questionnaire outline is presented in Table 4-3.

Table 4-3 Questionnaire outline

Section	Data	Type of question
Demographics	Q1. Employer	Multiple choice
	Q2. Experience	Y/N
	a. Role	Multiple choice
	Q3. Current role	Multiple choice
	Q4. Years of experience	Multiple choice
	Q5. Experience from phases	Multiple choice
Generics	Q6. Are you using EWS in your current project?	Y/N
	How or why not?	Open-ended
	Q7. Rate the importance of reacting to EWS	Likert scale
	Q8. Rate how difficult it is to react to EWS	Likert scale
	Q9. Rate how difficult it is to detect EWS	Likert scale
	Q10. How early could EWS be detected	Multiple choice
Category: Structure and project tools (17 EWS)	Q11. Experience with these EWS, and importance	Likert scale
	Other EWS in this category? Importance?	Open-ended
Category: Context and frame factors (6 EWS)	Q12. Experience with these, EWS, and importance?	Likert scale
	Other EWS in this category? Importance?	Open-ended
Category: Management (3 EWS)	Q13. Experience with these EWS, and importance	Likert scale
	Other EWS in this category? Importance?	Open-ended
Category: Relational factors and properties (12 EWS)	Q14. Experience with these EWS, and importance	Likert scale
	Other EWS in this category? Importance?	Open-ended

All data were administered in a codebook providing numbered values to the ratings. The respondents were also encouraged to suggest and rate potential missing EWS in each category through an open-ended question provided for each category. The questionnaire was pilot tested on four respondents with knowledge of the topic. This led to some minor changes regarding wording and technicalities. We used a sampling strategy based on both convenience and judgement (Marshall, 1996, Saunders *et al.*, 2019). We also asked personal contacts to suggest relevant respondents. We aimed at covering all main groups affiliated with hospital project front-end planning: respondents from the LHAs

and RHAs, the NHCA, architects, counselling engineers, external quality assurers and project board members. The persons that were interviewed prior to the survey were all invited to participate. All respondents received an invitation by e-mail, comprising information regarding the research project and some general information on EWS. The survey was administered through a digital solution provided by the university with which the researchers are affiliated.

Data analysis comprised frequency analysis of the demographic and generic questions, using bar charts and tables, aiming to establish an overview and description. The rating questions were analysed by calculating the mean score and standard deviation for each EWS in order to rank the EWS in each category and overall. We also did a comparison among two groups, the owners (respondents from the LHAs and RHAs) and the others, to see if there were any differences in EWS perception. For this purpose, we used the non-parametric Mann-Whitney U-test, comparing medians between the two groups. IBM SPSS software version 26 (IBM, 1989-2019) was employed for the statistical analysis. Due to this study's explorative approach and the nature of our data (small sample), the use of statistical analyses should be cautious, as should drawing preliminary conclusions from this work. However, the results can help us along the way of gaining more insight into EWS in the front-end of hospital projects.

Finally, we investigated the open-ended questions for each category of EWS using an Excel spreadsheet, and compared these to the established EWS. We created a textual summary for each category, presenting EWS that were not included in the survey and other reflections provided by the respondents. This proved to be an informative supplement, and it contributed to broaden our understanding of EWS in hospital projects' front-end phase.

4.6.4 Thesis' overall research design and reflections on time horizon

The research design for each paper is summarised in Table 4-4. The methodological choice, research strategy and data collection procedures are described in detail in the preceding sections.

Table 4-4 Summary of research design for each paper

	Paper I	Paper II	Paper III	Paper IV
Methodological choice	Qualitative	Qualitative	Qualitative	Mixed methods
Research strategy	Case study/ archival and documentary	Narrative inquiry/ archival and documentary	Case study/ archival and documentary	Narrative inquiry/survey/ archival and documentary
Time horizon	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional
Data collection	Reviews of front-end documents (5 projects)	Semi- structured interviews (13)	Document reviews from SOEs (5) and interviews (45)	Semi-structured interviews (13) and questionnaire
Central RQ	1,3	2,3	1,3	1,2,3

The time horizon has not been accounted for previously, but the table shows that all studies had a cross-sectional approach. This means that the studies are performed at a particular time, and not longitudinally, where the researcher may follow the development of a phenomenon over time. Longitudinal studies carry a strength in the ability to capture changes and developments, however, performing longitudinal studies requires that the researcher has sufficient time available (Saunders *et al.*, 2019). The undertaken research could not be performed longitudinally due to time constraints and available data sources, nor was it crucial to follow the research topics' development over time at this stage. However, it would be interesting to look at the development of hospital projects' front-end planning undertaken by using the revised guidelines from 2017, and compare this to the current research as a developmental and longitudinal approach. Performing evaluations would also be a very interesting approach, as would a follow-up of the EWS through more interviews and analyses of projects using the suggested EWS.

An overall view of the workflow in this thesis is illustrated in Table 4-5.

Table 4-5 Overall workflow

Mile-stones	2017		2018				2019				2020				2021			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PhD courses	■	■			■	■	■	■					■	■				
Literature studies	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Data gathering and analyses																		
Papers													I			II	III	
Thesis																		■

4.7 Quality of research and research limitations

Quality of research is generally assessed in terms of validity and reliability (Saunders *et al.*, 2019). Reliability refers to the chosen research method’s precision, i.e. whether the same result will be obtained if the study was replicated. Validity refers to whether we measure what we intend to measure, i.e. the appropriateness of the measures used. This is illustrated in Figure 4.9.

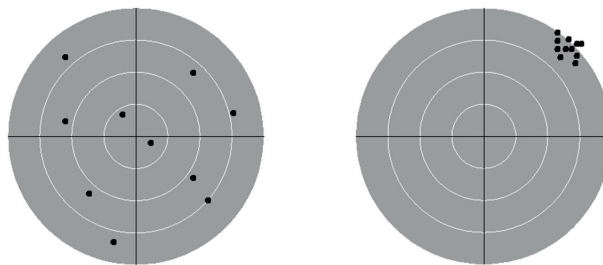


Figure 4.9 Validity and reliability. Left pane: good validity, low reliability. Right pane: low validity, good reliability (redrawn from Samset (2008, p. 176))

A distinction is often made between external and internal validity, where the former relates to a study’s generalisability and the latter pertains to if a study’s findings are related to interventions rather than flaws in the research design (Saunders *et al.*, 2019).

In qualitative research, however, these terms are challenged. In such contexts, the terms are partly seen as inappropriate, especially for research resting on interpretive assumptions. Since the purpose of qualitative studies often is to provide richer understandings and interpretations of social worlds and contexts, the need for replication (reliability criteria) is not always intended. Improving reliability for such studies is rather gained by providing methodological transparency enabling other researchers to perform similar studies, and by using more than one researcher in data collection and analyses (Saunders *et al.*, 2019). Regarding validity, the internal validity is not seen as an issue due to the in-depth nature of this type of research. On the other hand, the external validity criteria are difficult to meet due to small samples, which limit the generalisability. However, it is argued that other types of generalisability (when studying several cases, for example) are appropriate, such as e.g. analytical generalisation, where, based on a full description of the research approach, the study's *transferability* across settings can be judged (Creswell, 2014, Yin, 2014, Saunders *et al.*, 2019).

The concept *transferability* actually comes from a set of terms parallel to those of validity and reliability. The terms trustworthiness (dependability, credibility, transferability, neutrality) and authenticity (fairness, ontological authenticity, educative authenticity, catalytic authenticity) are suggested for research undertaken in a constructivist paradigm, within which the main parts of the current research has been undertaken (Schwandt *et al.*, 2007, Denzin and Lincoln, 2018, Saunders *et al.*, 2019). Trustworthiness is a compound term which was introduced by Lincoln and Guba in 1985 (Saunders *et al.*, 2019), who later also developed the authenticity criteria to determine the worth of qualitative inquiries (designed for the interpretivist paradigm) as an alternative to validity (Simons, 2015, Denzin and Lincoln, 2018, Saunders *et al.*, 2019). These criteria concern how we make sense of and further use or act on our interpretations (Schwandt *et al.*, 2007).

In the following discussion on the quality issues of this research, the terms validity and reliability are used together with the parallel terms. For reasons of simplification, I do not use the authenticity concept.

Several approaches are used for data collection. To secure the reliability/dependability of the current work, transparency both regarding the research process and theory is strived for (e.g. Olsson and Spjelkavik (2014), and efforts were made to gather data from reliable sources. For the document study in paper I, for example, public documents were used that are expected to be of such a quality that they enable decisions made at the management and government level, which makes them suitable for maintaining the study's trustworthiness (Lee, 2012). For the interviews in papers II-IV, persons with thorough knowledge of the investigated topic were interviewed.

For papers II and IV, the interviews were audio recorded and transcribed verbatim, and the transcriptions were checked by carefully listening to the recording afterwards. For the interviews reported in paper III, the respondents were given the opportunity to read the interview notes. Two or more researchers conducted all interviews reported in paper III, while for the audio recorded interviews two or more researchers were present for five of eleven interviews. The interviews where only one researcher was present were among the last ones to be conducted, ensuring that the researcher had experience from previous rounds. The detailed transcriptions from all interviews were read and discussed by several researchers. All interviews were based on interview guides accommodated to the topic in question, and were thoroughly discussed by the researchers prior to interviewing. For the studies reported in papers II and IV, a study protocol was made, in a manner similar to establishing a case study protocol, as recommended by Yin (2014) and Kallio et al. (2016), to increase the trustworthiness (dependability/reliability). Furthermore, the interview guide was pilot tested (ref. Kallio *et al.* (2016)) on two experienced respondents for validity and reliability reasons, leading to minor adjustments of the interview guide and to expanding the duration of the interview from 60

to 90 minutes. Prior to all interviews, document studies (of front-end briefs, minutes from board meetings, project models, etc.) were carried out, and any uncertainties resulting from these studies were sought clarified in the interviews to verify the researchers' own understanding (in order to meet the credibility criterion).

All respondents received written information regarding the study and its objectives prior to the interview. This enabled them to prepare by gathering documentation and reflect on earlier events and processes before being interviewed, an approach known to increase study validity and reliability (Saunders *et al.*, 2019). All respondents consented by signing a form. Information was treated confidentially according to national requirements and was approved by application to the Norwegian Centre for Research Data.

In paper IV, a mixed methods design following a sequential, exploratory approach was used. The intent (in general) of such an approach is to see if data can be generalised (to some extent for this particular study) (Creswell, 2014). Based on qualitative data (interview coding), a questionnaire was developed. The interviews were performed as mentioned above, thus the measures to secure validity/reliability/trustworthiness for this part of the study are described. The findings from the interviews were further explored in the quantitative phase (survey). The survey part of this study was pilot tested on four respondents with knowledge of the topic to strengthen both the validity (face validity) and reliability of the questionnaire. Results from this pilot test were analysed and changes (language, technicalities) implemented before administering the survey to the respondents. Several tools for performing reliability analysis exist, but due to the strong exploratory nature of this research and the relatively small number of respondents, this was not carried out. The aim of the study was to perform an initial investigation of the EWS discovered through the interviews both by grading questions and by open-ended questions, and further enable a preliminary systematisation. To get the desired overview given the current material, simple descriptive statistics would

be the preferred tool. Measures such as e.g. Cronbach's α -test were discussed, but due to the modest number of respondents, this was not found appropriate. Looking at generalisability/external validity, the response rate needs to be evaluated.

To further strengthen the research quality, triangulation of data sources and methods is strived for. Under an interpretive paradigm, this entails adding depth, breadth, complexity and richness to the research (Saunders *et al.*, 2019, p. 216). Although paper I reports from a study using documents as the sole source of information, it is argued that the findings do serve as a first step to deepen the understanding of front-end performance in hospital projects. Data from several cases were used, which provided a possibility for picking up similarities or convergence of information that could strengthen the study's credibility (Bowen, 2009). Moreover, a template based on public guidelines was developed for categorisation, which made it possible to treat each case neutrally, and the external quality assurance reports were used for comparison after the categorisation, thus enabling an additional check of the study's trustworthiness. The documents illustrate the nature of the planning process in many ways, and thus provide a genuine representation of the topic, facilitating deeper understanding of the context and processes, and therefore has a high level of what e.g. Flyvbjerg (2011) designates conceptual validity.

The other studies undertaken in this research use different combinations of data sources, such as interviews, documents and a survey.

Table 4-6 shows the link between the different criteria relevant for the current research.

Table 4-6 Quality criteria

Criterion	Parallel criterion	Issues of concern	Accommodative measures
Dependability	Reliability	Repeatability for other researchers	Methodological transparency Using more than one researcher Use key sources
Credibility	Internal validity	Generally not seen as a problem, however, measures should be taken to ensure meeting this criteria (as part of a rigorous research design)	Duration of involvement (trust building and collection of sufficient data) Discuss with peers Checking data, analysis, interpretations with participants
Transferability	External validity/generalisation	(How) Can results be generalised? (analytical generalisation)	Methodological transparency to let the reader judge if the research may be transferred to other settings with similar characteristics or for learning purposes

Limitations

Limitations to the research design are present both due to general limitations in the chosen methods and due to particular issues pertaining to the undertaken research.

Using documents as a sole source of information (paper I) may present a potential bias in the research. There is a risk that documents will not provide sufficient detail to fully answer the research question (Bowen, 2009). Document analysis is often used to complement other research methods for the purpose of triangulation, which is considered to be important to reduce bias (ibid.). Regarding the study reported in paper I, there is also a concern considering the public guidelines (from which the template for analysis was made) in that they show somewhat ambiguous expectations on what to include

when performing front-end planning, making room for interpretations among different planners. This may explain the variations in content in the different cases' reports, and thus affects the comparisons made in this study.

For semi-structured interviews, the lack of standardisation can lead to reliability/dependability issues, i.e. if other researchers would identify the same information. In addition, biases connected to the respondent or the interviewer may be present (Saunders *et al.*, 2019):

- *interviewer bias* - where interviewers' behaviour or comments lead to bias in responses; lack of trust, failing to be accepted by the respondent, interpretation of responses, allowing personal dispositions/subjective meanings, etc. are issues that need to be considered
- *response bias* - where the respondent does not reveal or discuss parts of the topic studied due to a perception of intrusion or wishes to avoid probing questions, which in turn fails to provide a complete picture of the situation/topic studied
- *participation bias* - where the sample is biased, i.e. respondents' unwillingness to participate due to e.g. time concerns

The survey undertaken as part of the study reported in paper IV had a fair amount of rating questions, where the respondents were asked to use a Likert-based scale. Some general concerns with this approach are known regarding interpretations, definitions and scope, which also were experienced in this particular survey. For example, some misunderstandings regarding the definition of early warning signs were present, both considering that not all respondents knew what this was, and that other understandings of the term were present. We did try to overcome this by clear definitions in the covering letter, and furthermore by answering all questions raised. This type of rating procedure also carry some uncertainties, both by assigning a numerical value to experienced preferences, and by the inherent subjectivity found in ratings. The participants may very well interpret the strength of the statements differently, which can also be true for one participant's interpretation among

the different statements. Another issue that should be mentioned, is the use of the same respondents in both the interviews and the survey given the sequential, exploratory approach, thus introducing a confounding factor into the study, which compromises validity (Creswell, 2014).

An overall limitation is the use of a single type of projects (hospitals) in a Norwegian context only as well as a rather small sample of respondents, which limit a potential generalisability of the findings. The theoretical lens through which this research is viewed, is mainly rooted in project management, and one could believe that viewing this research through other lenses such as management theory or organisational theory would provide deeper insight into this field, at least for the study on collaboration (paper II). The same goes for creating a wider perspective through the interviews by inclusion of patients and relatives, for example. Another issue is the timeline, where all projects had finished the front-end phase and moved on to subsequent phases. This represents long periods of time, thus it may be challenging for the respondents to remember all details when interviewed in retrospect. Observation studies or longitudinal approaches would have improved the study's reliability.

4.8 Summary of research approach

Adding up all the layers following the research onion taxonomy, the complete research approach for this thesis is illustrated in Figure 4.10.

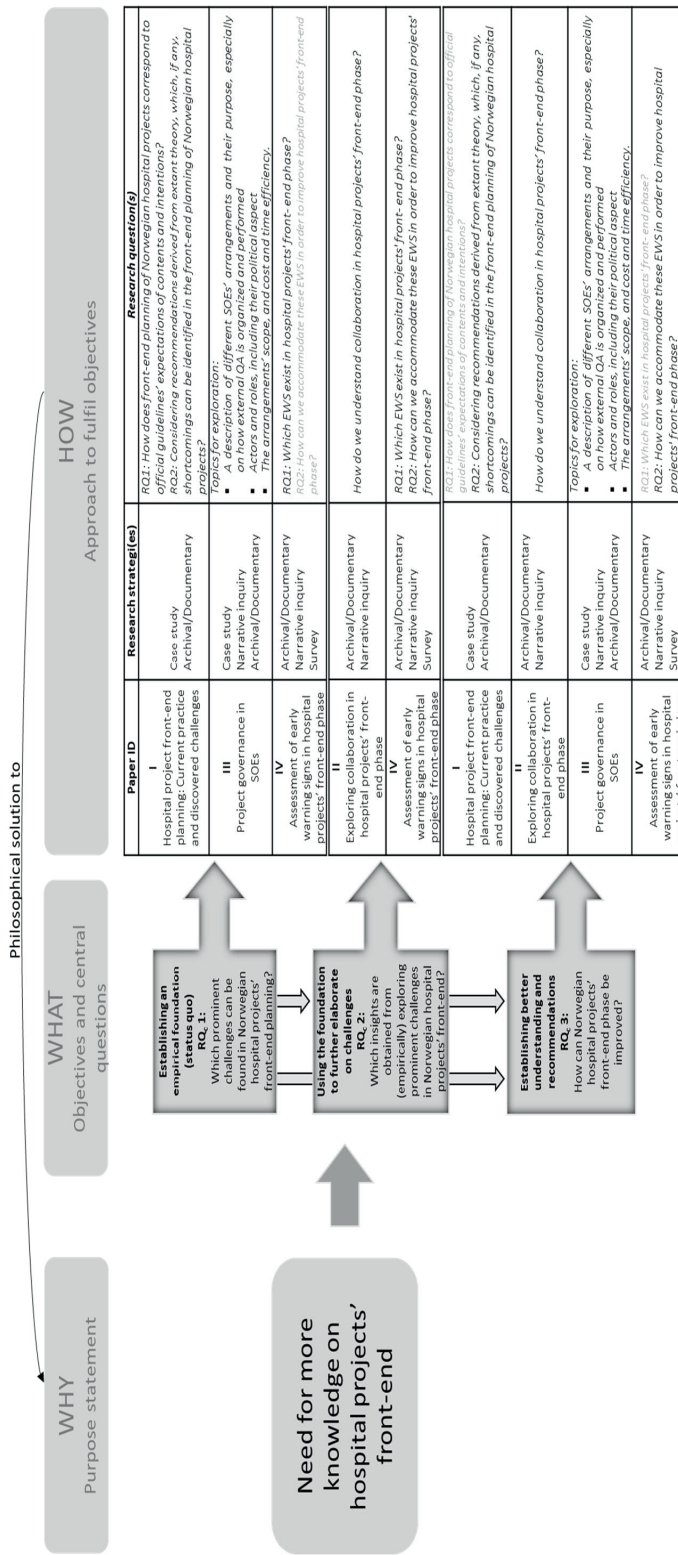


Figure 4.10 Overall research approach for this thesis

5 FINDINGS FROM INDIVIDUAL PAPERS

This thesis builds on four individual papers that can be found in part II. The following sections describe each paper's findings and discussions.

Figure 4.10 shows the relationship between the motivation, objectives and central research questions for this thesis and furthermore how the individual papers contribute to answering the central research questions. Although

Figure 4.10 may give the impression of a 'linear' process, it was not quite so in reality. The process was much more iterative or dynamic in nature. Some papers had more than one research question and their contributions relate to more than one of the central questions and objectives. Consequently, the contributions from each paper are not directly linked to one specific central research question or objective. Nor was it the case that everything was followed up in a 'step-by-step' manner; for example, some findings that primarily related to the establishment of the empirical foundation were also valid for the 'last' central research question considering recommendations for improvement of hospital projects' front-end phase. The vertical arrows in

Figure 4.10 illustrate this.

5.1 Findings and discussions from paper I

Paper I set out to explore how front-end planning of Norwegian hospitals corresponded to existing guidelines and if any shortcomings could be identified, compared to extant literature. Our research questions pertained to finding out how front-end planning corresponded to governmental guidelines' expectations and to investigating potential shortcomings in the planning processes in light of extant theoretical recommendations for front-end planning.

We found that the projects conscientiously follow the planning guidelines and adhere well to the guidelines' expected contents, implying that guidelines are important for front-end planning. It is worth noting that the studied projects

showed some differences regarding what was included in the front-end documents, pointing back at the possibility for interpretations of the guidelines' expectations. The coverage of main topics in the idea and concept phases is shown in Figure 5.1.

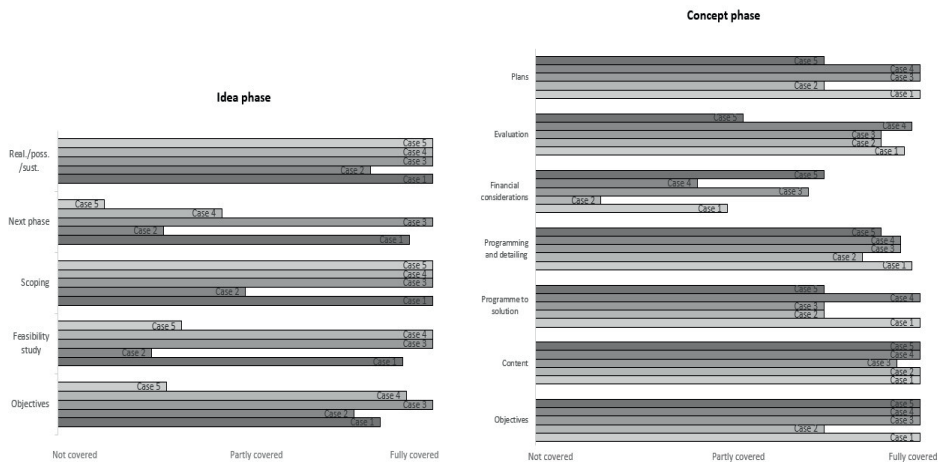


Figure 5.1 Coverage of main topics from planning guidelines (Left pane: Idea phase; Right pane: Concept phase)

The discovered challenges mainly related to the *planning process* or *exploration of the opportunity space* and *concept elaboration*. Using the theoretical recommendations as a backdrop, we found that topics associated with the planning process were theoretically related to creating the project perspective, aligning the project objectives and analysing stakeholders' needs and interests, while topics associated with the opportunity space and concept elaborations were theoretically related to the development of concepts and assessment of the chosen concept. This is described in more detail below.

Planning process

The most pronounced topics relating to the planning process that emerged from the analysis were:

- *The guidelines were thoroughly applied, but the projects interpreted the guidelines differently*
- *Projects displayed the same triggering factors*
- *Long planning timelines*
- *Challenges in formulating the objectives' hierarchy*

Challenges pertaining to formulation of the objectives' hierarchy are reflected in general understanding (Smith *et al.*, 2003, Klakegg, 2006, Samset, 2010, Klakegg and Haavaldsen, 2011, Samset and Volden, 2016b, Linton *et al.*, 2019). This also appeared to be true for the studied hospital projects, where the objectives appeared unrealistic and difficult to measure. This is a challenge, since the objectives' hierarchy contributes to the project strategy and alignment of objectives, which is a premise for project success (Klakegg, 2010, Williams *et al.*, 2019a). Hospital projects' inherent complexity (Aubry & Lavoie-Tremblay, 2018; Aubry *et al.*, 2014; Denis *et al.*, 2011; Fréchette *et al.*, 2020) contributes to this challenge when aiming for an establishment of a mutual point of departure and furthermore to satisfy different stakeholders' expectations and the realisation of societal objectives. This also reflects that hospital projects go beyond being mere construction projects due to inherent organisational transformations following healthcare development and the societal impact following these projects (Aubry *et al.*, 2014, Aubry and Lavoie-Tremblay, 2018, Fréchette *et al.*, 2020). Potential solutions to the defined need should be assessed in terms of the degree to which they meet the project's objectives. The lack of a clearly defined objectives' hierarchy therefore makes the evaluation and ranking of potential solutions difficult. The ranking of conceptual solutions is often based on ambiguous or vague preferences due to the delimitation of rationality, as the future is impossible to fully predict, and knowledge of the different solutions and their consequences is limited (Samset *et al.*, 2013, 2014).

Long planning timelines are a known characteristic of large and complex projects (Miller and Hobbs, 2005, Andersen *et al.*, 2007, Samset, 2008,

Flyvbjerg, 2014, Klakegg *et al.*, 2016, Wisth and Hjelmbrække, 2018), which were found in this study as well. This might challenge the ability to find strategically sound solutions, especially in the hospital and healthcare sector due to the rapidly changing environment in medical technology and treatment.

Familiarising oneself with project context, and further aligning needs, objectives and effects by examining the project holistically to enable mutual understanding and strengthen the odds for success, is a theoretically recommended activity early in major projects' front-end, and should be prioritised. The ability to handle the relationship between project objectives and project development is crucial to project success and a well-known project strategy challenge (Morris, 2009).

Exploration of the OS and elaboration of concepts

Exploration of the OS and the elaboration of concepts stood out as a pronounced topic when investigating the front-end documents using a backdrop of theoretical recommendations, comprising:

- *The hospital concept is ambiguous*
- *Absence of the use of theoretical assessment tools when searching for concepts*
- *Early detailing despite large uncertainties and scant information*
- *The OS is narrowed early; early 'lock-in'*
- *Realistic solutions are equal to financially realistic solutions*

Several factors contribute to narrowing the OS, and the conceptual variations found in the studied projects are modest. Concepts tend to be modifications over alternative dimensions, localisation or both. The often demanding project context, such as political battles or disagreements among stakeholders, adds to the project complexity and contributes to a narrower OS by preventing the openness and creativity that is needed in the front-end phase when seeking future solutions. Different determinants, such as the demanding context, delimit the OS and are emphasised by the perception of healthcare's path

dependency (Samset *et al.*, 2013, 2014). Theory states that choice of concept is vital to strategic success, which is why the front-end plays such an important role in this (Klakegg and Haavaldsen, 2011, Samset and Christensen, 2017). Consequently, discussions on what constitutes a concept in hospital projects are called for.

Another finding from this study, which is also confirmed in paper III, is that one concept seems to be preferred early in the planning process, leading to early lock-in, thus there is a risk of missing strategically successful concepts (Flyvbjerg, 2014). This might be due to limited or changed mandates, which might be a direct consequence of the unsolved issue of balancing concept elaboration and political decision-making (Klakegg *et al.*, 2016, Samset and Volden, 2016a).

Handling the complex context and balancing this with future needs call for examining the project holistically, thus there is a need for systematic assessment taking on a wider perspective in order to achieve strategic project success. This is confirmed in other studies (Smith *et al.*, 2003, Samset and Dowdeswell, 2009).

Early detailing is considered less valuable in the front-end of projects due to the level of uncertainty and scarce information supply (Samset, 2008, Samset and Christensen, 2017). The studied projects, however, performed some detailed calculations early on. This might be due to complex and rapidly shifting environments within which hospitals and healthcare development exist combined with hospital projects' long life expectancy, which seemingly become a paradox for planners. Making decisions while experiencing high uncertainties and high conflict levels seem to generate a need for concrete tasks and demonstrated progression and accordingly a need for the establishment of a quantified basis. This makes quantifying what is quantifiable pertinent, thus giving quantifiable elements primary focus in the elaborations. In turn, this suppresses creativity and imagination, abilities considered beneficial for creating future concepts, as well as further discussions on how to develop

future healthcare services, which potentially leads to a loss of viable concepts (Klakegg, 2010), and thus compromising long-term project success.

Summary

Implementing theoretical recommendations both in guidelines and in practice should be a desired and possible development to further improve hospital projects' front-end planning, thereby strengthening the odds of project success both on a tactical and a strategical level. The current planning practices do not achieve the desired level of diversity that should be present in the front-end phase, but this might be improved by revised guidelines. We discovered a gap between the theoretical approaches to planning and the practical performance such as vague objectives' hierarchies, early narrowing of the OS, early detailing, ambiguous concept definitions, low ability to take the outside view and an expressed economic focus. Failing to address these challenges represents a risk of not achieving a successful outcome. The challenges we found are well-known challenges in the front-end of major projects, thus our findings corroborate prior research. Tools for performing early project appraisals should be at hand for the project manager, and if lacking skills, possibilities for gaining such skills should be easily obtainable. Hence, guidelines are an essential supportive tool in these processes, which should rely on theoretical recommendations and experiences to avoid the most common project pitfalls.

5.2 Findings and discussions from paper II

The complexity of hospital projects is largely due to the multiplicity of stakeholders present. This makes collaboration in these projects a fundamental activity, and we assume that collaboration is key to strengthening front-end performance, thus paving the way for strategic successful projects. Paper II set out to explore collaboration in hospital projects' front-end, and to provide a framework for collaboration in this phase (Figure 5.2). Successful collaboration may positively affect project outcome and leads to innovation and learning,

which are important assets for hospital projects in identifying successful future solutions, hence strengthening the projects' odds of long-term success.

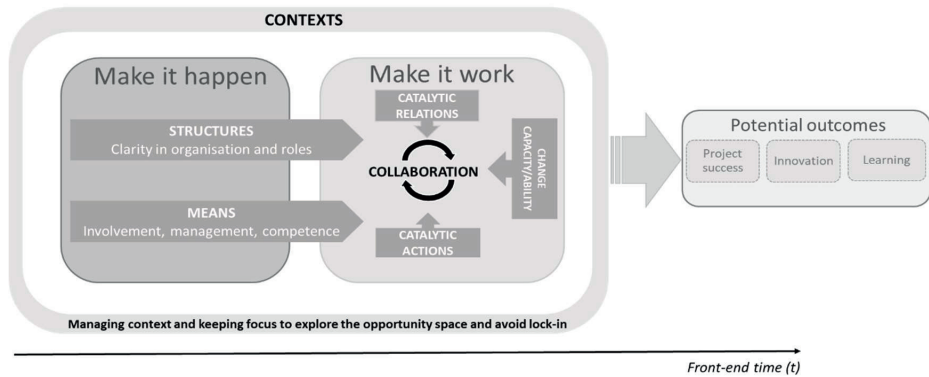


Figure 5.2 Framework for collaboration in hospital projects' front-end

Our analysis identified four main categories: *contexts*, *structures*, *means* and *catalysts*, describing collaboration in hospital projects' front-end. The categories do not constitute separate entities, but are interdependent and interact *making collaboration happen* and *making collaboration work*. The distinction between making collaboration happen and making collaboration work indicates that the different categories should be considered at different times during the front-end phase to facilitate collaboration. That is, what should be thought of when initiating the projects' front-end and what should be thought of and acted on after the initiation to further fuel collaboration in the front-end. This illustrates the processual nature of collaboration, accordingly we adopted the view of collaboration as an evolving process (Gray, 1985, Mintzberg *et al.*, 1996, Bedwell *et al.*, 2012). We believe that it is possible to engineer and prepare collaboration to a certain extent to help the project get off to a good start, and to maintain the pace further on.

To initiate collaboration, that is to make it happen, structures and means seem to play an important role, while for making collaboration work, catalytic actions and relations come more into play. Throughout the front-end phase, the

projects' external and internal contexts should be taken into account due to their considerable impact on collaboration.

5.3 Findings and discussions from paper III

Paper III reports on a study of project governance schemes in five state-owned enterprises (SOEs), emphasising external quality assurance, comparing them to each other and to the Norwegian State Project Model (SPM), in which SOEs' projects are not included. The last 20 years, trailing research has been performed on the SPM, while there is limited knowledge pertaining to governance performance end effects in the SOEs. External quality assurance (QA) is a fundamental part of the governance regimes, but little is known regarding the performance of QA in general and in SOEs in particular. The paper looks more closely into the description of the governance arrangements, their actors and roles and political aspect, and the arrangements' scope, cost and time efficiency. The results from the different SOEs are to a large extent jointly presented. In the following, some general findings are presented and specific findings relating to RHAs and hospitals are emphasised.

The different SOEs' governance arrangements have similar features and resemble the SPM by for example being based on stage-gate models performing external QA at selected decision gates. The RHAs perform the external QA of the business case in the same way as in the SPM, although somewhat later. The topics that are subject to QA in the RHAs' arrangements are agreement according to strategic plan, objectives hierarchy, feasibility studies as a function of the health authorities' financial capacity/sustainability, localisation and patient safety. Moreover, the QA is parallel for all investigated SOEs, unlike for the SPM, where QA happens at specific points.

Roles and actors vary between the SPM and the SOEs, as illustrated in Figure 5.3.

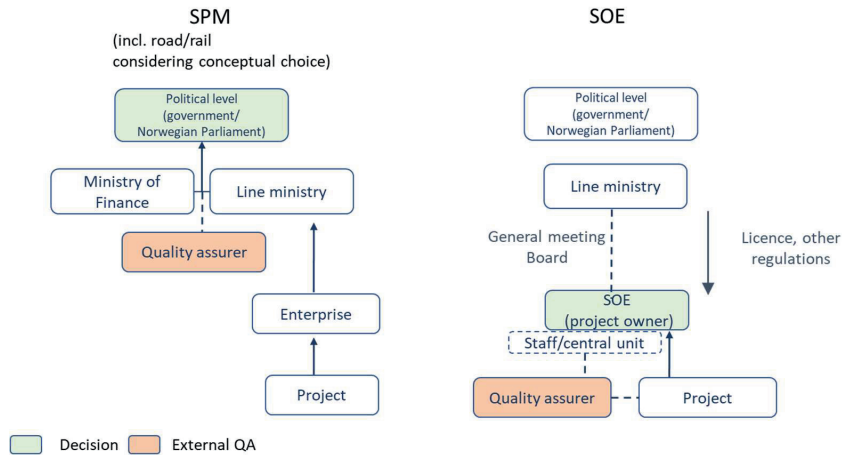


Figure 5.3 Organisation of actors in the SPM and SOE arrangements

The line ministries own the projects for the respective SOEs, as opposed to projects under the SPM, where project ownership should be considered as part of a hierarchy comprising the government, the line ministry and the agency (as discussed in Volden and Andersen (2018)). The SOEs initiate their own projects and necessary elaborations, and contract the external quality assessors. For the SOE projects, the quality assessors provide their recommendations to the SOE, which mainly serves as the decision-maker for the project's continuance. The line ministries may be involved in the processes either as shareholder or as licensing authority, lender or governor. However, in these projects, state ownership does not imply governing/controlling the individual projects. Investment decisions are generally not decided at the political level by the government or parliament. Line ministries' corporate governance is mainly practiced through the appointment of a board. The SOEs' arrangements contribute to a political distancing compared with the SPM. The line ministries' degree of involvement differs, thus affecting how political control is exerted. The political distance may make it easier for the projects to perform rational assessments regarding investment needs, life cycle costs, and profits in a long-term perspective. However, several respondents also held that the political

distance made it more difficult for the projects to include sufficient political and societal considerations. The SOEs' arrangements are primarily tools for supporting the boards and management in making the right decisions, and are not made for the purpose of serving the State's and wider society's interests.

Hospital projects differ from other SOEs' projects in that according to health legislation, the Ministry of Health and Care Services should make the decisions in projects that lead to considerable changes to health services (such as the closing down of hospitals).

As opposed to the SPM, the SOEs themselves are responsible for both producing the decision-making basis and for contracting its external QA. Responsibility for handling elaborations in an early phase varies among the SOEs, as does the establishment of a dedicated project organisation. For hospital projects, the relevant regional health authority serves as project owner, while the Norwegian Hospital Construction Agency is responsible for contracting the QA.

For the RHAs, contracting is taken care of through long-term framework agreements with between three and six companies or constellations of companies. The companies are contracted through competitive bidding, as opposed to the SPM, whereby quality assurers are contracted by aiming to attain a certain percentage distribution of the assignments seen over time. All SOEs are concerned with using limited time and resources on the QA process, thereby limiting the scope of the QA assignments, aiming to gain early access to the quality assurers' recommendations. The importance of keeping the assessed projects up to speed is emphasised, since project delays are regarded as a considerable disadvantage for financial and other reasons. For example, hospital projects have a high degree of user involvement, making it important for them to keep to the project timeline.

Both commissioning practice and performance of the QA process make the distance between the quality assurer and the SOE/project less than in the SPM. The closeness between the SOEs' projects and the external quality assurers may

make the exchange of professional advice easier, but at the same time challenges the impartiality, especially since the QA process is parallel. The parallel process may affect the quality assurers' role, making it more advisory, and the quality assurers risk assessing their own advice since they receive continuous versions of the decision documents. The expected contents of the QAs appear as more flexible in the SOEs' arrangements, and the specifications regarding what to include are experienced as more guiding than absolute, as opposed to the SPM's specifications. This makes it possible for the SOEs to assess the scope of the QA for each project, which then becomes subject to competitive bidding.

The respondents from the SOEs held that their arrangements were more efficient than the SPM, the scope was generally less ambitious, and the QA process was often parallel and generally more flexible. This, in turn, led to more efficient implementation of the investment projects. Using this as a backdrop, one could ask whether the SOEs' arrangements are too scarce or too narrow. The SOEs find their arrangements sufficiently thorough, and point to the external QA as part of an extensive QA system, which also includes internal assessments. Most enterprises/agencies have their own arrangements, but it could be argued that enterprises that have their own boards and that are financially responsible for a project portfolio may have stronger incentives for such arrangements. However, it should be emphasised that the case SOEs are still state-owned companies managing the State's assets, and thus efforts should be made to ensure the societal perspective.

Even if some differences are found among the SOEs' governance arrangements, some general recommendations can be made from the comparison to the SPM:

- *External QA should focus on concept elaboration and, in order to take on a holistic societal perspective, it should be performed early enough (in the projects' front-end phase).*

- *Care should be taken regarding which decisions are political in nature, and it should be ensured that decisions are anchored in the right (governmental) level.*
- *Sufficient resources for external QA should be provided.*
- *Capability/awareness of the need to balance external quality assurers' impartiality with the required and desired process efficiency is important when using parallel QA arrangements.*
- *Arenas should be established to promote mutual learning between the different arrangements through exchanging experiences and advice.*

5.4 Findings and discussions from paper IV

One way of keeping track of front-end phase performance would be to establish a performance measurement system monitoring the project status considering challenges or pitfalls that could potentially compromise the project outcome. At the project front-end, early warning signs (EWS) may serve as means for improving decision-making and project processes aiming for project success (Haji-Kazemi *et al.*, 2012b). Defined simply, EWS provide information on incipient or future issues that would affect the project (Williams *et al.*, 2012). Paper IV explores EWS in hospital projects' front-end. We had a preliminary idea that the handling of EWS in hospital projects' front-end are scarce, and started out by aiming to describe the status quo of EWS in hospital projects' front-end, and further to investigate which signals may serve as EWS for the front-end phase.

Sixty-two challenges were mentioned that could compromise front-end performance. The challenges mainly comprised vagueness or shortages in processes or relations. Interview analyses enabled a categorisation of EWS in hospital projects' front-end into '*Structures and tools*', '*Context and frame factors*', '*Management*' and '*Relational factors and properties*' (Table 5-1). The categories comprised several EWS, further investigated through a questionnaire distributed to 56 eligible respondents.

Table 5-1 EWS' categories

CATEGORY	EWS
STRUCTURE AND TOOLS	<ul style="list-style-type: none"> • Vague organisation • Cumbersome decision-lines • Vague role descriptions • Lack of role understanding • Disproportional power balance • Unbalanced authority and actions • Lack of strategies and plans • Lack of connection between strategic plans • Insufficient planning guidelines • Point of departure is vague/badly defined project • Lack of information flow • Communication is lacking or is ineffective • Assessments are not performed • Vague objectives • Disagreements/misunderstandings regarding numbers/project basis • Lack of documentation • Order of planning process not followed
CONTEXT AND FRAME FACTORS	<ul style="list-style-type: none"> • Outer/external context affecting the project • Organisational conflicts • Project's previous history • Localisation is undecided • Early lock-in of the project/concept • Vague/not adjusted financial boundaries
MANAGEMENT	<ul style="list-style-type: none"> • Project lacks anchoring in management • Management changes project support • Management shows vague ambitions for the project
RELATIONAL FACTORS AND PROPERTIES	<ul style="list-style-type: none"> • Lack of mutual understanding • Lack of involvement or involvement level is wrong • Lack of honest involvement/involvement is not real • Lack of openness • Lack of/insufficient/wrong competence • Lack of maturity • Not sufficient time for maturing • Lack of willingness/ability to allow discussions/disagreements • Lack of trust • Hidden motives • Vague concept/disagreement on concept • Optimism bias/overenthusiasm

The response rate was 45 per cent, comprising experienced respondents (more than half having over 11 years of experience). Ninety-two per cent of the

respondents perceived the EWS concept as very important. More than half of the respondents reported using EWS in current projects. Reasons for not using EWS were the perception of EWS as an unfamiliar concept or an unwillingness to admit or realise realities. Most respondents found detection of EWS minor to quite difficult, while the majority did not find it that hard *acting* on EWS. More than 60 % of the proposed EWS were rated '*Quite important*' or '*Very important*'. Approximately 17 % were rated '*Not experienced*'. The highest ranked EWS was the projects' external context, e.g. political impact. Several respondents held that constantly changing project environments exert huge challenges for project planning. Several of the highest ranked EWS show common features. Lack of clarity both in the business case and in the project organisation were considered unfortunate for project progress if not handled. Issues such as lack of trust and communication were also highly ranked. There were further no indications of differences in how project owners rated EWS to that of other project participants (p-value > 0.05).

To achieve strategic project success, it is important to possess the ability to raise crucial questions as early as possible in the project. At this time in a project, changes come at the lowest cost and there is still time to adjust, correct or even terminate a project. An important finding was that knowledge of detection and handling of EWS varies, thus raising consciousness by introducing a system for regular checks in the front-end phase would be a fortunate place to start.

6 OVERALL FINDINGS AND DISCUSSION

In the previous chapter, findings from the individual papers were presented and discussed. In the following chapter, the answers to the three central research questions (RQ_c) are provided based on contributions from the individual papers. These serve as the main findings of the thesis, and further provide a more holistic and deeper understanding of hospital projects' front-end phase and implications for its improvement.

A main purpose of this research was to elucidate the challenges in hospital front-end planning in order to suggest improvements. Challenges were identified both from literature reviews and through the empirical data obtained during the work with this thesis. The four papers report on studies that in different ways shed light on perceived challenges. The studies in papers II, III and IV result from the empirical foundation established in paper I, and from interactions with peers, practitioners and through PhD courses. A kaleidoscopic model has been used for describing the undertaken research. This model encompasses the identified challenges, and serves as an illustration of the multifaceted front-end phase of hospital projects, observing it through a PM lens. The rotation of the 'front-end kaleidoscope' represents the exploration of the research topic, which has made it possible to view some of the 'insides' (i.e. collaboration, governance and early warning signs) of the front-end from different angles. The different angles represent both a practical and theoretical viewpoint, which corresponds to the needed integration of perspectives to further approach and develop the field of project management. This has provided a possibility to look at how important front-end topics interact, constituting various perspectives in the current setting, which have further expanded and deepened the understanding of the front-end phase for hospital projects.

Viewing the papers as a whole, the identified challenges and topics constitute a scale from the project perspective to a system perspective, as illustrated in Figure 6.1.



Figure 6.1 The challenge-perspective scale

The scale should be perceived as floating, meaning that challenges emerging in one perspective might affect both outcomes within this perspective but also outcomes in other perspectives.

Projects have a polysemic nature (Ika and Bredillet, 2016), and a processual approach to projects is quite explicit in this research. Seeing projects as processes and not as fixed and instrumental entities seems appropriate in the complex and dynamic front-end phase. This also plays along with the suggestion by Ika and Bredillet (2016) to view the front-end as a process and in a constant state of becoming. Coping with such settings/environments requires other approaches than the mere instrumental and action-based, which makes further demands on PM in the front-end.

The different challenges constituting the challenge-perspective scale express a processual nature both in themselves and in their interactions. The challenges may be perceived as interacting sequences of the planning process that evolve

over time, similar to the description of processual approaches referred to in literature (Niederman *et al.*, 2018). As examples, paper II adopts a processual perspective when exploring collaboration in the front-end, emphasising the nuance between making collaboration happen and making collaboration work. In paper IV, EWS are investigated and treated as potential tools for learning and guidance, rather than pure control tools, echoing the need for processual approaches to accommodate the growing complexity and ‘plurality’ found in projects today (Pesämaa *et al.*, 2020).

The central research questions are answered below.

6.1 RQ_c1: Which prominent challenges can be found in Norwegian hospital projects’ front-end planning?

The first central research question aimed at providing an empirical foundation for hospital projects’ front-end for the purpose of further research, through identifying and investigating current practices and challenges in the planning process. The question was mainly addressed in paper I, where planning practices’ compliance with public guidelines were studied and, furthermore, if shortcomings could be identified considering recommendations for front-end planning from extant literature. Other answers to this question were also found through studying governance regimes (paper III) and by looking into early warning signs (paper IV), where in the latter case the interview respondents were asked to describe perceived challenges in front-end planning.

The contributions of the three papers at the ‘challenge-perspective’ scale are illustrated in Figure 6.2.

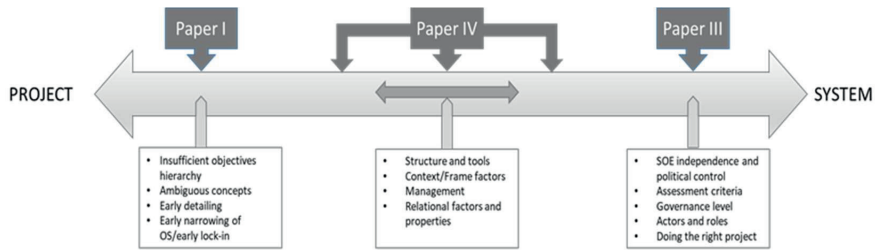


Figure 6.2 Contributions of papers on the challenge-perspective scale

Challenges were found both in a project perspective (what may be viewed as more technical and relational aspects connected to internal planning processes), and in a wider system perspective where the project is viewed as a part of a larger whole and where challenges are seen in the interactions between the project, its surroundings and its 'societal positioning'. Figure 6.2 also illustrates the scale's floating characteristic, where different challenges at one end of the scale may affect the outcomes at the other end. As an example, the more practical and technical challenges, like formulating the objectives' hierarchy, have implications for the system perspective and vice versa, e.g. narrow mandates from the owner may compromise the exploration of the OS.

6.1.1 A universal challenge: complexity and context

Hospital projects are complex at several levels, both in themselves and through their role in society, making the projects challenging to run. Contextual issues, such as turbulent or high-conflict planning environments, are also discovered challenges. The impact of context was pronounced in all studies, and is reflected as a 'universal' challenge, and as a separate 'category' that must be considered both when looking into collaboration and EWS in the front-end phase. This also corresponds to the evolution of PM, and to the permeability that is one of the characteristics of current project management.

Complexity and contextual aspects pose challenges both at a project and system level, consequently affecting both planning processes and the interactions between the project and its surroundings.

Project perspective

The inherent complexity in hospital projects may be one of the reasons for early detailing and a distinct need for something concrete. As an example, we saw that the hospital area in the studied projects was calculated very early in the process, but later had to be reduced on account of excessive costs. Thus, detailed planning at this point is difficult due to a high level of uncertainty and scarce supply of information (Samset, 2008, Samset and Christensen, 2017), and further underlines the front-end's main role, which should be to provide an appropriate project strategy (Samset, 2010). The need to concretise may, as one of the respondents pointed out, also stem from the fact that hospital employees have a tradition for being solution-oriented and practical; they are used to action and want things to happen, which might compromise the attitude and skills needed in the front-end phase such as creativity and coping with abstractness. Therefore, appropriate methods are regarded as a remedy for such shortcomings. The abstractness and strategic thinking are perceived partly as guesswork and of little value for project progression. One of the respondents actually referred to this type of approaches as science fiction, and viewed the meetings where this was on the agenda as nonsensical and pointless. The discipline experts involved in the planning processes, and who are essential in these processes, come straight from clinical operations and sometimes it appears to be hard to let go of day-to-day challenges, which further may affect the exploration of the opportunity space. The planning actors' personal preferences and interests together with organisational issues and practices are known to affect the choice of alternatives and are a reason for experiencing path dependency (Samset *et al.*, 2014).

Thus, PM approaches should be adapted to the current situation/settings. Different project manager skills are needed in the front-end than in the execution phase (Edkins *et al.*, 2013), and authors have emphasised the need for being able to improvise or exhibit adaptive skills in such complex situations (Snowden and Boone, 2007, Daniel and Daniel, 2018).

Making decisions when uncertainties are high is challenging and seems to generate a need for establishing a quantified basis for decision-making. When conflict levels are high as well, which unfortunately is rather common in hospital projects, it seems that a need for concrete tasks and demonstrated progression is emphasised. Consequently, quantifiable or measurable dimensions become the project focus and suppress the more beneficial approaches to front-end activities, such as creativity and imagination, which are necessary for developing sustainable concepts, further ensuring the achievement of strategic project success (Klakegg, 2010).

Managing to balance the multitude of stakeholders expressing divergent views on what the project they are working on actually *is* and should achieve when finished, and reach a mutual understanding, is vital to a successful planning process (Elf *et al.*, 2015). This entails that the project manager needs to create a mindset in the project team directed towards the important role of strategy and strategy-making in ensuring successful project outcomes. The high level of involvement of different stakeholders in Norwegian/Scandinavian hospital projects makes this a highly relevant challenge. Consequently, measures aiming to make the project a joint collaborative effort should be prioritised and carried out through a positive interaction between project managers, planners, practitioners and decision-makers (Aubry and Lavoie-Tremblay, 2018).

Some of the cases mention scenarios, testing levels of different parameters. However, this is not given much attention. Scenarios could be a way of establishing perspective, tuning different parameters and looking at corresponding outcomes.

The system perspective

In a system perspective, challenges are found that affect different parts of the project on a more superior level and that may have an impact on, or may compromise, the prospects of strategic project success.

Some general concerns regarding hospital projects' organisation within SOEs should be elucidated. The deviation from the general purpose of governance arrangements regarding providing political power to public projects might compromise strategic project success through the loss of societal perspective. Although the Ministry of Health and Care Services should be involved when making considerable changes to health authorities and hospitals, the transfer of responsibilities regarding societal needs from the political level should be carried out consciously. Moreover, political control should not be undermined, but secured through a suitable level of state governance in order to maintain the societal perspective.

Challenges connected to political perspectives are seen throughout the studies, and other studies also indicate that balancing concept elaboration and political decision-making is a well-known challenge that is yet to be solved (Klakegg *et al.*, 2016). Political impact might compromise the degrees of freedom needed for elaboration of viable concepts by contributing to early lock-in and preferences on specific conceptual solutions. Planning processes should not be short-circuited by e.g. an external constraints level that is too high. Thus, the need to examine the project in a more holistic manner, as shown in e.g. the OECD evaluation model, may strengthen the basis for strategic project success. Wide assessment criteria should be utilised to keep a holistic, societal perspective, as is the case for the SPM. Consequently, there are possibilities for learning from the SPM's procedures and experiences given that this regime has existed and been researched for over two decades. This could further contribute to a deeper understanding of the *concept* term and to harmonising the terminology. None of the projects performed such assessments systematically. This implies that a systematic and formalised way of assessing the projects is required, which is also shown in other studies (Smith *et al.*, 2003).

Harmonising the terminology was further seen as an important tool for countering complexity through facilitating proper communication. Multiple

stakeholders with different backgrounds and perspectives and on several levels in the project environment make this a challenge.

Hospital projects are often set in turbulent environments. A risk for compromising strategic success is seen when a mechanism for countering the turbulence is to make fast decisions, which may lead to compromising solutions where no one is fully satisfied. The need for making the state budget is also a reason for making quick judgements. However, long planning timelines also represent a challenge to identifying strategically sound solutions due to the rapidly changing hospital and healthcare service environment. This is also seen in other public sectors and is a characteristic of large and complex projects (Miller and Hobbs, 2005, Andersen *et al.*, 2007, Samset, 2008, Flyvbjerg, 2014, Klakegg *et al.*, 2016, Wisth and Hjelmbrække, 2018). Consequently, it is challenging to find the appropriate level of planning time, which might call for a discussion on this on a general level, and which, at a system level, points back to the need for clarifying planning process expectations and the need for appropriate guidelines.

In the following, prominent challenges connected to the project perspective are discussed. Compared to theoretical recommendations, the findings indicated that current planning practice has shortcomings, especially as pertaining to the *planning process, the exploration of the OS and the elaboration of concepts.*

6.1.2 Challenges in the project perspective: planning process

For the planning process, the challenges and shortcomings relating to formulating the objectives' hierarchy should be emphasised, as project strategy and alignment of objectives are a premise for project success (Klakegg, 2010, Williams *et al.*, 2019a). The ability to handle the relationship between project objectives and project development is crucial to project success and a well-known project strategy challenge (Morris, 2009).

The objectives found in this study were unrealistic and difficult to measure, which is consistent with feedback from external quality assurance,

representing a shortcoming according to theoretical recommendations. Challenges associated with definition of the objectives hierarchy are further reflected in general understanding (Smith *et al.*, 2003, Klakegg, 2006, Samset, 2010, Klakegg and Haavaldsen, 2011, Samset and Volden, 2016b, Linton *et al.*, 2019). The stakeholder multiplicity found in hospital projects pose a challenge to the objectives hierarchy due to political determinants, stakeholder heterogeneity and hospital organisations' inherent pluralism, leading to different perceptions of success (Denis *et al.*, 2011, Aubry *et al.*, 2014, Aubry and Lavoie-Tremblay, 2018, Fréchette *et al.*, 2020). This is consistent with descriptions of success being a compound measure (Shenhar, 2004, Klakegg, 2009, Samset, 2010). Moreover, divergent views on what a project really is are one of the main reasons for unsuccessful outcomes (Morris, 2013, Ika and Bredillet, 2016). It may also lead to escalating indecision (Denis *et al.*, 2011). This is partly reflected in the findings, where respondents point at compromising agreements, where decisions are made after long periods of time to fit the process and further demonstrate continuance, leaving the project based on fuzzy decisions for the purpose of pleasing everyone and stabilising the situation. Consequently, stakeholder handling in the front-end is important to provide the best possible point of departure for satisfying stakeholders' expectations and realisation of societal objectives. This is not well understood for the front-end (Aaltonen *et al.*, 2015), which is one of the emphasised research gaps in this thesis. Accordingly, paper II aims at exploring collaboration in the front-end and add to this knowledge. Paper II will be discussed in a later section. The abovementioned challenges also reflect that hospital projects go beyond being mere construction projects due to inherent organisational transformations following healthcare development and the societal impact relating to these projects (Aubry *et al.*, 2014, Aubry and Lavoie-Tremblay, 2018, Fréchette *et al.*, 2020).

6.1.3 Challenges in the project perspective: Opportunity Space (OS) and concept elaboration

Regarding the OS and concepts, the findings indicated that the hospital concept is ambiguous, that the OS is narrowed early, leading to early 'lock-in', and that the projects are detailed early despite large uncertainties and scant information - all aspects of 'problematic behaviour' as described by Flyvbjerg (2009). The concepts suggested were, to a wide extent, variations over the same solution themes, demonstrating the path dependency found in hospital projects (Samset *et al.*, 2014). Path dependency is also an aspect of problematic behaviour, and should be avoided to enable identifying the most viable concept that strengthens the odds of strategic success. Thus, information needed for elaboration of concepts should be carefully and deliberately selected both to avoid 'analysis-paralysis' and early lock-in (Flyvbjerg, 2014, Samset and Volden, 2016a). Path dependency is quite common in hospital projects, consequently it poses a challenge for the front-end phase, the reason for which should be investigated. One reason or explanation for the observed path dependency might be that it becomes a practical way out of a complex setting. Another question that should be asked in this regard is what constitutes a concept in hospital projects. Considering that the term *concept* is ambiguous makes answering this question a challenge, and the process of concept elaboration becomes fuzzy and probably makes it convenient to act as before and make similar, if not identical, choices. Another reason for narrow interpretations of the concepts may stem from limited mandates from the project owner. Thus, there should be a discussion on what constitutes a hospital concept, although it is known from experience within the SPM that the *concept* term is generally demanding, and has been a subject of discussion for years. General discussions on defining the term *concept* are probably best suited at a superior level, but efforts should be made to communicate this into the planning process, for example through guidelines and/or education and knowledge sharing. The change in the project model (ref. section 3.2), where the idea phase is omitted, also affects the degrees of freedom in the front-end phase, making it

more instrumental in the sense of scoping and the step-wise concept phase. This might constitute a necessary move, especially considering the endless discussions and disagreements regarding localisation choices, which for the current version of the guidelines are expected to be made before entering the concept phase. However, this change in project model most likely puts added emphasis on the role of the strategic plan, and measures should be taken to ensure continuity between the strategic plan and the front-end phase, e.g. by better integration of the current guidelines. The guidelines appear to be very important according to the findings from paper I, where it is shown that the studied projects conscientiously follow the guidelines even if they are said to be advisory. Consequently, one ought to strive to ensure and maintain the quality of the guidelines, where efforts should be made to align them with theoretical recommendations and provide systems for continuous improvement.

The degrees of freedom inherent in concept elaborations should be taken fully into consideration when performing front-end planning. They can be further explored by gaining more knowledge and by suitable use of existing methods for early project appraisals and the inclusion of this into proper evaluation systems or models. This, however, is a deficiency in the hospital planning processes, further underlining the claim of Samset and Dowdeswell (2009, p. 78) that ‘... *the insight and visions to guide strategic planning are at hand, but they are still not well translated into viable conceptual solutions*’.

6.2 RQ_c2: Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects’ front-end?

As mentioned on several occasions earlier in this thesis, some topics stood out as especially interesting for understanding and coping with front-end planning. These constituted *collaboration*, *governance* and *early warning signs*, which are discussed in papers II, III and IV, respectively. This triplet of topics is not by any means exhaustive of the challenges found in hospital projects’ front-end, but during the different approaches selected for establishing a deeper understanding of the current context, these topics emerged from different

sources as important for the front-end in themselves, but also through their interactions. Thus, in the kaleidoscope model these topics are illustrated by separate mirrors reflecting each other and depicting patterns and images through their interactions.

6.2.1 The role of collaboration in the front-end

One of the factors that contribute to hospital projects' inherent complexity is the multiplicity of stakeholders found in these projects, also known to be a challenge in major projects in general (Engwall, 2003, Cicmil and Marshall, 2005, Cooke-Davies, 2009, Dietrich *et al.*, 2010, Eskerod *et al.*, 2015, Flyvbjerg, 2017, Lenfle and Loch, 2017, Merschbrock *et al.*, 2018). As mentioned in section 6.1.2, stakeholder handling stood out as a pronounced topic for managing the front-end phase, and it is furthermore one of the informal mechanisms that should be understood in order to cope with project complexity (Cicmil and Marshall, 2005, Bygballe, 2010, Bygballe and Swärd, 2019). However, despite the crucial role of collaboration in achieving successful project outcomes, stakeholder handling in projects' front-end phase is not well understood (Baccarini, 1999, Tzortzopoulos *et al.*, 2006, Edkins *et al.*, 2013, Aaltonen *et al.*, 2015, Williams *et al.*, 2019a).

The findings in this thesis support the view of collaboration as an evolving process, as stated by Bedwell *et al.* (2012). It was found that collaboration could be described by means of four interdependent categories: *structures*, *means*, *catalysts* and *context*. The processual nature is reflected in that the categories should be considered at different times during the front-end in order to facilitate collaboration. This is further described in terms of the nuance between *making collaboration happen* and *making collaboration work*.

On the challenge-perspective scale introduced in this thesis, collaboration is an activity that mainly belongs to the project perspective (Figure 6.3 shows the positioning of paper II on this scale).

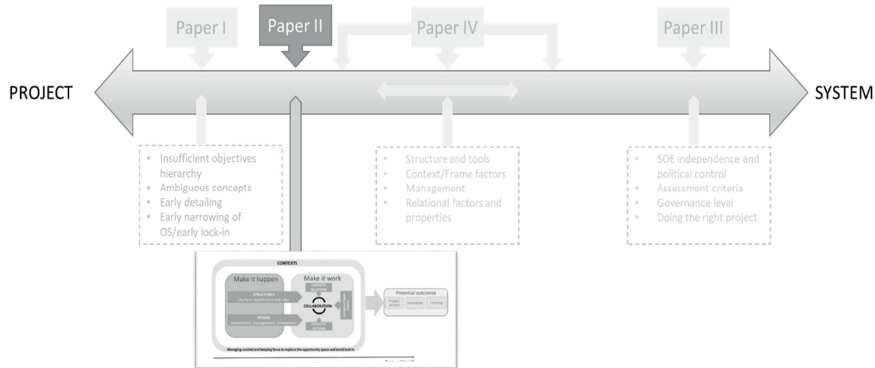


Figure 6.3 Positioning paper II on the challenge-perspective scale

The context, however, has an impact on both the initiation and maintenance of collaboration, and collaboration may look different due to contextual changes (Bedwell *et al.*, 2012). Consequently, a project's context should be thoroughly analysed and considered throughout the front-end phase, which is a part of creating a project perspective (Williams *et al.*, 2019a). In the system perspective, this means that the planning processes must take hospitals' political implications and impact into account. The multiple preferences and meanings of multiple stakeholders might compromise the implementation of projects, e.g. by forcing decision-makers to start new assessments or reverse decisions, which can render the project indecisive (Denis *et al.*, 2011). However, such indecision might also result from external demands, i.e. political actions or compromises leading to change of mandate, as we learned from one of our studied cases. Indecision is unfortunate since it has the potential to alter the project focus for instance by stalling the project and making it more expensive, thus presenting a risk of failing to identify suitable long-term solutions, compromising the intention of the front-end (Williams *et al.*, 2019a).

It should also be noted that insufficient performance of collaboration in a project perspective might negatively affect the system perspective in several ways. It is important to be aware of such 'widened' consequences, and, if

possible, measures should be taken to avoid this. As an example, the need for structures to make collaboration happen has a potential for narrowing the OS by challenging the level of abstraction that is needed in this part of the project, which in turn may compromise the project's strategic success.

Some strategies for coping with the inherent multiplicity of stakeholders with divergent perspectives are beneficial. The ambiguity and vagueness sometimes experienced in the planning and decision-making processes might be a way of accommodating the differences and making stakeholders stay in the processes to enable further discussions and process maturity. Some authors (e.g., Denis *et al.*, 2011, Smith and Lewis, 2011, van Marrewijk *et al.*, 2016) also point at exploiting the tensions that come from the diversities to the benefit of the project by strengthening the project's change capability and thus nurture collaboration. Cicmil and Marshall (2005) also held that open management strategies, where tensions are viewed as continually rearranging issues in the project, might be beneficial. Flexibility and dynamic capabilities are important in coping with the front-end's inherent complexity, both to avoid compromising the exploration of the opportunity space and for utilising the multidisciplinary nature of the projects in order to establish the broad focus needed to fulfil the goals of the front-end. Appropriate *competence, involvement* and *management* are means of accommodating this and for making collaboration happen, referring to the conceptual framework for collaboration suggested in this thesis.

When it comes to PM skills in these settings, these differ from the execution phase, or at least they need to be accentuated differently. People orientation and coping with social dynamics should be emphasised (Cicmil *et al.*, 2006, Pauget and Wald, 2013, Turner *et al.*, 2013, Aubry *et al.*, 2014, Bygballe *et al.*, 2016, Matinheikki *et al.*, 2016, Merschbrock *et al.*, 2018). The project manager should aim at balancing different views while at the same time avoiding delays of decisions and stalling the project, being aware of the risk related to postponements and thinking that agreements will come downstream (Bygballe,

2010). Another dimension of this was that in the studied setting, project managers often experienced that their role was more of a supportive one, acting as a facilitator and interpreter and bridging gaps between the collaborative parties. This is similar to the relational competences described by Pauget and Wald (2013) and the alternative view of PM skills described by Cicmil *et al.* (2006).

As previously mentioned, user involvement is an important means of collaboration, especially for making it happen. The respondents were unanimous in this; however, the level of user involvement was a topic for discussion. User involvement was seen as crucial to successful project outcomes by creating ownership and continuity, for building project culture and for specifying demands, which is in line with literature (Henriksen *et al.*, 2006, Tzortzopoulos *et al.*, 2006, Bygballe, 2010, Olsson *et al.*, 2010, Pemsel *et al.*, 2010, Zou *et al.*, 2014, Elf *et al.*, 2015). In a Scandinavian context, a strong tradition for user involvement is present as part of a democratic culture (Olsson, 2008, Eriksson *et al.*, 2015, Strand and Freeman, 2015), consequently many people are involved in these processes. Although acknowledging its importance, some concerns were raised due to the level of (multiple) expectations that is generated from this multitude of people. Hence, the risk of false expectations should be taken into account when involving a large amount of people with different perspectives (Daniel and Daniel, 2018), and finding the optimal level of planning should be reflected upon (Serrador and Turner, 2015). Other discussions or challenges originated from different levels of maturity regarding the planning process among the project participants, in this setting between the representatives from the hospital and the representatives from the NHCA. This poses a genuine challenge since, according to the Norwegian planning regime, there is a demand to include the NHCA as a part of projects exceeding NOK 500 million, making collaboration between the NHCA and users obligatory in most projects. The differences between the planning actors pose a dilemma for the projects, in balancing enough time for the needed maturity

and creation of ownership with the need for keeping the timeline and reaching the state budget.

Another dilemma that was found, was the dual role experienced by some of the hospital employees involved. They were both seen as knowledge-providing experts pointing out the hospital's future direction, but also as appointed organisational representatives participating in the planning processes and thus contributing to the justification of the decisions made (Olsson *et al.*, 2010). This was perceived as a challenge, since the hospital representatives feared becoming hostages to the decisions being made, due to lack of empowerment and process maturity, something also found by Henriksen *et al.* (2006), and Olsson *et al.* (2010). To accommodate this challenge, clarity in organisation and roles is important. Structures would help position the project in the parent organisation, and the parent organisation's management should further be clear about its ambitions and intentions with the project to achieve a successful planning process (Elf *et al.*, 2015, Winch and Cha, 2020). In general, clarity further contributes to mutual understanding, an important issue for making collaboration happen and getting the project going, and further serves as a way of balancing a project's goals and limitations in order to avoid or ease disappointments and lack of motivation among stakeholders caused by unrealistic expectations. Clarity is also linked to trust, which is a crucial factor for collaboration, expressed both by our respondents and found in general literature (van Eyk and Baum, 2002, Dietrich *et al.*, 2010, Nevstad *et al.*, 2018, Bygballe and Swärd, 2019, Haaskjold *et al.*, 2019). In the conceptual framework for collaboration in hospital projects' front-end presented in paper II, trust serves as a catalyst for making collaboration work. This is an illustration of the processual nature of collaboration, where structures and clarity initiate collaboration and contribute to the generation of trust, which further promotes collaboration work in the planning process. Lack of clarity, on the other hand, reduces levels of trust.

Therefore, structures and clarity are important topics in initiating and maintaining collaboration. However, the need for structure can also pose a risk to planning if it is exaggerated at the expense of the needed flexibility prominent in these processes. The need for structure in many ways reflects the stakeholders' competence, harnessing project complexity with familiar tools, which in this case mostly relate to those found in classical project management in an execution point of view. This is manifested by hospital employees' expressed need for concretising early on in terms of calculations and drawings, thus challenging the front-end's level of abstraction, which may be unfortunate for keeping the opportunity space open for as long as possible. The front-end presents a terminology and requires a mindset and set of skills considerably different from the hospital core business, unfamiliar to several of the stakeholders. The respondents pointed at the lack of required competence for front-end intentions and activities, and considered it as challenging to relate to the front-end's need for abstractness in seeking future solutions.

Challenging the required level of abstraction in these processes by turning to instrumental tools which are known/familiar but not necessarily appropriate for the front-end phase, may compromise the project's strategic success. Turning to the challenge-perspective scale, this is an example of the project affecting the system in an unfortunate way, which should be countered for.

6.2.2 Aiming for project success: the role of (appropriate) governance

To find the appropriate level of governance and quality assurance is a general challenge, but nevertheless seen as important in creating predictability and thus improve decision-making, which may positively affect project performance.

Governance is regarded as pivotal in a project's front-end (Williams *et al.*, 2019a), where decision-making links governance and improved project performance (Turner, 2020b, a). In a project-system perspective, governance serves as a tool that 'positions' or 'anchors' the project in the system perspective and provides systems, processes and regulations to ensure project success.

The governance scheme for hospital projects should ensure sufficient quality-at-entry and strive for 'doing the right' project, i.e. aiming for strategic successful projects (Williams and Samset, 2010). Compared to the SPM, both the interpretation of the OS and of the *concept* term is narrower in hospital projects, which could compromise a project's strategic success. Findings showed that concepts assessed in hospital projects all involved new buildings, comprising variations of alternative dimensions and localisations, or both. As in other SOEs, the focus of the assessments was on whether the preferred solution was well documented, rather than exploring actually different concepts. Consequently, it can be claimed that the conceptual choice, as defined in the SPM, is made in advance. Again, there are signs that the *concept* term in hospital projects needs further clarification, a topic that has emerged from different sources during this research. This discussion should be broad, encompassing both the project and system perspective, since reasons for narrowing of the OS are diverse. For example, both lack of skills or unfamiliar terms and ways of working in the front-end planning process and narrow mandates from the decision-makers are factors contributing to narrowing of the OS. Experiences from other sectors and other regimes would be of value, and might pave the way for mutual learning between different sectors.

The political distancing prominent in SOEs' governance regimes contrasts the general purpose of governance arrangements as a way of providing central political power to the decisions on major public projects and anchoring the projects at the central level (Christensen, 2011). Deviating from the general purpose might compromise legitimacy and accountability by undermining central control and might further compromise strategic project success by losing sight of the bigger societal picture. There is no tradition for governing individual projects in Norway, except for the RHAs, where the Ministry of Health and Care Services should make the decisions upon suggestions leading to considerable changes to healthcare services. Due to political complexities associated with these situations, it is regarded as a challenge for the health

authorities to let go of their governing rights, illustrating how uncertainty and the level of conflict may influence the delegation of authority (Huber and Shipan, 2013). Thus, for hospital projects, the government has a way of exercising political power even if the SOEs in general operate at an arm's length to politics.

Potential variations in the content of QA due to scope flexibility might challenge the governance arrangements' legitimacy and accountability when the analytical basis is affected by increasing unpredictability and reduced transparency. Furthermore, flexibility is considered crucial (Müller *et al.*, 2014, Volden and Andersen, 2018), indicating that finding a proper balance between demands and possible adaptations is important.

Administration of the governance schemes is done by the SOEs themselves as opposed to the SPM, where this is performed at the ministry level. For hospital projects, the relevant RHA serves as project owner, while the NHCA is responsible for contracting the QA. This might become a challenge, since the agency is used as project managers or advisors in hospital projects exceeding NOK 500 million, and is thus at the risk of contracting QA of its own work.

For all studied SOEs, the importance of an effective performance of the QA process is pointed out. For hospital projects, the extensive level of user involvement is one of the reasons for wanting to keep the project timeline; also, project delays are in general associated with financial disadvantages. Compared to the SPM, the QA process in SOEs has a limited scope and it is important for the SOEs to gain insight into the quality assurers' recommendations as early as possible. Consequently, the reports and elaborations presented by the SOEs should be of an initial good quality, making demands on the skills of those who perform these elaborations and on the quality of the tools they have at hand for performing the planning, e.g. the guidelines. Moreover, the need for efficiency should not prevent the quality assurers from doing a good job, seeing that a superficial quality assurance report might cause the decision-makers to make their decisions on the basis of false premises. The limited room for making

independent analyses due to the narrow time frames and need for progression, e.g. due to the need for being included in the state budget for the current year, might compromise the quality of advice or recommendations provided by the quality assurers. The overall decision basis should be assessed as a whole to evaluate if it is sufficient for making decisions.

Other pronounced differences between the SOEs' arrangement and the SPM, are found both in commissioning practices and in performance of the QA process. The SOEs mainly perform parallel assessments with a continuous dialogue and interaction between the quality assurers and the project. The quality assurers receive continuous versions of the decision documents and take on an advisory role in the process, which is perceived as valuable among the respondents since it is efficient and eases the exchange of professional advice. The closeness may also contribute to the advice and recommendations of the quality assurers being accepted, which was sometimes deliberate and seen as necessary due to the high degree of insufficiencies in the assessed reports, where the quality assurers' advisory role became explicit in having to tell the projects what to do.

Working together and drawing on the different actors' experience and competence potentially creates a sound culture for decision-making as part of project governance, which in turn might be beneficial for project performance (Turner, 2020b). Knowledge sharing may improve the internal quality of work and facilitate the learning and knowledge exchange process between different entities (Nesheim and Hunskaar, 2015, Hussein, 2020). However, the closeness between the project and the quality assurers may compromise the impartiality that should be prominent in these processes, for example by the quality assurers risking having to assess their own advice due to the continuous deliverance of (revised) reports.

Transferring responsibilities for decisions regarding societal needs from the political level to SOEs with limited sectoral objectives should be carried out consciously. Efforts aimed at ensuring the societal dimension in the projects should be taken, seeing that the SOEs and their projects are managing the

State's assets. The societal perspective should be given prominence by securing political control through a suitable level of state governance.

Choosing the right concept is vital for strategical project success, hence SOEs' elaboration of concepts should adopt a holistic societal perspective by exploring the opportunity space sufficiently (Klakegg and Haavaldsen, 2011, Samset and Christensen, 2017). The choice of concept in hospital projects should be made on the basis of a more holistic societal perspective and the Government should be given a formal role in approving the projects. This corresponds to the general critique against New Public Management regarding the decentralisation of power in matters important to society (e.g. Christensen (2009, 2011)). Broad assessment criteria should be used when assessing projects belonging to SOEs in order to fully exploit the OS, thus the governance arrangements in these enterprises could benefit from the experiences gained with the SPM. Two of the studied SOEs presented a slightly different governance regime, where the conceptual decisions were made at the central level, delegating authority to the SOE afterwards. This might be beneficial, considering the level of uncertainty and potentially high levels of conflict that can occur in the earliest project phases (Huber and Shipan, 2013).

6.2.3 Ways to be 'precautionary': assessing Early Warning Signs (EWS)

Throughout this research, efforts have been made to identify and provide insights into current challenges in the front-end planning processes in order to improve front-end performance on the road to successful projects. When looking at possibilities for keeping track of front-end performance, considering and evaluating challenges through performance measurement systems could be a remedy for strengthening the odds of success. EWS are a means for being precautionary in the front-end and may support and improve decision-making and project processes (Haji-Kazemi *et al.*, 2012b).

According to our respondents, the EWS approach is perceived as a useful means for improving and supporting the front-end planning process. However, a clarification seems necessary due to the seemingly extensive use of EWS,

whereas a common understanding appears to be lacking. Thus, the terminology and concept should be discussed. In many ways, this constitutes part of the need for developing consciousness of this term and approach. It is claimed that approaches and exercises aimed at identifying EWS are actually more useful than the actual indicators, which is in line with literature (Spjelkavik *et al.*, 2008, Williams *et al.*, 2012).

However, in the respondents' view, the detection of EWS is seen as difficult, as stated also in literature (Williams *et al.*, 2012). Establishing regular activities in a project aimed at identifying EWS may remedy these difficulties following processual approaches in order to provide sufficient flexibility to cope with the projects' inherent complexity (Cicmil and Marshall, 2005, Snowden and Boone, 2007, Brunet and Aubry, 2016, Daniel and Daniel, 2018). This emphasises the role of performance measurement systems in becoming more of a tool for learning, guidance and decision-making, rather than being pure control systems (Spjelkavik *et al.*, 2008, Pesämaa *et al.*, 2020).

The formal assessments connected to hospital projects' front-end are tools for finding the hard EWS. Nevertheless, this is not sufficient for detecting soft issues, which are particularly important in complex projects. 'Gut-feeling' approaches are suitable in identifying soft issues. However, in the current context, this might become challenging due to the inherent complexity found in hospital projects' front-end phase, which seems to generate a strong need for formalities to actually cope with this complexity. Emphasising the formal approaches too much, however, may lead to conservatism and path dependency, which may compromise the front-end intention and elaboration of concepts that should ensure strategic project success. This also underlines the need for flexibility and processual approaches in the front-end phase in general.

Our findings were consistent with other findings (Nikander and Eloranta, 2001, Kappelman *et al.*, 2006, Klakegg *et al.*, 2010, Williams *et al.*, 2012, Abotaleb *et al.*, 2019, Adebisi *et al.*, 2020) and showed that the EWS comprise both hard and

soft issues. Four categories of EWS were established: *Structure and tools*, *Context and frame factors*, *Management* and *Relational factors and properties*.

The EWS that was perceived as most important was the external context, pointing at the importance of looking at the projects as part of a larger whole. In the current context of hospital projects, political forces are a strong premise provider. The impact of the external environment aligns with Ansoff's (1975) views regarding where the project gets its information. This could also have a reverse effect, since the hospital projects' multitude of stakeholders, who often have divergent views on the projects' objectives and goals, also affect the political processes. The role of the context poses requirements to the project manager, who should adapt to this context in order to provide sufficient management (Williams *et al.*, 2012). The multitude of stakeholders also challenges the ability to reach a common level of project maturity needed for progression of the project and for creating a common understanding of the objective(s) in order to align the project to the parent organisation's strategy, one of the most important missions of the front-end (Williams *et al.*, 2019a). These issues can compromise the projects' strategic success if not countered. The lack of mutual understanding is considered a relational EWS in the undertaken study, however this EWS also demonstrated clear connections to the expressed need for organisational clarity, i.e. structure and reducing vagueness relating to roles and decision lines, for instance. The decision-makers' ability to provide clear structures and a clear point of departure for the project will strengthen the projects' ability to create mutual understanding; these were also among the highest ranked EWS. These issues should be part of the management's portfolio. However, the EWS in the *Management* category were not highly ranked, which was a bit surprising. The topics that were gathered from the interviews in this category comprised anchoring the project to the management, changes in project support and vague project ambitions. This might reflect varying degrees of management involvement and organisational models in the Norwegian context. It may also indicate that

relational issues inside the project team, such as establishing mutual understanding, seem more important than pure management performance.

An overall impression when investigating the role of EWS in hospital projects' front-end is that this is viewed as a useful approach to improve front-end planning. However, some clarifications and discussions are required. It should be noted that there are challenges related to finding a universal list of EWS or optimal EWS (Blakegg *et al.*, 2016). Nevertheless, given our limited context in this study and the context dependency of EWS (Williams *et al.*, 2012, Blakegg and Krane, 2015), the established systematisation may serve as a valuable starting point in raising consciousness about this topic by initially acknowledging its role in the front-end.

6.3 RQ_c3: How can Norwegian hospital projects' front-end be improved? Accommodating the challenge-perspective scale

In this research, hospital projects' front-end is studied from different angles. The multiple perspectives have enabled approaching this complex topic as viewing it through a kaleidoscope, where the different topics provide different patterns that eventually enrich our understanding. This provided a challenge-perspective scale, which is helpful for targeting improvement efforts for the front-end phase of hospital projects.

Overall, the four papers provide results from different parts of the hospital projects' front-end planning process. Hospital projects have large societal impact and create broad societal engagement, thus a hospital project has to be considered in its context and not as a closed entity. This also affects improvement initiatives, where it becomes necessary to have both a project and a system perspective on improvement, knowing that this might include issues stretching beyond the individual project or the project's power to decide. It is also believed that an overall improvement/sum of improvement efforts will be larger than the single improvement effort, seeing that the different topics studied interact and affect each other.

In general, more knowledge of the front-end planning process is needed, and investigating potential pitfalls and challenges may mitigate unfortunate outcomes. In the researched setting, harnessing what could be harnessed is useful in coping with the inherent complexity and plurality. However, caution should be exerted so as not to focus solely on these aspects, but rather through the processes establish maturity and experience in order to handle all aspects of the front-end.

6.3.1 Systems improvement - coping with complexity and pluralism

Throughout this research, an attempt has been made to view projects as part of a larger whole, i.e. as components of a system. This corresponds to a change in philosophy as described by Konstantinou and Müller (2016), where a project is no longer viewed as a standalone entity. In this system, governance serves as the interface between the project and its context.

The governance arrangements contribute to the creation of predictability, which in turn could improve decision-making environments and thereby project performance (Turner, 2020b, a). Creation of predictability would also be a remedy for coping with the inherent complexity that is found in hospital projects' front-end. Ensuring strategical success in hospital projects requires the projects to adopt a societal perspective and provide sustainable solutions. This implies that the projects should be assessed using broad criteria that encompass the projects' societal position and thus reflect the inherent complexity within and around these projects. Here, there are possibilities to learn from the experiences of other sectors, making the establishment of common arenas for knowledge sharing appropriate. This would also emphasise the need for harmonising the terminology between sectors and projects. Building consciousness and understanding regarding the meaning and development of concepts and exploration of the opportunity space as important front-end activities to ensure strategic project success (that is, 'doing the right project'), should also be part of the systems' improvement efforts.

On a more practical level, further insight into governance arrangements will help identify the 'right' level of external quality assurance and balance this with internal arrangements. Furthermore, it enables assessing which topics should be emphasised in the quality assurance reports, how the governance arrangements should be organised, and how the quality assurers' role should be balanced in favour of acting as advisers.

Due to the important role of the guidelines, efforts should be made to ensure that they are knowledge based, and that they are continually evaluated and improved according to state-of-the-art knowledge. It is also important to ensure that the different guidelines affecting the front-end planning process adhere to each other, especially the guidelines for the strategic plan (which serves as the basis for the front-end) and the guidelines for the front-end.

The value of evaluations for learning and development should also be emphasised. This is also a requirement posed by the authorities, and the NHCA has started to perform evaluations in the sector. The results of these evaluations are important means for improvement and should thus be a source of further development for the whole hospital project community.

6.3.2 Project improvement - tools, methods and mindset

In a project perspective, proper front-end tools should be present. These should be particularly adapted to facilitating the exploration of the opportunity space and development of concepts, given the role of these issues in contributing to a project's strategic success. In a project manager's perspective, the need for coping with the soft/relational issues is important. The characteristics of the front-end imply that we must move away from a traditional and instrumental approach. The multiplicity of stakeholders and inherent tensions are challenges that have to be addressed, and focussing on collaboration is inevitable. The level of involvement of different groups in these processes should be discussed on a system level, but the practicalities connected to the 'merging' of stakeholders would be performed in a project perspective. Thus, dialogue is key in these processes to provide for mutual understanding of the project and its goals and

to ensure that all parties work jointly towards these goals. Furthermore, treating collaboration as a process, as something that has to be initiated and then maintained, will be beneficial in finding the right tools at the right time and ease the challenges pertaining to the multiplicity of stakeholders and diverse views. Successful collaboration in a project strengthens the odds of project success, may lead to innovation, and has a valuable learning potential.

Another coping strategy for collaboration in these complex settings is to make use of tensions and treat these as an asset for the projects. Different views may lead to innovative results and can drive collaboration forward. This, however, requires that project managers possess sufficient knowledge, which on a system level should be provided through established fora for education.

Early warning signs also seem to have a potential for facilitating the front-end phase. Approaches and exercises aimed at identifying these signals should be performed on a regular basis, and is said to be a value in itself for the project. This could be part of a formal assessment, even though formal assessments mainly uncover the hard issues and not the soft issues that are key to front-end performance. However, the formal assessments provide an external view, that of the quality assurers, and thus provide other perspectives in order to ensure successful projects (Williams *et al.*, 2012, Flyvbjerg, 2013). Regarding the soft issues, a start would be to acknowledge their importance and use existing knowledge to provide a point of departure for detecting them.

Thus, the project manager in the front-end phase should possess a different set of skills than in the traditional execution point of view, or at least accentuate her/his skills differently. A front-end toolbox would probably be of value, where the content should be tools and methods for coping with the front-end together with approaches for establishing an appropriate 'front-end mindset', i.e. maintaining a processual and dynamic view that rests on relational aspects.

Furthermore, to be able to manage the front-end phase, there has to be some sort of alignment with project practitioners to ensure that all are on the same

page, reaching for a common goal and using the same terminology, by means of methods considered to be useful and meaningful. This implies that further approaches for developing and improving front-end planning should interact with practitioners' reflections, i.e. realising the value of the reflective practitioner. This is also one of several implications stemming from the evolution of PM (Walker and Lloyd-Walker, 2016). One way of enabling this, is to develop or strengthen existing arenas suitable for knowledge sharing, where researchers, practitioners and decision-makers can meet and discuss. Facilitating knowledge sharing through suitable arenas to provide for improved performance is connected to the management's role (Söderlund, 2002, Hussein, 2020), and is thus part of the governance regime.

Figure 6.4 illustrates ways of improving the front-end phase in hospital projects based on the current research. The figure shows that based on exploration of the front-end phase and its prominent challenges, a challenge-perspective scale can be provided, and improvement areas and improvement suggestions are described.

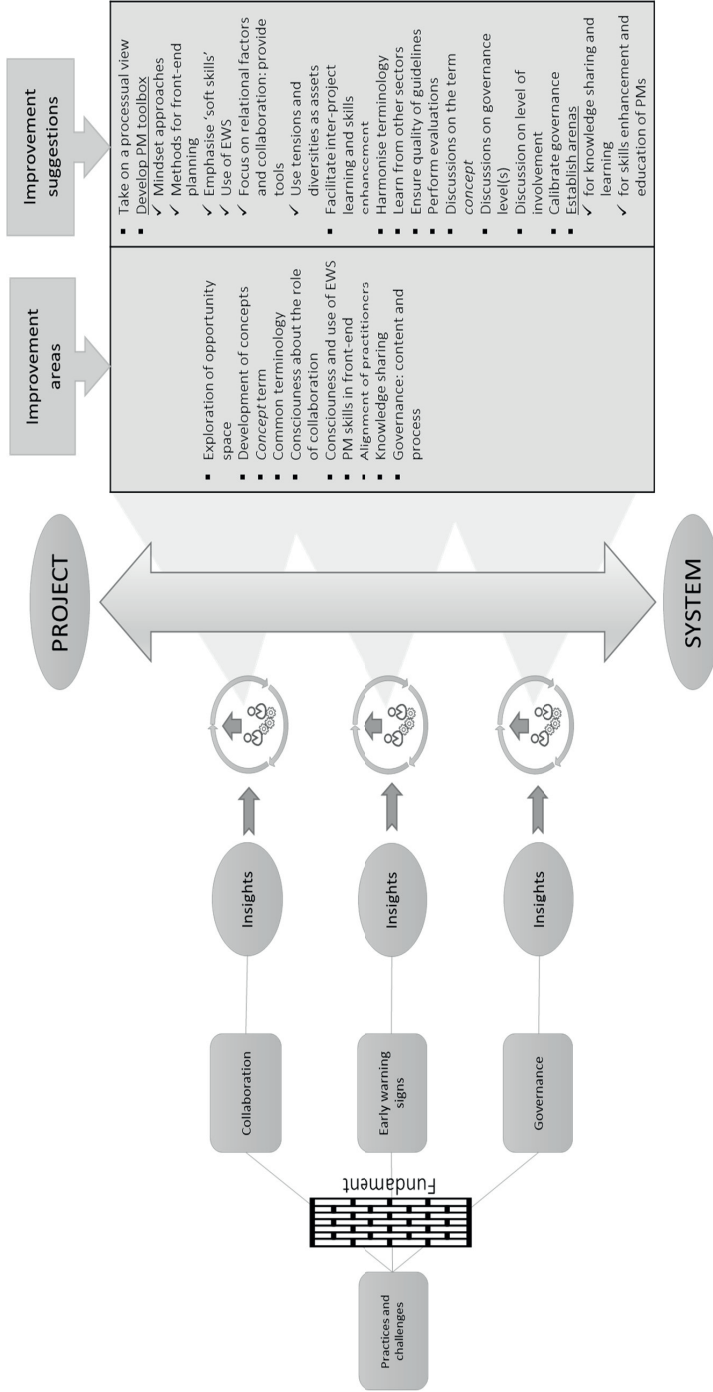


Figure 6.4 Summary of improvement approaches in hospital front-end planning

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7 CONCLUSION

This chapter presents the conclusions of the undertaken research and the theoretical and practical contributions provided by this thesis. Finally, the overall contributions to the identified research gaps are described together with some reflections and propositions on further work.

7.1 Answering the central research questions

The overall purpose of this thesis was to establish a deeper understanding and insight into the front-end phase of Norwegian hospital projects by exploring the planning process, in order to provide more knowledge and suggestions on how to improve the planning processes and thus strengthen the odds of successful projects. An iterative and exploratory research process made it possible to exploit the projects' inherent multiplicity and investigate emerging topics important for front-end performance through a kaleidoscope model. This model allowed for studying the interactions of emerging topics and the resulting perspectives in order to expand and strengthen our understanding.

Mapping the challenges pertaining to the front-end is a valuable point of departure for initialising improvement. Thus the first central research question was to explore which prominent challenges could be found in the front-end of Norwegian hospital projects. The next phase of this research was to explore these challenges further, identifying three topics that were perceived as especially important for front-end performance: *collaboration*, *governance* and *early warning signs*. These topics were further investigated. Based on the obtained insights, the iterative research approach then provided the opportunity to explore areas and present suggestions for improvement. The work in this thesis was guided by the three following central research questions:

- **RQ_{c1}**: *Which prominent challenges can be found in Norwegian hospital projects' front-end planning?*

- *RQ_{c2}: Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects' front-end?*
- *RQ_{c3}: How can Norwegian hospital projects' front-end phase be improved?*

The undertaken research has shown that hospital projects' front-end phase presents multiple challenges, which can be viewed along a challenge-perspective scale, i.e. from a project to a system perspective. This implies that the detected challenges could be specific to the system the project is part of or to the project itself. However, the scale should not be perceived as fixed, meaning that one challenge does not strictly belong to a single perspective. Rather, it should be perceived as floating, meaning that the challenges might affect other perspectives than its point of emergence.

RQ_{c1}: Which prominent challenges can be found in Norwegian hospital projects' front-end planning?

The inherent complexity found in these projects was perceived as a major challenge and as a risk that may compromise a successful outcome. A main component in this complexity was the contextual issues that affect the project, especially the external or outer context often synonymous with the political aspect. This is a well-known challenge for major public projects and should be handled consciously in the planning processes. Other well-known front-end challenges were also discovered for hospital projects, where early narrowing of the opportunity space, early lock-in, ambiguous concepts, and path dependency all constitute risks that could compromise the project outcome. On a more practical planning level, formulating realistic and measurable goals/objectives seemed challenging, resulting in objectives' hierarchies of little value compromising the project strategy and subsequently the project outcomes. The studied projects exhibited shortcomings compared to theoretical recommendations for front-end planning, and to address this gap between theory and practice action has to be taken by significant parties. To accommodate these challenges, tools for front-end planning should be

provided, and skills in using these tools should be at hand or easily obtainable. This makes demands on the system level in that e.g. planning guidelines should be knowledge based (i.e. based on the theoretical recommendations) and continuously evaluated and improved. Moreover, arenas for knowledge sharing and education or development of skills should be established.

RQ_c2: Which insights are obtained from (empirically) exploring prominent challenges in Norwegian hospital projects' front-end?

Looking further into the challenges, *collaboration*, *governance* and *early warning signs* emerged as prominent topics for front-end performance and should thus be relevant candidates for improvement. The insights gained into these topics showed that the project and system perspectives are retained, and that challenges and potential solutions for improvement at one end of the scale may affect the other end.

The presence of multiple stakeholders with divergent views is one of the major contributors to the complexity of hospital projects, which makes collaboration an inevitable activity in the front-end phase. Viewing collaboration as a process where different approaches and tools are required at different times during the front-end phase might improve the way collaboration is facilitated and subsequently lead to successful outcomes, innovation and learning.

Governance is the interface between the project and its context, where decision-making links governance and project performance. Finding an appropriate level of governance is important in creating predictability and thus strengthening the decision-making processes, which are crucial for achieving project success. Two main issues should be noted regarding this. First, an organisational issue relating to hospital projects being carried out in state-owned enterprises (Regional health authorities) resulting in a distance to the political level, which in turn may compromise the ability to keep a broad societal perspective in the project planning. Second, at a more practical level, the parallel approaches for external quality assurance of these projects should

be performed with caution. The current arrangements are valued in the planning communities; however, efforts should be made to ensure sufficient impartiality between the quality assurers and the project. The governance arrangements should be discussed on a system level, and learning and knowledge sharing among different arrangements, both different state-owned enterprises and the State project model, would be beneficial. Consequently, arenas for such activities are key to improving current governance arrangements.

To keep track of front-end performance, establishment of performance measurement systems is beneficial in monitoring project status with regard to challenges or pitfalls threatening a successful outcome. In the front-end, early warning signs may serve as a means for improving decision-making and project processes aiming for project success. Early warning signs were mainly perceived as a valuable tool in this respect. However, the concept seems a bit immature in the planning community, and clarifications are needed. Thus, discussions are called for, and processes for establishing suitable early warning signs should be undertaken. This is actually a fortunate position, since it is known from literature that the approaches and exercises performed in order to identify indicators are perceived as more useful than the indicators themselves. However, the study performed on early warning signs made it possible to establish four categories of potential warning signs: *Structure and tools*, *Context and frame factors*, *Management* and *Relational factors and properties*. These provide a useful starting point, especially since it is generally perceived as challenging to know where to start looking for early warning signs.

Based on the findings and insights provided by answering the first two central research questions, the focus could now be turned to improvement, and the third central research question was asked as follows: **RQ_c3: How can Norwegian hospital projects' front-end be improved?**

By studying and investigating current challenges along the challenge-perspective scale, improvement areas (based on current challenges) and

improvement suggestions were detected and formulated, accordingly. These are summarised in Table 7-1.

Table 7-1 Improvement areas and improvement suggestions along the challenge-perspective scale

IMPROVEMENT AREAS	IMPROVEMENT SUGGESTIONS
<ul style="list-style-type: none"> ▪ Exploration of opportunity space ▪ Development of concepts ▪ <i>Concept</i> term ▪ Common terminology ▪ Consciousness about the role of collaboration ▪ Consciousness and use of EWS ▪ PM skills in front-end ▪ Alignment of practitioners ▪ Knowledge sharing ▪ Governance: content and process 	<ul style="list-style-type: none"> ▪ Take on a processual view ▪ <u>Develop PM toolbox</u> <ul style="list-style-type: none"> ✓ Mindset approaches ✓ Methods for front-end planning ✓ Emphasise ‘soft skills’ ✓ Use of EWS ✓ Focus on relational factors and collaboration: provide tools ✓ Use tensions and diversities as assets ▪ Facilitate inter-project learning and skills enhancement ▪ Harmonise terminology ▪ Learn from other sectors ▪ Ensure quality of guidelines ▪ Perform evaluations ▪ Discussions on <i>concept</i> term ▪ Discussions on governance level(s) ▪ Discussion on level of involvement ▪ Calibrate governance ▪ <u>Establish arenas</u> <ul style="list-style-type: none"> ✓ for knowledge sharing and learning ✓ for skills enhancement and education of PMs

7.2 Theoretical contributions

Despite its role in achieving strategic project success, the front-end phase is not fully understood (Williams *et al.*, 2019a). Several authors and entities have called for more knowledge and improvement of major projects' front-end phase (Elf and Malmqvist, 2009, Larssen, 2011, Office of the Auditor General of Norway, 2011, Elf *et al.*, 2012, Pauget and Wald, 2013, Consulting Engineers' Association, 2015, Norwegian Ministry of Health and Care Services, 2015, Ernst & Young, 2016, Williams *et al.*, 2019a, Consulting Engineers' Association, 2021). This thesis has added to the general knowledge of the front-end phase by exploring and providing insights into different aspects that are important to project performance. More insight advances our general understanding and helps us cope with the front-end's inherent complexity. More knowledge of the planning process and its potential pitfalls mitigate challenges by harnessing what may be harnessed. This contributes to enabling improvement and strengthening of project performance, which further contribute to sector development and value for money. Obtaining more knowledge will also potentially enable cross-project learning, which is a desired development for the healthcare sector.

The contribution from **Paper I** is the exploration and unearthing of different challenges and shortcomings in the front-end of hospital projects. This provided thorough insight into the planning practices of this sector and enabled a comparison with commonly accepted theoretical recommendations for front-end planning. The discovered convergence between the identified challenges and findings from literature contributes to confirming existing knowledge, and adds to a relative recent and scarce body of literature. Establishing an overview of current challenges makes it possible to initiate action to prevent unfortunate outcomes, furthermore providing a 'roadmap' for where to start or situate the efforts when aiming for improvement, something that is not intuitive given the inherent complexity found in these settings.

Paper II studied collaboration, which is considered key to front-end performance, and which can be viewed as a stakeholder management strategy (Savage *et al.*, 1991, Aaltonen *et al.*, 2015) and as a human resource strategy (Bedwell *et al.*, 2012). Stakeholder management and its dynamics is not well understood for the front-end phase (Aaltonen *et al.*, 2015), which is unfortunate both for managing this phase of a project (Edkins *et al.*, 2013, Williams *et al.*, 2019a) and for subsequent project outcomes (Baccarini, 1999, Tzortzopoulos *et al.*, 2006). Paper II advances our understanding of collaboration in the front-end phase and confirms the view of Bedwell *et al.* (2012), who saw collaboration as an evolving process. Paper II provides a conceptualisation of collaboration in the front-end, demonstrating the need for emphasising different approaches when initiating and maintaining collaboration. The level of involvement and multiplicity of stakeholders with divergent views and objectives make collaboration inevitable in hospital projects' front-end, creating tensions and paradoxes. Thus, more knowledge about the role, influence and coping strategies of collaboration would be valuable as a contributor to project performance.

Paper III studied the governance arrangements in different state-owned enterprises, providing contributions to two areas of research: the quite recent and fragmented research in project governance (Ahola *et al.*, 2014, Volden, 2019c), and by adding further insights into SOEs in general, which is called for (e.g. Grossi *et al.* (2015), Bernier and Reeves (2018)). The study points to the challenging role of the state-owned enterprise as a hybrid organisational form, balancing independence and efficiency with the need to keep a holistic, societal perspective and make societal decisions at the right political level. The paper provides an illustration of challenges relating to public reforms, such as New Public Management, underlining former criticism regarding delegation of decision-making and thus political distancing of societal matters. The study also adds to the general understanding of governance of major public projects' front-end phase by establishing more knowledge of such projects undertaken

in a context distant from central politics. The comparison of the state-owned enterprises' governance arrangements to the State Project Model, which adheres to recommendations from project management literature and is used for governing public projects undertaken in a political context where decisions are centralised in order to maintain societal interests, contributes to creating a point of departure for improvement and mutual learning among the different arrangements.

Identification of early warning signs is a beneficial starting point for the improvement of front-end planning processes (Nikander and Eloranta, 2001, Haji-Kazemi *et al.*, 2012b). **Paper IV** assesses potential early warning signs in hospital projects' front-end phase, and thus adds to the general understanding of both early warning signs and the front-end phase. The study echoes the call for more empirical research on early warning signs in general (Nikander and Eloranta, 2001, Haji-Kazemi *et al.*, 2012b, Haji-Kazemi, 2015), and also the call for more sector-specific insights on this topic and the impact of complexity in such situations (Williams *et al.*, 2012). The study indicates a categorisation of early warning signs in the hospital front-end setting that confirms prior findings (e.g. Kappelman *et al.* (2006)), and further provides a preliminary systematisation that could serve as a valuable point of departure for improvement.

Taken together, the contributions from the papers provide insight into the front-end through several angles, which is also sought illustrated by the kaleidoscopic model presented in this thesis. The framing of various challenges and shortcomings, as viewed on the challenge-perspective scale, helps establish a point of departure for improvement resting on a theoretical and empirical foundation. The theoretical contributions are summarised in Figure 7.1

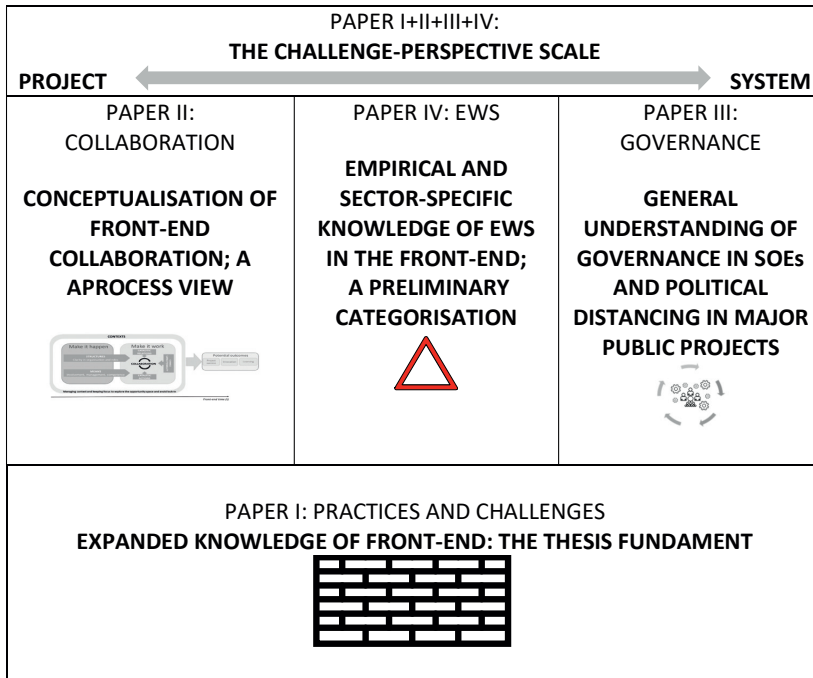


Figure 7.1 Summary of theoretical contributions

7.3 Practical contributions

All the papers in this thesis contribute to shedding light on hospital projects' front-end phase in order to provide more insights and enable improvement. Consequently, some practical approaches are suggested aimed at planners/practitioners and decision-makers in these processes.

Paper I provided an empirical foundation for the undertaken research, and furthermore a starting point for the following research process by exploring and describing current practices and challenges found in front-end planning of Norwegian hospitals. Practitioners would benefit from the comparisons to theoretical recommendations and which issues to be especially aware of in order to improve planning processes and strengthen the odds of successful outcomes.

Paper II provided a framework for collaboration serving as a practical guide to manage this important front-end activity. The suggested processual approach highlights the need for different actions for preparing and maintaining collaboration. Thus, it is believed that collaboration may be engineered and prepared to a certain extent to help the project get off to a good start and to maintain the pace further on.

The study of governance in **paper III** offered some recommendations to state-owned enterprises and their line ministries on topics that might compromise project performance if not dealt with properly:

- External QA should focus on concept elaboration and, in order to adopt a holistic societal perspective, it should be performed early enough (in the projects' front-end phase).
- Care should be taken regarding which decisions are political in nature, and it should be ensured that decisions are anchored at the right (governmental) level.
- Sufficient resources for external QA should be provided.
- Capability/awareness of the need to balance external quality assurers' impartiality with the required and desired process efficiency is important when using parallel QA arrangements.
- Arenas should be established to promote mutual learning between the different arrangements through exchanging experiences and advice.

The practical contributions provided in **paper IV** on assessing early warning signs, constitute a recommendation to include approaches for handling these signals in the project manager's toolbox. The varying degree of knowledge and handling of these signals vary. However, they are perceived as important tools for improving front-end planning and for further strengthening the odds of successful project outcomes. This shows that consciousness pertaining to this topic should be raised, with a preliminary aim of establishing experience and skills and thus pave the way for dynamic approaches adapted to project

complexity. Strengthening the connection between formal assessments and EWS should be looked into, along with the use of 'gut-feeling' approaches for capturing the soft issues, which are extremely important to front-end importance. The paper also contributed a categorisation and preliminary systematisation of detected early warning signs, which provide a starting point for working with this tool in the front-end. However, it should still be kept in mind that approaches and exercises aimed at identifying early warning signs are often regarded as more useful than the actual indicator. Thus, such processes should be initiated. They could also elaborate on the preliminary findings of the current study, knowing that it can be a challenge to understand where to start looking for early warning signs in these complex settings (Williams *et al.*, 2012). The potential early warning signs highlighted in the study are of different 'strengths', meaning that some could prevent potential crises, while others may contribute to more modest improvements. However, due to the complexity found in the studied setting, a cause-effect relationship is not easily identified, hence none of the suggested EWS should be neglected until more experience and knowledge are gained.

7.4 Further work

The findings of this thesis represent only a small and preliminary step on the road to establish increased understanding of the front-end phase of hospital projects in order to facilitate improvement for the purpose of successful outcomes.

All studied topics could be subject to further research in various ways, and all four papers have suggestions for further research.

The empirical foundation established in paper I elucidated the importance of the concept elaboration and exploration of the OS together with the impact of complexity and context. In addition, it gave rise to the subsequent research undertaken in this thesis. The convergence of the challenges to the commonly accepted theoretical recommendations makes room for considering to what

extent this could be generic. However, generalisations or expansions to other contexts from case studies should be made with caution, and the findings have to be discussed and validated through further research to clarify to what extent the findings could be considered generic. Comparisons to planning practices across public sectors or to hospital projects in other countries, or both, constitute an interesting and valuable further approach.

Comparison of projects planned according to the 2011 guidelines and according to the revised version from 2017 would also be of interest, given the change in project model and the removal of the idea phase. It would be interesting to investigate if this has affected the dynamics and outputs from the health authorities' strategic plans, and if or how it has shaped the planning processes in general. Anyway, the revised guidelines should be evaluated independently of earlier versions to ensure that the purpose of the revision is met.

The developed framework for collaboration presented in paper II would have benefited from being tested among the practitioners/project managers. Comparing the framework to other sectors and/or other project phases is also an avenue for further research, in order to review the study's findings. Sectoral comparisons, regarding why or why not collaboration in hospital projects differs from other sectors, would be interesting, as would international comparisons to gather experience and facilitate learning.

With regard to governance arrangements, continued research on the development of the arrangements, especially concerning relative effects on cost control, achievement of tactical and strategical objectives, and other success criteria would presumably be beneficial to further improvements and learning, also in an international context. This may guide us towards identifying the right level of external quality assurance and finding out how to balance this against internal quality assurance arrangements. All arrangements studied in paper III were quite immature compared to the State Project Model, which has been researched for two decades. Consequently, the need for more research on arrangements of state-owned enterprises is pressing.

To establish more knowledge and take advantage of the improvement opportunities resulting from the identification of early warning signs, it would be beneficial to test the preliminary findings from paper IV on different projects. This could help in establishing further relevance and usefulness for practitioners/project managers. It would also be interesting to perform additional interviews with project participants in hindsight regarding what could have been avoided if a more active approach towards early warning signs had been taken. This would provide the results with more rigour and enable a further validation of the preliminary ranking. Comparisons across sectors and/or other countries would also be of interest and most likely valuable avenues for learning.

Overall, looking at the challenge-perspective scale presented in this thesis, further research aiming to investigate the different challenges' impact on project performance and how this might shift during the planning process, would be interesting. Although the potential context dependency should not be underestimated, this could allow for a weighting of the scale, which in turn might serve as a guiding tool for coping with complexity, and for helping project managers and planners prioritise.

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APPENDICES

A-1 Interview guide (in Norwegian language)

Intervjuguide

A) GENERELLE SPØRSMÅL

- Organisasjonstilhøyricheit
- Rolle i prosjektet
 - Medarbeidar, leiar (nivå)?
- "Fartstid" i prosjektet/med denne typen prosjekt
- Kva fasar har du vore med i?

B) PROSJEKTSPEISIFIKKE SPØRSMÅL

- Korleis er tidlegfasen for prosjektet organisert?
 - Fullmaktsstruktur
 - Partar/organisasjonar som samarbeider
 - Er desse med i ulik grad i dei ulike fasane?
 - Er prosjektet lokalisert i eigne lokale? Kven sit her?
Ulike representantar frå ulike org.?
- Korleis er medverkinga (HF) organisert?*
- Kor mange har anslagsvis vore i sving i prosjektet frå HF-sida?*

- Kvar er prosjektet no?

C) TIDLEGFASEN GENERELT

- Korleis vil du beskrive tidlegfasen for prosjektet?
 - Bruk gjerne adjektiv
 - Forventningar, kompetansebehov, samarbeid etc.
- Har retningslinjene for tidlegfasen vore nytta?
 - Var desse til hjelp?
 - Kunne noko vore betre?
 - Var noko særskilt bra?
 - I kva grad nyttast erfaringar frå tidlegare prosjekt?
- Korleis vurderer du tidsbruken i tidlegfasen?
 - Kva har du vore mest involvert i sjølv?
 - Kva meiner du har vore brukt mest tid på?
 - Positivt? Negativt? Forståeleg? Brukt annleis?

- Føler du at målsetjingane med prosjektet er klare?
 - Er desse "vekta" ulikt mellom dei ulike interessepartane i prosjektet?
 - Opplever du at prosjektet har ein klar prosjektstrategi?
- I kva grad opplever du prosjektet som «forutbestemt»?
 - Føler du at du har vore i posisjon til å påverke prosjektet viss behov?
- Kva legg du i omgrepet sjukehuskonsept?
 - Legg ulike partar ulik forståing til grunn?
- Korleis har ein gått fram for å utvikle konsept?
 - Er omgrepet mogelegheitsrom nytta?
 - Er konseptane som er utvikla reelt ulike?
 - Kva varierer ein med?
 - Kor fritt kan ein tenkje?
 - "Lock-in"
- Kva for vurderingar er gjort i tidlegfasen for ditt prosjekt?
 - Kven har utført dei?
 - Korleis er dei utførte?
 - Ad hoc? Teoretisk forankring? Planlagt?
 - Nyttige?
 - Meir av noko? Mindre av noko? Manglar heilt?
- Korleis opplevde du ekstern kvalitetssikring?
 - Sluttevaluering eller flg. evaluering?
 - Møter?
 - Gav denne innspel som vart nytta i vidare arbeid?
 - "pliktløp" eller nyttbart?

D) UTFORDRINGAR (TIL EWS)

- Kva meiner du har vore utfordrande i tidlegfasen?
 - Kvifor oppstod desse slik du ser det?
 - Kva for utfordringar (kan ein kategorisere)?
 - Organisasjonisk, fullmakter, samhandling, tidsmessig, økonomisk etc.
- Ved ev. utfordringar eller problem, kunne desse vore fanga opp tidlegare, og korleis?
 - Dvs. før dei utvikla seg til eit problem?
- Kva bør ein, etter di meining, rette særskild merksemd mot i tidlegfasen for å unngå/reducere problem eller utfordringar (sikre suksess)?

- Har nokre av utgreiingane/vurderingane i tidlegfaseprosessane vore med på å legge grunnlaget for å handtere (identifisere/følgje opp) større utfordringar seinare i prosjektet?

E) SAMARBEID (TIL SAMPEL OG KOMMUNIKASJON)

- Kan du skildre samarbeidet med SHB?
 - Målsetjingar, fokus, arbeidsfordeling, felles forståing
 - Er dette ulikt i ulike fasar?
- Kan du skildre samarbeidet med HF?
 - Målsetjingar, fokus, arbeidsfordeling, felles forståing
 - Er dette ulikt i ulike fasar?
- Kan du skildre samarbeidet med ARK og RI?
 - Målsetjingar, fokus, arbeidsfordeling, felles forståing
 - Er dette ulikt i ulike fasar?
- Kan du skildre samarbeidet med EKS?
 - Målsetjingar, fokus, arbeidsfordeling, felles forståing
 - Er dette ulikt i ulike fasar?

A-2 Questionnaire (in Norwegian language)

KODE	SPØRSMÅL	TYPE	ALTERNATIV/MERKNAD
1	Hvor er du ansatt?	Drop down	RHF/HF/SHB/RJ/ARK/EKS/Annet
2	Har du erfaring fra ulike sykehusprosjekter?	Drop down	Ja/Nei
2a	Hvis svar på 2 JA: Hvilke roller har du hatt i disse sykehusprosjektene?	Bokser, flervalg	Prosjektleder/prosjektleder/prosjektleder.../Anne
2b	Hvis ANNEN ROLLE på 2a: Vennligst utdypp	Fritekst	
3	Hvilken rolle har du hovedsakelig i nåværende sykehusprosjekt?	Drop down	Prosjektleder/prosjektleder/prosjektleder.../Anne
3a	Hvis ANNEN ROLLE på 3: Vennligst utdypp	Fritekst	
4	Hvor mange års erfaring har du med sykehusprosjekter?	Skala	0-5/6-10/11-15/16/20/>20 [år]
5	Hvilke faser har du erfaring fra i sykehusprosjekter?	Bokser, flervalg	Idefase/Prosjektinnramming/Konseptfase/Forprosjektfase/Senere faser

Tusen takk for at du velger å svare på denne spørreundersøkelsen. Alle opplysninger du gir, er anonyme. Ved å svare på denne undersøkelsen, samtykker du til at besvarelsen kan brukes til forskning.

Denne spørreundersøkelsen omhandler tidlige varslingsignal i sykehusprosjekters tidlige fase. Tusen takk for at du bidrar i denne undersøkelsen, som er en del av et doktorgradsprosjekt knyttet til forbedring av tidligfasen for sykehusprosjekter. Vi viser også til tidligere utsendte informasjonsskriv.

EWS KNYTTET TIL STRUKTUR OG PROSJEKVERTØY		
11	<p>Har du opplevd noen av disse tidlige varlingssignalene knyttet til STRUKTUR og PROSJEKVERTØY, og hvor viktig vurderer du disse til å være:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Utydelig organisering <input type="checkbox"/> Tungvinte beslutningslinjer <input type="checkbox"/> Utydelig rollebeskrivelse <input type="checkbox"/> Manglende rolleforståelse <input type="checkbox"/> Uforholdsmessighet i maktforhold <input type="checkbox"/> Ubalanse mellom autoritet og handling <input type="checkbox"/> Manglende strategi og planverk <input type="checkbox"/> Manglende sammenheng mellom strategisk virksomhetsplan og bygningsplan <input type="checkbox"/> Svakt metodeverktøy <input type="checkbox"/> Prosjektet har et uklart utgangspunkt eller er dårlig definert <input type="checkbox"/> Manglende informasjonsflyt <input type="checkbox"/> Ineffektiv eller manglende kommunikasjon <input type="checkbox"/> Målformuleringer er uklare <input type="checkbox"/> Dokumentasjon mangler <input type="checkbox"/> Vurderinger/kartlegginger ikke gjennomført <input type="checkbox"/> Misforståelser eller uenighet om tallgrunnlag <input type="checkbox"/> Feil rekkefølge i planleggingsprosessen 	<p>Skala: MATRISE</p> <p>Ikke opplevd/Ikke viktig/Litt viktig/Ganske viktig/Meget viktig</p>

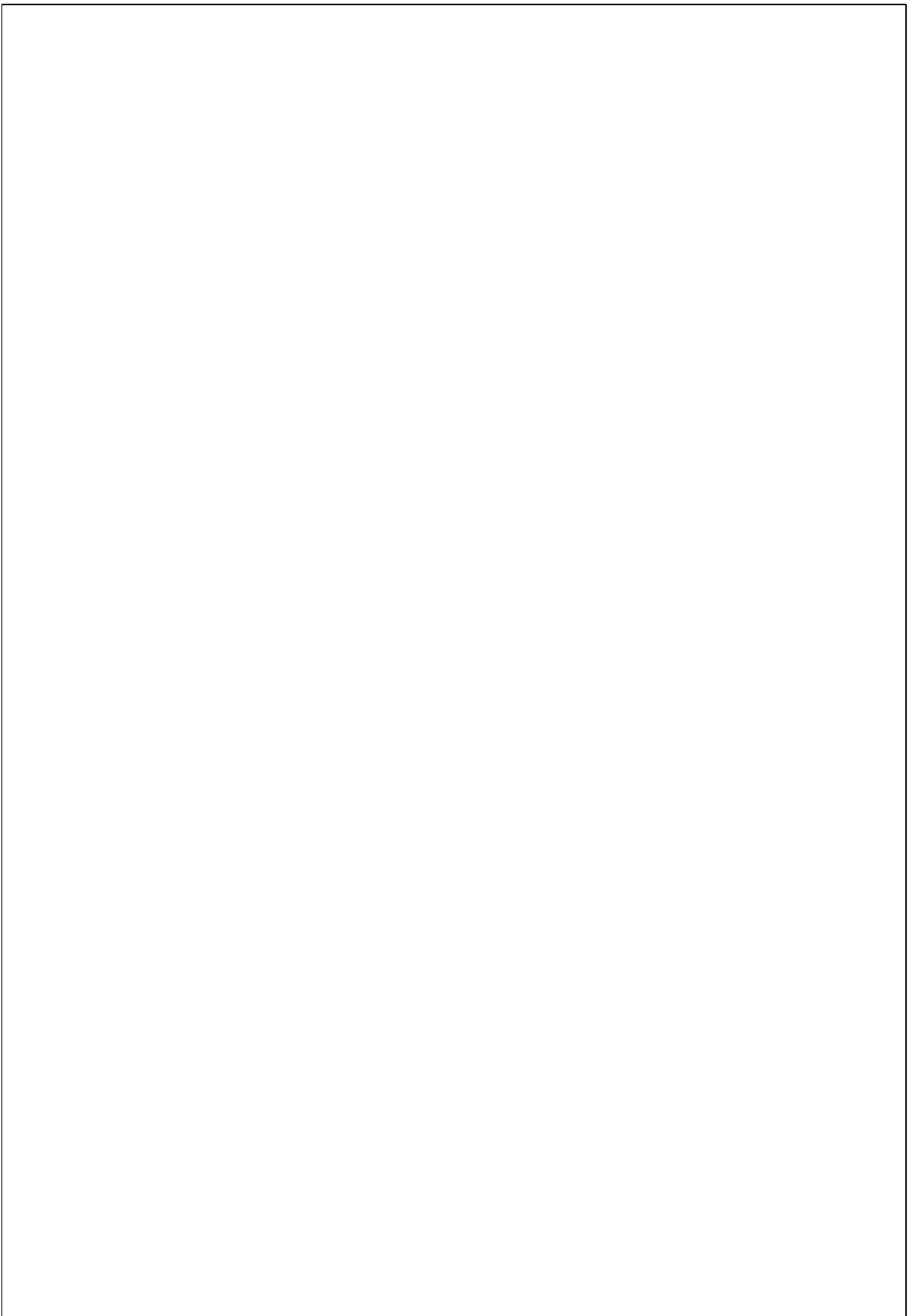
11a	Har du opplevd andre tidlige varslings signaler knyttet til STRUKTUR og PROSJEKTVERTØY ? Vennligst svar tekstlig, og angi også hvor viktig du vil vurdere at disse er	Fritekst	
EWS knyttet til KONTEKST/RAMMEFAKTORER			
12	<p>Har du opplevd noen av disse tidlige varslings signalene knyttet til KONTEKST/RAMMEFAKTORER, og hvor viktig vurderer du disse til å være:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Eksterne krefter påvirker prosjektet (f.eks. politikk) <input type="checkbox"/> Organisatoriske konflikter <input type="checkbox"/> Prosjektets forhistorie <input type="checkbox"/> Uavklart lokalisering av sykehuset <input type="checkbox"/> Tidlig løsning av prosjektet/konseptet <input type="checkbox"/> Uklare/ikke tilpassede økonomiske ramme 	Skala: MATRISE	Ikke opplevd/Ikke viktig/Litt viktig/Ganske viktig/Meget viktig
12a	Har du opplevd andre tidlige varslings signaler knyttet til KONTEKST/RAMMEFAKTORER , og hvor viktig vil du vurdere disse? Vennligst svar tekstlig, og angi også hvor viktig du vil vurdere at disse er.	Fritekst	
EWS knyttet til LEDELSE (ditt nærmeste ledernivå)			
13	Har du opplevd noen av disse tidlige varslings signalene knyttet til LEDELSE , og hvor viktig vurderer du disse til å være [kryss av]: <input type="checkbox"/> Manglende forankring i ledelse	Skala: MATRISE	Ikke opplevd/Ikke viktig/Litt viktig/Ganske viktig/Meget viktig

	<input type="checkbox"/> Endringer i støtte fra ledelse <input type="checkbox"/> At ledelsen har utydelige ambisjoner for prosjektet <input type="checkbox"/> Ingen av disse		
EWS knyttet til RELASJONELLE FAKTORER og EGENSKAPER			
14a	<p>Har du opplevd noen av disse tidlige varslingsignalene knyttet til RELASJONELLE FAKTORER og EGENSKAPER, og hvor viktig vurderer du disse til å være:</p> <input type="checkbox"/> Manglende felles forståelse <input type="checkbox"/> Manglende opplevelse av fellesskap <input type="checkbox"/> Manglende medvirkning eller medvirkning på feil nivå <input type="checkbox"/> Ikke reell medvirkning <input type="checkbox"/> Manglende åpenhet <input type="checkbox"/> Manglende eller feil kompetanse <input type="checkbox"/> Manglende modenhet <input type="checkbox"/> Ikke tilstrekkelig tid til prosjektmodning <input type="checkbox"/> Manglende rom for uenigheter og diskusjon <input type="checkbox"/> Manglende tillit <input type="checkbox"/> Skjulte motiv <input type="checkbox"/> Uklart konsept eller uenighet om konsept <input type="checkbox"/> Overoptimisme/overentusiasme	Skala: MATRISE	Ikke opplevd/Ikke viktig/Litt viktig/Ganske viktig/Meget viktig

PART II

Individual papers

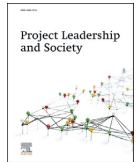
PAPER I





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Empirical Research Paper

Hospital project front-end planning: Current practice and discovered challenges

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ABSTRACT

Development of healthcare services is a societal responsibility often appearing as major public projects. These types of projects often have a long lifetime expectancy and represent large investments and changes to established welfare systems with a considerable societal impact. This makes strategic project success depending on front-end planning performance crucial. Motivated by literature claiming that the hospital projects' front-end phase has a potential for improvements, this paper presents findings from a study investigating front-end planning practice in five Norwegian hospital projects. Discovered challenges mainly relate to the planning *process* or *exploration of the opportunity space* and *concept elaboration*. A main conclusion is that implementing theoretical recommendations both in guidelines and in practice should be a desired and possible development to further improve hospital projects' front-end planning, thereby strengthening the odds for project success both on a tactical and strategical level.

1. Introduction

The planning of major public projects usually starts with the front-end phase. Many projects are insufficiently studied up-front, a deficiency that negatively affects a project's chances of success (Pinto and Kharbanda, 1996; Faniran et al., 2000; Næss et al., 2004; Carden and Egan, 2008; Samset, 2010; Flyvbjerg, 2014). The front-end phase calls for many decisions. These decisions do, however, exert a strong influence on the project's opportunity for strategic success (Samset, 2009; Samset and Dowdeswell, 2009; Haji-Kazemi et al., 2012). The front-end is more susceptible than any other phase to the decisions made in this phase and to what is referred to as 'problematic behaviour', which can lead to an unsuccessful project if not countered (Flyvbjerg et al., 2009; Flyvbjerg, 2013; Eizakshiri et al., 2011). Finding the right concept, the right solution to the expressed need, is however crucial to achieving project success (Williams and Samset, 2010). It is also known that projects that have been evaluated to be successful have prioritised front-end definitions e.g. created a vision and selected an onwards approach before being executed (Dvir and Shenhar, 2011).

Hospitals in many countries are public and owned and funded by the state (Smith et al., 2012; OECD, 2019). Their primary function is to

provide user and patient groups with specialised health care services. This therefore makes the development of healthcare services a societal responsibility that may end up being a major public project, a project that answers defined needs in the sector. A major public project may be initiated by the state when society experiences a certain need for development, as put forth by the political or administrative level or by end users (Haanæs et al., 2004; Samset and Welde, 2019). The defined need can relate to different parts of societal responsibility such as infrastructure, ICT-development and public buildings.

In general, major projects require comprehensive approximations to elucidate the different aspects of the project. They also require the opportunity to create a flexibility that can handle unforeseen issues (Samset, 2010). The front-end phase therefore requires a project to be examined through different cross-cutting issues or lenses, including the economic/financial, institutional, socioeconomic, technological, environmental and political issues suggested in the OECD¹-evaluation model (Samset, 2014), and also mentioned by Morris et al. (2009). Flyvbjerg et al. (2009) also recommend using an outside view in early-phase planning to provide a necessary project concept reality check. This is based on the findings of Kahneman and Lovallo (1993).

Hospital projects, like other public projects', manage societal

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¹ OECD= Organisation for Economic Co-operation and Development.

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resources, thus the importance for successful projects is prominent, both as a vehicle for the wanted development and for providing value for money (Samset and Volden, 2016a; van Wee and Priemus, 2017; Volden, 2019). Project strategy is shaped in the front-end phase. Long-term success is viewed in terms of a project's strategic performance, of whether a project is relevant to its users and whether it is sustainable over its life-span (Miller and Hobbs, 2005; Samset, 2007; Samset and Dowdeswell, 2009; Samset, 2014). Strategic success in major public projects is further said to be achieved by choosing the right concept (Klakegg and Haavaldsen, 2011; Samset and Christensen, 2017). A number of solutions (or concepts) to the defined need should therefore be elaborated in the front-end, to ensure that all principal solutions are taken into consideration (Samset and Christensen, 2017). This emphasises the importance of front-end appraisals and the elaboration of sound concepts which meet defined needs (Samset, 2010; Klakegg, 2010). The relationship between super-eminent objectives and project development is regarded to be a challenge of project strategy. This challenge must be handled correctly if project success is to be achieved (Morris et al., 2009).

Assessing different concepts by looking at the project from different angles, using multiple approaches and tools, is of importance (Volden and Samset, 2013; Samset, 2014). Understanding that viewing a project in other ways than the standard execution point-of-view is vital in front-end planning. Using established tools designed for defining, elaborating and assessing a concept can facilitate planning processes and strengthen the odds of a successful outcome. Such tools are thoroughly described by e.g. Samset (2010).

Concepts are further developed within the boundaries set by the demands of a number of sources, by needs and objectives and by political and analytical determinants, defining the 'Opportunity Space' (OS) (Samset et al., 2013, 2014). Narrowing the OS too early by introducing constraints can be counterproductive. Deciding on a solution before the elaborations of alternatives are available does, however, appear to be quite widespread, according to e.g. Flyvbjerg (2014) and Samset et al. (2014). This was also found in the Auditor General of Norway's investigation of Norwegian Health Authorities' property management (Office of the Auditor General of Norway, 2011), further indicating that the analytical approach is subordinate to political processes and non-rational considerations (Næss et al., 2004; Samset et al., 2009, 2014; Samset and Volden, 2016b).

Front-end design and performance are therefore important elements in increasing the odds of a strategically successful project. Miller and Hobbs (2005) also found a strong correlation between strategic depth and project performance. Society is probably most interested in the change of state a project will bring about, which can be expressed early on in the process as a strategy (Samset, 2014).

Pertaining to healthcare investments, these account for a large proportion of many countries' state budgets. In Norway, investments in buildings alone are estimated to be US\$3 billion in 2019 in the state budget (~1.7%) (Norwegian Ministry of Health and Care Services, 2015). Estimates for technical and structural investments are even higher. This is before demographic changes or future needs associated with other developments are taken into account (Ernst and Young, 2016). In Norway, today's specialist health services utilise a total area of 4.9 million m². This makes the health service the Norwegian State's largest property owner (Ernst and Young, 2016). The backlog in maintenance is, however, considerable (Larssen, 2011; Consulting Engineers' Association RIF, 2015). According to the Consulting Engineers' Association in Norway (Consulting Engineers' Association RIF, 2015) the level of investment is 20% lower than required, and action to prevent this negative trend to continuing should be taken. Major investments are planned for the years ahead. It has, however, been clearly stated that there is a need for more knowledge, innovation and more rational use of resources in these processes (Larssen, 2011; Pauget and Wald, 2013; Norwegian Ministry of Health and Care Services, 2015; Consulting Engineers' Association RIF, 2015; Ernst and Young, 2016).

Hospital projects' societal impact motivates comprehensive and

resource demanding planning processes. Hospital projects' complex and pluralistic nature (e.g. multiple stakeholders with potentially divergent perspectives influencing decision-making, uncertainties regarding healthcare development and socio-political position) are described by several authors (Glouberman and Mintzberg, 2001; Mintzberg and Glouberman, 2001; Eeckloo et al., 2007; Snowden and Boone, 2007; Klakegg et al., 2010; Olsson and Hansen, 2010; Denis et al., 2011; Pauget and Wald, 2013; Samset et al., 2014; Aubry et al., 2014; Ernst and Young, 2016; Särkilahti, 2017; Samset, 2017; Aubry and Lavoie-Tremblay, 2018; Fréchette et al., 2020). Time-consuming planning processes combined with a strong Norwegian tradition for involving a high level of medical personnel in these processes, make effective time usage important. Long-term project success is further connected to using the 'right' amount of planning time in the front-end. Findings show that the average project do not spend sufficient time upfront, whilst on the other side it is also shown that projects showing too long planning timelines have a lower success rating (Serrador and Turner, 2015). In our experience, planning processes also involve demanding and exhausting discussions, partly due to stakeholders' differing interests and views of objectives and due to disagreements on strategies. These are aspects that should not be underestimated when designing and performing planning processes. In a study of hospital planning, Elf et al. (2015) echo the importance of the front-end and point out that the most critical decisions are made in this phase. Insufficient exploration of the OS, resulting from focussing on structural issues rather than looking into future concepts that integrate user needs, may lead to poor outcomes and prevent strategic project success (Elf and Malmqvist, 2009; Elf et al., 2012). A further challenge in developing hospital concepts that meet future needs and long-life expectancy are the rapid changes experienced in the health sector due to technological and medical advances (Bayer et al., 2007; Ettelt et al., 2009; Pauget and Wald, 2013; Särkilahti, 2017).

In 2011, the Office of the Auditor General of Norway investigated the Norwegian Health Authorities' property management (Office of the Auditor General of Norway, 2011). The investigation highlighted the importance of the role of buildings in supporting quality and effectiveness in the performance of healthcare services. It also emphasised the challenging conditions in Norwegian healthcare facilities. The investigation found that the basis for making decisions on new hospitals in Norway was insufficient. The investigation also found that the formal guidelines used in the front-end planning of Norwegian hospital projects were partially inadequate. Experience in the sector shows that there is a gap between the use of the theoretical recommendations and good practice as presented for example by Samset (2010), and the practical front-end planning performance. Other authors also recognise the importance of the front-end phase and the challenges of hospital projects (Elf et al., 2012, 2015; Elf and Malmqvist, 2009; Bygballe, 2010).

The following sub sections summarise theoretical recommendations for front-end planning and describe the Norwegian planning process.

1.1. Summary of theoretical recommendations for front-end planning

When highlighting theoretical recommendations for planning the front-end phase, we draw especially on the work of Samset (e.g. Samset, 2010). In addition, a recent paper from Williams et al. (2019) summarises the front-end structure nicely, pointing out the preliminaries, the project purpose, analysis of concept and alternatives, and the assessment.

Early in the front-end phase, it is important to create a project perspective, to familiarise with the project's context and the project's socio-political standing. Williams et al. (2019) stress the importance of the project proposal and its contents, where among other things the project should be justified, and its feasibility should be accounted for. The project triggering factors and needs should be assessed thoroughly, and there should be an alignment of needs, objectives and effects. Williams et al. (2019) point to challenges for assessing the need for a major public project, given its inherent complexity and the difficult but important distinction between 'wants' and 'needs'.

The project objectives should be aligned with the organisational strategy, and the objectives and objectives hierarchy should be thoroughly elaborated. Objectives should specify the end situation, be specific, unambiguous, verifiable and measurable. Strategy analysis (e.g. Baccarini (1999), Samset (2010), Williams et al. (2019)), linking the objectives hierarchy to inputs, outputs and outcome is useful at this stage. Success criteria are also important means for defining the project, both on a tactical and strategical level.

Stakeholders' interests and needs should be carefully analysed to elucidate their expectations and to avoid stakeholder problems. This may be challenging, given complex projects' stakeholder multiplicity, and diverse perspectives, still it is important for managing the front-end phase.

To develop a project concept, one should be starting without a fixed idea of the concept, seeking open and principal solutions and being flexible. One should take on an overall approach, by viewing the concept in its societal, technological, economic, institutional, environmental and political context. Further, one should investigate which demands to attend to in order to fulfil expressed needs, hence limiting the opportunity space between analytical and political determinants, objectives and needs. Avoiding path dependency by creating concepts that are actually different solutions to the defined need, not just variations over the same 'solution theme' or continuation of the current solution, has proven essential. Front-end's inherent uncertainty calls for deliberate and careful selection of information when developing concepts to avoid 'analysis-paralysis' (Samset and Volden, 2016a) and early lock-in (Flyvbjerg, 2014).

After concept decision, the concept should be thoroughly assessed concerning cost, profitability, timing and risk.

1.2. The Norwegian planning process

The Norwegian Directorate of Health published the first guidelines for hospital planning in 2006 (The Norwegian Directorate of Health, 2011). The guidelines describe and recommend how the planning process for Health Authority investment projects should be performed. The guidelines have been developed over the years. The overall objective, which is to ensure sufficient quality in front-end planning and to help the making of sound decisions in hospital projects has, however, remained unchanged. The front-end should clarify whether the solution for an identified need or problem includes investments in buildings (The Norwegian Directorate of Health, 2011). Framework conditions are also to be clarified and different solutions are to be searched for. The process of front-end planning described in the 2011 version of the guidelines is a gateway model divided into several phases (idea phase, concept phase and pre-project phase). Gateways/decision points connect the different phases and decide whether the project can be continued into the next phase. Through the phases, possible principal solutions to the defined need should be identified, including both operational and structural solutions. A professional basis should be developed that establishes a sufficient degree of certainty of which is the right alternative, the right alternative being the one that best meets the expressed goals within the given framework conditions (The Norwegian Directorate of Health, 2011). The alternatives are to be assessed in terms of the defined goals and purposes and in terms of criteria partly derived from these and partly from the guidelines.

Reports from the idea and concept phases are usually based on a number of sub-elaborations. These sub-elaborations cover most of the many aspects of hospital planning. The reports are important documents that form the basis for passing the planning models' gateways. The role and importance of such reports (briefs) are highlighted by e.g. Kelly et al. (2005), Ryd and Fristedt (2007), Elf and Malmqvist (2009) and Elf et al. (2012). The report from the concept phase, together with the external quality assurance-report, form the basis for the application for funding through the Norwegian state budget.

Achieving increased long-term project success calls for further

knowledge of hospital projects' front-end in order to improve planning processes. This study is part of a larger project that aims to improve the front-end phase of hospital projects in Norway. It is an early step towards obtaining more insight into front-end planning, gained here through assessing project reports in the light of formal planning guidelines and theoretical recommendations. The study also aims to shed more light on the reasons why the basis for decisions are found to be insufficient (Office of the Auditor General of Norway, 2011). The front-end reports and minutes from board meetings or other decisive entities constitute the basis for answering our research questions:

- RQ1: How does front-end planning of Norwegian hospital projects correspond to official guidelines' expectations of contents and intentions?
- RQ2: Considering recommendations derived from extant theory, which, if any, shortcomings can be identified in the front-end planning of Norwegian hospital projects?

2. Methodology

2.1. Research setting

To answer our research questions and thus increase our understanding of the front-end planning of Norwegian hospitals, we followed a qualitative approach, applying a descriptive multiple case study strategy, under an interpretive research paradigm² (Given, 2008; Saunders et al., 2009; Denzin and Lincoln, 2018; Lincoln et al., 2018). This approach is justified by the aim for achieving a deep insight into a complex topic, for achieving a description of a phenomenon, and a clarification of the understanding of a problem (Eisenhardt, 1989; Flyvbjerg, 2006; Saunders et al., 2009; Yin, 2014). In this way, we also take advantage of the researchers' many years of experience in the field, which corresponds to the interpretivist transactional epistemology and its' axiological foundation (Saunders et al., 2009; Denzin and Lincoln, 2018; Lincoln et al., 2018).

The studied cases constituted five Norwegian hospital projects of different size and scope, planned between 2005 and 2016. Several Norwegian hospital projects have commenced the last decade, which makes it possible to gain insight into projects of different size and scope that are differently organised and experience different political settings. The projects' studied also vary according to their position in the Local and Regional health authorities (LHA and RHA), cases 1,3 and 5 represent a merger and re-location of hospitals, case 4 represents new buildings at a new location and case 2 is neither a merger nor a re-location. The cases, following a purposive sampling of typical cases strategy (Marshall, 1996), were selected based on information that was publicly accessible at the time. Inclusion criteria (Frey, 2018) required all projects to have completed the idea and concept phases, and have been subject to an external quality assurance.

All projects, except one, were planned using the guidelines published by the Norwegian Directorate of Health in 2011 (The Norwegian Directorate of Health, 2011). The exception is a project finished before 2011 using prior guidelines. This project was, however, included to allow differences in planning/elaborations based on the different planning guideline versions to be examined. The project was neither a subject of external quality assurance, since the external quality assurance requirement was introduced in the 2011 guidelines. The guidelines give an outline of each planning phase's content. The project owners (RHA) and the Ministry expect the projects to follow these guidelines. A new version of the guidelines was released in 2017. No projects have however, at this time, completed the front-end using the new version. The documents were therefore studied in relation to the 2011 guidelines' expectations and intentions.

² The interpretive paradigm is generally labelled as constructivism (Given, 2008).

2.2. Data collection and analysis

The main data source was projects' front-end documents (briefs) that is documents from the idea and concept phases, external quality assurance reports and proposals from board meetings. All documents were obtained from the LHAs/RHAs' websites and are publicly available information. All documents studied were approved by local and/or regional boards and had undergone the political processes required prior to final decision.

The front-end reports are essential in hospital project decision-making processes, and are required to include content of such a quality that project conclusions can be drawn, which also is stated by Elf et al. (2012). In Norway, applications to the Ministry of Health and Care Services (Ministry) from the RHA for project financing are based on the concept phase report and the report from the quality assurance. The role of the reports in the planning processes also mean they are vital to later project outcome assessment. They therefore play an important role in the continuous improvement of planning processes (Deming, 1994; Elf et al., 2012).

Document analysis is an efficient and cost-effective means of research, and is one that is suitable for qualitative case studies (Bowen, 2009). Documents provide broad coverage, which is a benefit given the complexity and long planning time-lines of hospital projects (Bowen, 2009).

A template for each phase was prepared based on the guidelines' content expectation. This template was used to assess whether and to what extent the projects fulfilled guideline expectations. The template contained main topics to be covered, mirrored from the guidelines' expected content, and several categorising questions were asked for each topic to evaluate the cases' coverage. The questions were mainly categorised by either C (covered), P (partly covered) or NC (not covered). Sometimes a \pm -scale was used to provide nuances. The answer N/A (not applicable) was also used, especially for case 5, which was planned prior to the 2011 guidelines thus using an earlier guidelines' version, and to some extent for case 2, which represents a 'smaller' project partly requiring fewer comprehensive elaborations. A written summary was prepared for each question, to allow for further discussions among the authors and for comparison reasons. Some of the guidelines' requirements, e.g. those regarding descriptions and comparisons, could not be sufficiently addressed by the simple categorisation method used. These requirements were, however, included in the overall analyses of the cases. The template and categorisations for the idea and concept phases can be viewed in Tables 2 and 3, respectively.

A numerical value was then assigned to each categorisation for each case. The numerical values were totalled for each main topic for each case and viewed against a 'fully covered'- scenario in order to illustrate the cases' relative compliance with the guidelines. It should be emphasised that this only provides a very rough visual overview of the extent of coverage.

The external quality assurance reports were finally read and summarised, and our findings were compared with the comments of the external quality assurance teams.

Topics displaying common features or other noticeable characteristics were further sorted and analysed.

The study is performed on Norwegian cases using guidelines for hospital planning in Norway, which are used as a categorisation template in this study. This limits the study's possibilities for generalisation, which also corresponds to our research paradigm. However, the study findings may facilitate learning for those who use them, which involves naturalistic generalisation/transferability (Stake, 1978; Gomm et al., 2000), and implies that the researcher should provide good enough case descriptions for the reader/user to decide if the findings fit to their own cases of investigation (Gomm et al., 2000). The theoretical recommendations are commonly accepted; hence, their value can be viewed in a wider context than the Norwegian, strengthening the study's transferability. The five studied cases' findings on shortcomings related to theoretical

recommendations converge. Whilst similar findings from several cases evidently are not a proof to account for a study's transferability to other settings outside the study, the consistent findings and the widely accepted theoretical recommendations may point in the direction of making analytical generalisations by corroborating prior research thus contributing to further expanding and generalising theories (Yin, 2014).

2.3. Validity and reliability

The constructivist paradigm 'replaces' conventional criteria (validity) for assessing quality in qualitative research with the terms trustworthiness (credibility, transferability, dependability, neutrality) and authenticity (fairness, ontological authenticity, educative authenticity, catalytic authenticity) (Schwandt et al., 2007; Saunders et al., 2009; Denzin and Lincoln, 2018).

The external validity deals with the ability to generalise study findings (Yin, 2014). Case studies can be used for analytical/theoretical generalization (Yin, 2014), which Lincoln and Guba have designated transferability (Saunders et al., 2009). Later, Lincoln and Guba (Simons, 2015; Denzin and Lincoln, 2018) introduced the concept of authenticity to determine the worth of qualitative inquiries, a criteria designed for the interpretivist paradigm, and an alternative to validity (Saunders et al., 2009). These criteria deal with how we make sense of and further use or act on our interpretations (Schwandt et al., 2007).

By developing a template for categorisation derived from official guidelines, we had a tool for treating each case neutrally. Several authors carried out the study. The template outline was discussed and subsequent findings were cross-checked separately as an independent control, hence strengthening the study's trustworthiness. The external quality assurance reports are obligatory assessments performed by consultants external to the projects. These were examined after the categorisations had been completed, to compare and to further check the trustworthiness of the findings.

There is some concern regarding the reports' variation in content resulting from the guidelines' somewhat ambiguous expectations on what to include when performing front-end planning. The planners and authors of the front-end reports may interpret the expectations differently among the cases, which, in turn, may affect the briefs' contents and thus the comparison of the cases. However, the available front-end documents are expected to be of such a quality that they can serve as decision basis for managers and government. Thus the use of these publicly available documents should be suitable for maintaining the study's trustworthiness (Lee et al., 2012). The documents further illustrate the nature of the planning process, thus providing a genuine representation of the topic, so facilitating a deeper understanding of context and processes and therefore has a high level of conceptual validity (Flyvbjerg et al., 2011).

By looking at several cases, we also aimed at picking up similarities or convergence of information that could strengthen our findings' credibility (Bowen, 2009).

2.4. Case descriptions

The cases represent hospital projects in Norway meant as typical cases to illustrate how the planning process is practically performed. The cases originate from three of the four Norwegian regional health authorities. Short descriptions of each case is provided in the following, and case characteristics are summarised in Table 1.

2.4.1. Case 1

Case 1 represents both a merger of somatic and psychiatric services and a re-location of a hospital, and is one of several hospitals constituting the LHA. The hospital is also, as the only hospital in the LHA, assigned responsibility for specialised functions. Several alternatives for developing healthcare services in the LHA as combinations of level of services and different locations have been discussed during the idea and concept

Table 1
Project characteristics.

Project no.	Hospital type	Merger	Potential re-location	Idea phase duration [approx. months]	Concept phase duration [approx. months]	Project triggering factor	Demand for area reduction	No. alternatives ^a brought to concept phase	Area from board approvals BTA [approx. m ²]	Cost [billion US\$, 2017-value]	
										P50	P85
1	Local health authority	Yes	Yes	6	19	Old building not suitable for future needs, too small and old fashioned	Yes	3 ^b	114 000	1.1	
2	Part of local health authority	No	No	10	20	Old buildings not suitable for future needs	No	2	43 000	0.3	
3	Part of local health authority	Yes	Yes	22	16	Old building, discussed over several years, not suitable for future needs	Yes ^c	1 (2) ^d	59 000	0.5	
4	Large hospital	No	Yes	6	31	Demographics, future activity and tasks, shortage of area in the future	Financial constraints; amount given for first building step	3	94 000	1.0	
5	Local health authority	Yes	Yes	4	19	Old buildings, not suitable for future needs	Yes	3	87 000	0.56	

^a All projects have included the 0-option (mandatory according to guidelines). However, this is used as a reference as it is not considered as viable for future needs.

^b Also looked at variations of the 0-option.

^c both due to new calculations, further demands in later phases as well.

^d Authoritative constraints reduced the number of main alternatives, main alternative was further divided into two possible solutions for operations.

phases over several years. Population growth and old buildings not suitable for future needs are the main project triggering factors.

2.4.2. Case 2

Case 2 represents a replacement of the LHA's main hospital and constitute the final stage in the LHA's long-lasting construction plan for modernising its hospital buildings. This case does not include a new location or merger.

2.4.3. Case 3

Case 3 represents a merger and re-location of two hospitals as part of a LHA. The triggering factor for the project was poor building conditions especially at one of the hospitals. The project's history is long and troublesome. Prior to the studied project, one of the hospitals had completed the concept phase suggesting replacement of the eldest hospital, but the project was stopped due to financial circumstances, and the Ministry of Health and Care Services required new elaborations to solve the unsatisfactory situation. This led to the merger of the two hospitals and long discussions regarding a new location and level of services. The case represents a history of years of political battles and compromises and high conflict levels between the many stakeholders to this project.

2.4.4. Case 4

Case 4 represents building of a new, large hospital with specialised functions. The hospital is not result of a merger but represents a re-location from its original site. The project-triggering factor was old buildings, expected population growth and growth in future tasks and activity not corresponding to the existing buildings and location.

2.4.5. Case 5

Case 5 represents a merger of several hospitals and re-location to a new hospital serving as the area's main healthcare provider. Outpatient services are shared with a smaller hospital. The project-triggering factor was old buildings unsuitable for future needs. Renovation was not an option due to large investments costs over time. A merger of services was regarded beneficial for increasing service quality and for the operating

economy.

All cases represent time-consuming processes. Table 1 shows the duration of the idea and concept phases for each case, but it should be noted that the ideas and strategies leading to initiation of the idea phase often started long before this initiation. Cases 1, 3 and 5 also experienced changes to their original mandates due to decision-makers' demands dealing with e.g. levelling of services and introduction of new potential locations after the concept phase. Three of the cases represent mergers leading to re-location. Changing healthcare services, whether it is re-location, resource/service re-allocation or both, generally lead to comprehensive discussions both on the political, societal and organisational level. This is clearly illustrated in case 3. A merger of hospitals in two small cities and a following re-location to a building plot nearest one of the two cities, lead to extensive political discussions, hostilities between the two cities, retirement of people in leading positions, a formal hearing and finally a trial aiming to invalidate the decision, initiated by the city that did not get the hospital nearby. The decision was not reversed. The history and political environment vary around the cases.

Areas and costs were retrieved from case documents from the regional boards' handling of concept phase reports. Costs are calculated for the 2017 value in Norwegian kroner using The Bank of Norway's rates (The Bank of Norway), and were converted into US \$.

2.5. Limitations

Using documents as a sole source of information may present a potential bias in the research. There is a risk that documents will not provide sufficient detail to fully answer the research question (Bowen, 2009). Document analysis is often used to complement other research methods for the purpose of triangulation, which is considered to be important to reduce bias (Bowen, 2009).

The study uses reports that are based on the 2011 guidelines. The 2017 version removed the idea phase and added a project-framing phase to define goals, premises and framework for the planning process and the project. Localisation should be decided before starting the concept phase. The concept phase is split into two steps. Step one should present

Table 2
Coverage of main topics in the idea phase.

MAIN	READER'S GUIDE QUESTIONS	CASES				
		1	2	3	4	5
OBJECTIVES	Strategic plan present?	C	C	C	C	C
	Need for revision of plan? Which?	C	P	C	C	N/A
	Does the strategic plan include the project?	C	C	C	C	N/A
	Do the project align with the LHA/RHA investment plan?	P	P	C	P	N/A
	Are possible, principal solutions defined? What are they? How do they separate?	C	C	C	C	C
	Are solutions for both operations and construction presented?	P	P	C	C	N/A
	Are structural solutions present?	C	C	C	C	N/A
	Is a feasibility study performed?	C	C-	C	C	N/A
	Did the feasibility study show differences between the potential solutions?	C-	N/A	C	C	N/A
	Did the feasibility study lead to any conclusions; was it possible to decide on which alternatives that could go through to concept phase?	C	N/A	C	C	C
SCOPING	Is the project sufficiently 'scoped'?	C	C	C	C	C
	Can the project be separated from other needs/projects in the LHA/RHA?	C	N/A	C	C	C
NEXT PHASE	Mandate for concept phase?	C	C	C	C	N/A
	Objectives, success criteria included?	C	N/A	C	C-	N/A
	Objectives, preconditions and project framework, success factors described?	C	N/A	C	NC	N/A
	Sufficient basis for comparison	P	N/A	C	NC	N/A

Table 2 (continued)

MAIN	READER'S GUIDE QUESTIONS	CASES				
		1	2	3	4	5
RELEVANCE, POSSIBILITY, SUSTAINABILITY	of alternatives supplied?					
	Criteria for evaluation of alternatives and consecutive choice?	C	N/A	C	P	P
	Resource allocation and plan for concept phase following guidelines?	C	N/A	C	P	N/A
	Activities and milestones? Timeline?					
	Project management plan?					
	Expected main conclusions/deliveries in concept phase described?	C	C-	C	C	N/A
	Organisation, responsibilities between project organisations and parent organisation described?	C	P	C	C-	N/A
	Are these themes covered? How?	C	P	C	C	C
	Is the expected number of alternatives (3-4, including 0-option) included?	C	C	C	C	C
	0-option should show current building can be financially optimized to continue acceptable capacity in current buildings lifetime. 0-op- tion is the relevant solution if the investment projects cannot be accomplished	C	C	C	C	C

different alternative concepts, this leading to a recommendation. The recommended concept will be further elaborated in step two. The recommended concept is then ready for external quality assurance, so reaching the concept decision-gate. The intention of front-end planning, however and as stated in the guidelines, remains the same. This makes insight into the planning processes based on the 2011 guidelines valuable to the objective of gaining more knowledge and further improving the planning processes.

This study is based on the phase reports and the external quality assurance reports. We are, however, aware that there also exist underlying elaborations, in particular for the concept phase. These elaborations detail the different solutions through the use of successive room

programmes. The report from the concept phase contains the main findings from the detailing and serves as a master document. Decisions made by the local and regional board and the governmental bodies are based on the concept phase report and the external quality assurance.

The findings do, however, serve as a step to deepen our understanding of front-end performance in hospital projects. Moreover, it can contribute to an improvement of front-end hospital planning.

3. Results and analysis

3.1. Idea phases

Table 2 shows the outline of the reader’s guide and categorisations (topics and questions) for the idea phases.

Fig. 1 shows the results for the idea phase. Coverage per main topic is displayed relative to a ‘fully covered’-scenario, that is answering ‘covered’ (C) to all questions in the main topic.

The studied cases show quite good compliance with the guidelines’ requirements for the idea phase. Cases 2 and 5 show slightly less consistency, which can be explained by case 2 being a smaller project, and case 5 using earlier guidelines. The topic *Relevance/Possibility/Sustainability* also considered if the cases presented financially realistic alternatives and how sustainability was interpreted and handled. All cases included alternatives that were too expensive, except case 2. For one of the cases, all alternatives presented were more expensive than the RHA had expected. Sustainability is mainly seen in a financial perspective. However, in cases 1, 3 and 5 there are traces of environmental aspects and discussions on how to ensure future workforce (sustainable recruitment).

3.2. Concept phase

Table 3 shows the outline of the reader’s guide and categorisations for the concept phases.

The results for the concept phase are shown in Fig. 2. Coverage per main topic is displayed relative to a ‘fully covered’-scenario, that is answering ‘covered’ (C) to all questions in the main topic.

The concept phase categorisation shows quite good compliance with the guidelines’ expectations. The *Financial considerations*-topic is the least

consistent topic, which is mainly due to a minor important lack of P30-calculations, but more importantly, a lack of pre-defined cost cutting measures. All cases have performed or partly performed socio-economic analyses, and all cases experienced that the analyses contributed to providing a sufficient basis for making choices between alternatives or solutions. Concerning the *Content*-topic, all cases have covered the assessment and ranking of alternatives. However, the cases handle this differently, e.g. the objectives hierarchy is only partly used for this purpose, which will be discussed in the following section.

3.3. Planning process, opportunity space and concepts

Using the theoretical recommendations summarised in this study as a backdrop while studying the projects’ compliance with theoretical guidelines, pronounced topics emerged from the analysis. These can be divided into two main categories, topics associated with the *planning process* (1), theoretically related to creating the project perspective, aligning the project objectives and analysing stakeholders’ needs and interests, and topics associated with the *exploration of the OS and elaboration of concepts* (2), theoretically related to the development of concepts and assessment of the chosen concept:

- (1) Planning process
 - The guidelines are thoroughly applied, but the projects interpret the guidelines differently
 - Projects display the same triggering factors
 - Long planning timelines
 - Challenges in formulating the objectives hierarchy
- (2) Exploration of the OS and elaboration of concepts
 - The hospital concept is ambiguous
 - Absence of the use of theoretical assessment tools when searching for concepts
 - Early detailing despite large uncertainties and scant information
 - The OS is narrowed early, early ‘lock-in’
 - Realistic solutions are equal to financially realistic solutions

There are only minor differences between the project planned prior to the 2011 guidelines and the four other cases. There are small differences in the *Next phase* and *Evaluation* topics in the idea and concept phases,



Fig. 1. Coverage idea phases.

Table 3
Coverage of main topics in the idea phase, (*P35).

MAIN	READER'S GUIDE QUESTIONS	CASES					
		1	2	3	4	5	
OBJECTIVES	Report from idea phase available? Need for revision of plan? Which?	C	C	C	C	C	
	Is a mandate present? Are different solutions emphasised?	C	P	C	C	C	
CONTENT	Elaborations demands (program, technical, equipment) for each alternative?	C	C	C	C	C	
	Cost calculations?	C	C	C	C	C	
	Consequences operational costs?	C	C	C-	C	C	
	Assessments and ranking- how and which criteria are used?	C	C	C	C	C	
PROGRAMME TO SOLUTION	Detailing reports present	C	P	C	C	C	
	General themes elaborated for each solution? Any special analyses?	C	C	P	C	P	
PROGRAMMING AND DETAILING	Requirement specifications? Premises for dimensions for future solution?	C	C	C	C	C	
	Current state, demands/consequences for future development/changes	C	C	C	C	C	
	Clinical pathways used in planning?	P	P	P	P	C	
	Flexibility handled?	C	C	C	C	C	
	Further detailing (sub-specifications)?	C	N/A	C	C	N/A	
	Organisational development handled? How? Separate project?	C	C	C	C	C	
	Further detailing equipment- how is this handled? Separate project?	C	C	C	C	C	
	Further detailing technical issues- how is this handled? Separate project?	C	C	C	C	C	
	Pre-project completed according to guidelines?	C	C	C	C	C	
	Logistics, personnel, goods- principles for handling?	C	C	C	C	C	
	FINANCIAL CONSIDERATIONS	Project costs- P50 and P85	C	C	C	C	C
		Project costs- P30	NC	NC	C*	NC	NC
		Socio-economic analysis performed	C	P	C-	P	C
Pre-defined cost cutting measures		NC	NC	NC	NC	C	
Financial plan		C	N/A	C	C	C	
EVALUATION	Alignment of project to RHAs/LHAs long-time investment budgets/financial scope	C	P	C	C	C	
	Should the project be followed through or is it possible to choose the 0-option?	C	C	C	C	C	
	Evaluation criteria present?	C	C	C	C	C	
	Fulfilment of goals-how does this correspond to objectives hierarchy?	C	C-	C-	C	P	
	Financial sustainability and scope	C	C	C	C	C	
	Capacity, quality, RHA's provider responsibility	C	C	P	C	P	
	Coordination	C	C	C	C	P	
	Efficiency, operation planning gains	C	P	C	C	P	
	Environment: patients, personnel (working environment)	P	C	C	C	N/A	
	Environment: ext., need for energy, CO2-waste	C	C	C	C	C	
	Patient safety	C	C	C	C	N/A	
	Recruitment, development reg. knowledge etc.	C	C	C	C	N/A	
	Quality of buildings, flexibility	C	C	C	C	C	
	Societal consequences/issues	C	P	P	C-	N/A	
	PLANS	Mandate for next phase	C	P	C	C	P
Plan for construction phase		C	C	C	C	C	

respectively. The contents of the idea and concept phase reports for this project and for projects that used the 2011 guidelines were generally very similar.

3.3.1. Process related issues

The categorisations of both phases show that the projects adhere quite well to the guidelines and that they endeavour to cover the required topics. A number of different solutions to the defined need were presented in the idea phase, which is as expected by the guidelines (3–4 alternatives including the 0-option). Further elaborations of the solutions in the concept phase enable the decision-making authorities to make a conceptual choice. The processes have, even so, produced different outcomes or 'behaved' in different ways. All projects share the same triggering factors, as seen in Table 1. These factors include old buildings that are not suitable or viable for future health services. All projects also have long planning timelines of between 25 and 38 months for different reasons, this time being unevenly distributed between the idea and concept phases.

The guidelines emphasise the importance of the prominence of the objectives hierarchy in projects. The clarity and further use of these objectives do, however, vary. It seems that definition of the objectives hierarchy is challenging. The objectives hierarchy is further one of the most important topics assessed by external quality assurance. This may affect planning processes, making the definition of objectives compulsory in order to meet the standards. Even if all cases have framed an objectives hierarchy, the objectives' formulation and relations need to be investigated. We found overlap between the levels of objectives and objectives

that were not always realistic. Objectives were neither sufficiently operationalised, making them difficult to measure. In case 3, the objectives were developed through the phases and became more specific aiming for better measurability. One side effect of this 'transformation' was, however, that some of the objectives became actions rather than objectives. It is furthermore expected that concepts are evaluated based on criteria related to or deduced from the objectives hierarchy. While all cases presented evaluation criteria, only case 4 used the objectives in a systematic manner for this purpose. This case allocated weights to each objective, so using this as a decision tool. It also occurred that evaluation criteria presented in the concept phase were not traceable in the idea phase report, and we found examples of new criteria being introduced or added as a supplement or substitution to criteria deduced from the objectives hierarchy. The ranking of conceptual solutions was therefore often based on ambiguous or vague preferences. This may be partly due to the challenges presented by formulating the objectives hierarchy.

3.3.2. 'Opportunity space (OS)' and concept related issues

3.3.2.1. The hospital concept is ambiguous. We found that all cases interpreted and used the guidelines differently, particularly when defining concepts. This implies that concept development is ambiguous in hospital planning. The projects' ability to explore the OS affects concept development, this ability to explore varying between the cases. The framework conditions and political issues formed by authority demands also heavily affect the OS, narrowing it before appraisal has begun.

The guidelines oblige the projects to present, in the concept phase, a predefined number of concepts as solutions to the defined need, which the majority of cases do. However, this requirement does affect the processes. Some concepts were just variations of a single ‘theme’, which probably relate to the need for meeting the ‘stipulated number’ of concepts required by the guidelines. These concepts are not clearly different and do not meet the diversity intentions stated in the literature on identification of concepts. The degree of solution differentiation varied between projects. Localisation was not pre-set in four cases (1, 3–5), thus the localisation decision became a weighty issue in the creation of concepts. Localisation was therefore pursued as a concept ‘variation parameter’ in the concept phase and tends to become a dominant parameter in the variation between concepts, different concepts often being just different locations.

Other conceptual variations presented include the allocation of services between the new hospital and existing sites, financial aspects and the allocation of somatic vs. psychiatric services. These discussions strongly attract the attention of the different stakeholders and are frequently the subject of media interest. Localisation discussions likewise. The political determinant in major projects cannot be neglected and may considerably influence the planning processes and OS. This is exemplified in cases 1 and 3. The former case had to revise its concept phase due to authoritative demands regarding localisation, while the latter was set in a hostile political environment carrying a troublesome project history, where preliminary solutions to the defined need were politically refused thus narrowing the OS.

3.3.2.2. The demand for realism. The guidelines’ recommendation that the solutions should be realistic was treated unambiguously as a financial issue in the cases, i.e. only relating to parts of the notion described in the theoretical framework. Financial reality also varied between the projects. Every suggested solution was, in one project, too expensive. All projects,

except one, also experienced a reduction in the initially planned area due to the preliminary layouts turning out to be too expensive.

3.3.2.3. Looking to others. The studied projects also examined other projects in the sector and referred to these. In case 1, the board even assigned an additional task of elaborating a new solution to the defined need using parameters from the last completed hospital project in the country. The effects of the choices made in this last completed project were, however, unknown at the time. Constraints such as this contribute to a narrowing of the OS. In this specific project, the constraints also introduced a risk for the project outcome and long-term result since the effects were unknown.

3.3.2.4. Theoretical tools. It is not easy to trace any systematic use in the reports of the tools that are available for front-end planning and appraisal. Most projects use tools to assess the concept, such as risk analysis and cost estimations. Systems analysis and strategic tools for concept definition and elaboration are, however, only used to a lesser extent. Some projects still performed feasibility studies and uncertainty mappings. Financial and economic issues (cost estimates, calculations, and considerations of financial sustainability) were in particular analysed with respect to uncertainty. The most likely explanation of this detailing is the projects’ interpretation of the guidelines’ demand for realistic solutions as a financial issue. The needs analysis performed in the idea phase is primarily based on projections of the need for health services, which in turn is based on population growth, age distribution and epidemiological development. This is combined with qualitative factors such as technology development, distribution of health services between primary and secondary care and changes in the level of care. Calculation of the area is based on these projections, on recent activity and current area standards and is performed quite early in the planning process. It is therefore an influential yet politically inferior determinant of the OS. The

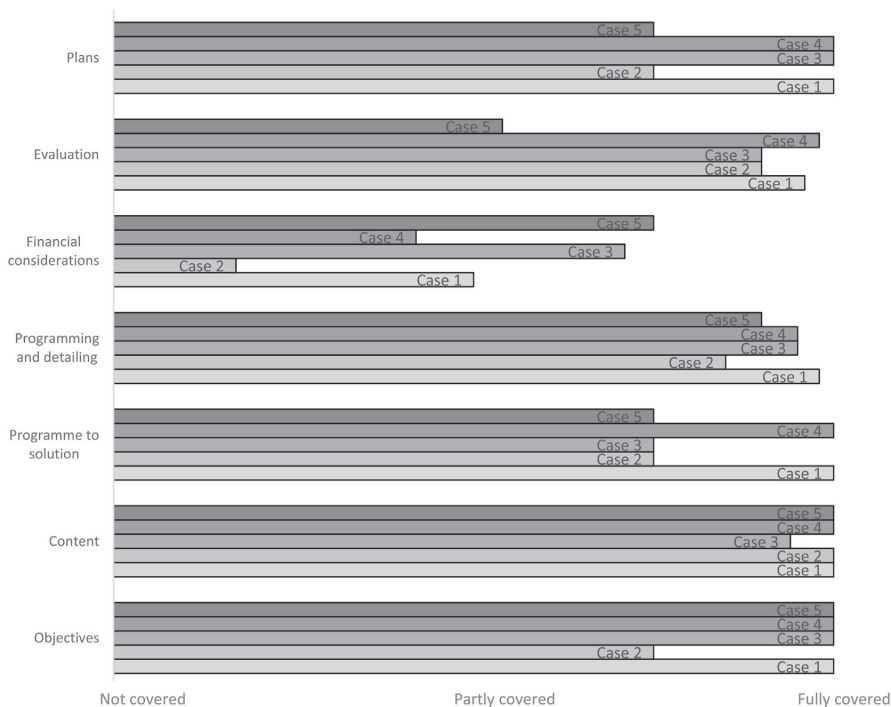


Fig. 2. Coverage concept phases.

accuracy/uncertainty of the calculations should be a topic of discussion, particularly where allocation/localisation-issues are open to debate. The area is scrutinised further in the processes and used in the very decisive economic considerations of these projects. There is reason to believe that some of the parameters used in area calculations have a high level of uncertainty due to the estimations of future services. There is no explicit handling of this uncertainty, as opposed to the financial aspects uncertainty.

4. Discussion

There are indications that Norwegian hospital projects' front-end phase has potential for improvement, which is in accordance with the findings from the Auditor General of Norway (*Office of the Auditor General of Norway, 2011*). This study set out to investigate how Norwegian hospitals' front-end planning corresponds to official planning guidelines' expectations, and if planning procedures have any shortcomings compared to recommendations from extant front-end theory. By highlighting challenges in front-end planning compared to theoretical recommendations, we provide a starting point for improving the planning practices. Theoretical recommendations, as summarised in this study, comprise the creation of a project perspective, alignment of project objectives, analysing stakeholders' needs and interests, development of concepts and the assessment of the chosen concept concerning cost, profitability, timing and risk.

The findings from the study mainly fall into two main categories, one that relates to the *planning process* and the other to *exploration of the OS and elaboration of concepts*, which will be discussed in the following.

4.1. The planning process

Generally, the study indicates that the cases adhere well to the guidelines. The cases endeavour to include the expected topics, even if the guidelines are regarded as general advice. This could be because the reports are subject to an external quality assurance. However, there are some differences regarding what is included by the different projects, pointing back at a certain ambiguity in the guidelines' demands. This can further be utilised for learning purposes if we are able to gather these experiences systematically through e.g. evaluations.

Theoretical recommendations for the processual aspect of front-end planning include creation of a project perspective, aligning project objectives and analysing stakeholders' needs and interests. The objectives hierarchy plays a major role in the guidelines, which is furthermore emphasised in the quality assurance reports. All studied cases present an objective hierarchy, but it seems to be a challenge to establish this in a logical and measurable manner. The objectives found in this study, were unrealistic and difficult to measure, which is consistent with the external quality assurance feedback, and represents a shortcoming according to theoretical recommendations. Challenges associated with definition of objectives hierarchy are further reflected in general understanding (*Smith et al., 2003; Klakegg, 2006; Samset, 2010; Klakegg and Haavaldsen, 2011; Samset and Volden, 2016b; Linton et al., 2019*). The objectives hierarchy connects to the project strategy and alignment of objectives, which is a premise for project success (*Klakegg, 2010; Williams et al., 2019*). Hospital projects' complexity contributes to this challenge due to political determinants, stakeholder heterogeneity and hospital organisations' inherent pluralism, leading to different perceptions of success (*Denis et al., 2011; Aubry et al., 2014; Aubry and Lavoie-Tremblay, 2018; Fr chet te et al., 2020*). Stakeholder multiplicity in hospital projects makes stakeholder handling in the front-end important to provide the best possible point of departure for satisfying stakeholders' expectations and realisation of societal objectives. This also holds that hospital projects go beyond being mere construction projects due to inherent organisational transformations following healthcare development and the societal impact following these projects (*Aubry et al., 2014; Aubry and Lavoie-Tremblay, 2018; Fr chet te et al., 2020*).

Long planning timelines, as seen in this study, represent a challenge for finding strategically sound solutions due to the rapidly changing hospital and healthcare service environment. This is also seen in other public sectors and is a characteristic for large and complex projects (*Miller and Hobbs, 2005; Andersen et al., 2007; Samset, 2008; Flyvbjerg, 2014; Klakegg et al., 2016; Wisth and Hjelmbrekke, 2018*). Familiarising with project context, and further aligning needs, objectives and effects by examining the project holistically to enable mutual understanding and strengthen the odds for success, is a theoretically recommended activity early in major projects' front-end which should be prioritised. Generally, major projects' need to be successful at different levels to echo the societal call for desired development and value for money. Thus, we need to look at success at both a tactical (project) and strategic (societal) level, which represent short-term and long-term perspectives, respectively. The ability to handle the relation between project objectives and project development is, however, crucial to project success and a well-known project strategy challenge (*Morris et al., 2009*).

Potential solutions to the defined need should be assessed in terms of the degree to which they meet the project's objectives. The lack of a clearly defined objectives hierarchy therefore makes the evaluation and ranking of potential solutions difficult. The ranking of conceptual solutions is often based on ambiguous or vague preferences due to the delimitation of rationality, as the future is impossible to fully predict and knowledge of the different solutions and their consequences is limited (*Samset et al., 2013, 2014*).

4.2. Exploration of the 'opportunity space' (OS) and definition of concepts

Exploration of the OS and the elaboration of concepts stood out as a pronounced topic when investigating the front-end documents using a backdrop of theoretical recommendations, comprising the concept development and concept assessment concerning cost, profitability, timing and risk.

4.2.1. Exploring the OS, concepts and early detailing

The guidelines' expectation on presenting a specific number of conceptual solutions to the defined need was followed by the majority of the cases. However, the defined needs in healthcare often require a new building. The concepts therefore solely tend to be modifications of alternative dimensions (services provided), localisations or both. This limits the needed openness to find possible principal solutions to the defined need, described in literature. The need to decide localisation tends to dominate the concepts, different concepts often being just different locations. Demanding contexts such as political battles or disagreements among stakeholders adds to project complexity and may provoke premature solutions, not making room for the openness needed to explore future solutions. This calls for a discussion on what should constitute a hospital concept.

Theory states that choice of concept is vital to strategic success, which is why the front-end plays such an important role in this (*Klakegg and Haavaldsen, 2011; Samset and Christensen, 2017*). Different concepts are found by exploring the OS. 'Degrees of freedom' is therefore an important premise in front-end planning and in finding strategically successful concepts. The delimitation of the OS by different determinants, reduces the 'degrees of freedom', and introduces a risk of missing suitable concepts. This is further emphasised through healthcare being said to be path dependent (*Samset et al., 2013, 2014*), the same steps, actions and presumably mistakes being carried out over and over again. As shown in case 1, a demand was set to use parameters from the last completed project without knowing the effects. Strategically successful concepts can also be lost due to early lock-in (*Flyvbjerg, 2014*), one concept being preferred early in the planning process. This negatively influences the analysis of alternatives. Our findings indicate that some of the decision-makers' project demands appear to bring about early lock-in or reduce 'degrees of freedom', which may have compromised OS exploration. In case 1, for example, the concept phase had to be revised due to

additional demands from the LHA board. The balance between concept elaboration and political decision-making is a well-known challenge, one that is yet to be solved (Samset and Volden, 2016a; Klakegg et al., 2016). An appreciation of the importance of 'degrees of freedom' in the front-end phase should be strong at all levels - from authorities initiating and further scoping the project to the planners who execute them. The processes should not be short-circuited by, for example, an external constraints level that is too high. Hospitals are often set in complex settings, due to e.g. political pressure and multiple stakeholders with divergent perspectives. Thus, the need to examine the project in a more holistic manner, as shown in e.g. the OECD evaluation model, may strengthen the basis for strategic project success. None of the projects performed such assessments systematically. This implies that a systematic and formalised way of assessing the projects is required. This is also seen in other studies (Smith et al., 2003).

Further, theory elucidates that the level of detail in early project appraisals, due to the high level of uncertainty and the scarce supply of information, is not that valuable (Samset, 2008; Samset and Christensen, 2017). Precise information gained at this point will rapidly become obsolete. However, it seems like the complex and rapidly shifting environment within which hospitals and healthcare development exist combined with hospital projects' long-life expectancy become a paradox for planners. The hospital area is calculated early in the front-end phase and is based on quantitative and qualitative projections of future services, mainly to find project cost, which is perceived as an important parameter, as also seen in the study by Linton et al. (2019). Cases 1, 3, 4 and 5 had to reduce their preliminary area, due to cost being too high.

Theory has also pointed at the risk of 'analysis-paralysis' i.e. bringing in too much detail early on in the project process (Samset and Christensen, 2017). Making decisions when uncertainties are high is challenging and seems to generate a need for establishing a quantified basis for decision-making. When conflict levels are high, it seems that a need for concrete tasks and demonstrated progression emerge. This makes quantifying what is quantifiable pertinent, so giving these elements primary focus in the elaborations. In turn, this suppresses creativity and imagination, abilities considered beneficial for creating future concepts, and further discussions on how to develop future healthcare services, which potentially leads to a loss of viable concepts (Klakegg, 2010), and thus compromising long-term project success. Some of the cases mention scenarios, testing levels of different parameters. This is, however, not given much attention. Scenarios could be a way of establishing perspective, tuning different parameters and looking at corresponding outcomes.

The 'degrees of freedom' inherent in concept elaborations should be taken fully into consideration when performing front-end planning, and can be further explored by gaining more knowledge, by the suitable use of existing methods for early project appraisals and the inclusion of this into proper evaluation systems or models. This, however, is a deficiency in the hospital planning processes, further underlining the claim of Samset and Dowdeswell (2009, p.78) that *'...the insight and visions to guide strategic planning are at hand, but they are still not well translated into viable conceptual solutions'*.

4.2.2. Concepts and looking to others

Taking the outside view, as part of concept development, is said to be important in choosing the right concept (Flyvbjerg et al., 2009). The studied cases to some extent use experiences from other projects. It is said that the evaluation of the effects, i.e. fulfilment of the project's goals, should not take place until approximately two years into the operational phase (Andersen et al., 2007). Care should therefore be taken to avoid path dependency, even if learning from similar projects is important as part of continuous improvement (Deming, 1994; Klakegg et al., 2016). Gained experience should always be considered in its original context. It is not suitable for direct adaption to and application in other projects. Samset et al. (2013) also stress that the processes could not be improved by altering the analytic procedures alone. They are part of a larger system

of institutional, societal and political aspects, which also should be perceived as the outside view. Learning from other public sectors, in which project results are established and systematically evaluated, would help in taking the outside view.

5. Summary

To summarise our main findings pertaining to RQ1 regarding the studied projects' compliance with official planning guidelines, we found that the projects conscientiously use formal planning guidelines even if these are said to be advisory. Our findings indicate that the projects adhere well to formal planning guidelines and largely cover expected topics.

The guidelines appear to be important in harmonising the planning of hospitals in Norway, which aids the comparison of projects and learning from each other, as is the Ministry's intention. The 2011 guidelines were evaluated and revised in 2017 by the Norwegian Hospital Construction Agency (Norwegian Hospital Construction Agency, 2015). The conclusions were that the guidelines had been useful and have had an impact on planning processes, as is also seen in other public sectors (Samset et al., 2013). The guidelines were said to be of an advisory nature. They do not provide checklists or stipulate demands. This provides room for diversity and qualitatively good solutions and processes. This diversity is, however, said to provide a basis for choosing a number of local solutions which give no clear guidance on which to recommend. This paper argues that diversity is not fully achieved with today's practice. This is also reflected in findings of the Auditor General of Norway (Office of the Auditor General of Norway, 2011). This might be improved by the new guidelines.

Even if the front-end phase is said to be insufficiently understood (Williams et al., 2019), prior research do provide recommendations on different aspects and actions that should be considered when performing front-end planning (e.g. Samset, 2010; Williams et al., 2019). Thus, our second research question aimed at identifying possible shortcomings in the studied projects according to theoretical recommendations. The theoretical recommendations are only formalised to a lesser extent in the 2011 guidelines. The projects' capacity to use such approaches independently is limited. This creates a gap between theoretical approaches for front-end planning and practical performance in the hospital projects studied. Several reasons for the observed gap exist, some beyond the projects' power to decide. We discovered that the projects studied displayed mutual front-end challenges when compared to theoretical recommendations for front-end planning. These challenges include vague objectives hierarchies, early narrowing of the OS, early detailing, ambiguous concept definitions, low ability to take the outside view and an expressed economic focus. Failing to deal with these challenges represents a risk of not achieving a successful outcome. The challenges we found are well-known challenges in the front-end of major projects, thus our findings corroborate prior research.

Hence, our study indicates that there is room for improvement in Norwegian hospital projects' front-end when comparing practical performance to best practice from extant theory. This is also in accordance with the findings from the Auditor General of Norway (Office of the Auditor General of Norway, 2011).

Improving front-end planning practices in line with theoretical recommendations from our study, will contribute to a better alignment of hospital projects to the defined needs. This is maintained by providing a better basis for ensuring hospital projects' societal objectives and improving stakeholder handling.

Providing learning insights on what to be aware of when performing front-end planning of hospital projects is important when aiming for success both in a tactical and strategic perspective. This is valuable especially for project managers and decision makers embarking on these complex planning processes often set in challenging environments. Navigating through such landscape may challenge the ability to keep the long-term perspective, thus potentially compromising strategic success.

Taking on a hospital project is not an everyday task for LHAs and RHAs, and one cannot expect necessary experience and competence to be instantly at hand. As seen in the cases, the complexity and unfamiliarity might lead to a need for 'being practical' which compromises necessary future orientation. The OS should be kept open for as long as possible to strengthen the odds for finding the right concept and achieve long-term success. This requires that project managers and project participants are able to handle inherent uncertainties and to keep an open mind even when conflict levels are high due to stakeholder disagreements or political interventions. Avoiding path dependency and analysing the real needs triggering the project are important to enable future sound solutions and project long-term value. Thus, tools to perform early project appraisals should be at hand for the project manager, and if lacking skills, possibilities to gain such skills should be easily obtainable. Hence, guidelines are an essential supportive tool in these processes, which should rely on theoretical recommendations and experiences to avoid the most common project pitfalls.

5.1. Implications

Our study echo the call from [Elf and Malmqvist \(2009\)](#), and [Elf et al. \(2012\)](#) on providing more studies on front-end planning, and provides further insight into the front-end planning of Norwegian hospital projects. The projects' effort to use and follow the guidelines, implicates that the guidelines are needed in hospital projects' front-end. The guidelines' content and quality should therefore, on a regular basis, be evaluated and discussed in light of existing theory, to ensure continuing functionality and usefulness. By highlighting shortcomings in front-end planning compared to theoretical recommendations, we provide a starting point for improving the planning practices.

Evaluation and learning can help achieve continuous improvement. Efforts should be made to systematically perform evaluations linking theory and practice, and to prepare for mutual learning. Importance of evaluation is also pointed out by [Samset \(2010\)](#), [Williams et al. \(2019\)](#) and [Linton et al. \(2019\)](#). Greater knowledge on the evaluation of these projects is required, and suitable evaluation tools should be implemented. This is also emphasised by the Ministry. Other public sectors perform evaluations on a regular basis. The potential for transferring knowledge from these to the hospital sector is great.

Following our research paradigm, this study's aim was to get a thorough insight into Norwegian planning practices and to identify potential challenges, as a point of departure for improvement. The findings have elucidated shortcomings in planning practice when compared to theoretical recommendations, thus revealing a learning potential that connects to the transferability of our study. Bridging the gap between theoretical approaches and practical performance starts with knowledge acquisition. However, different significant parties have to take action on these findings in order to enable improvement (catalytic and tactical authenticity). Managerial implications, in this manner, may be to carefully evaluate and potentially improve guidelines in light of theoretical recommendations, actively stimulate inter-project learning and skills enhancement on project front-end through established forums and educations and systematically perform ex-post evaluations of hospital projects. Moreover, we do see that the challenges experienced in the studied cases partly correspond to the findings from [Elf and Malmqvist \(2009\)](#), and [Elf et al. \(2012\)](#), set in a Swedish context implying that planners might struggle with similar challenges across borders and planning regimes. Further, the theoretical recommendations referred to in our study, are commonly accepted; hence, their value can be viewed in a wider context than the Norwegian. This might suggest that there also could be learning potential outside the Norwegian context. Our findings are more relevant where healthcare is publicly financed.

5.2. Further research

Results from this study come solely from studying documents.

Document studies are retrospective and cannot capture all aspects of a complex front-end process. The trustworthiness of the results of this study could, however, be improved by triangulation using other data sources. Going deeper into the projects by interviewing different stakeholders would be a suitable approach, this approach looking 'beyond' the reports and giving more insight into the *processes* from different perspectives. This may also give us an opportunity to explore the hospital projects' as organisational transformations and provide better understandings regarding stakeholder multiplicity and handling.

The aim of this study was not to generalise, but to gain a deeper understanding of how hospital projects' front-end planning is performed in a Norwegian context compared to theoretical recommendations and to shed light on potential challenges found in these processes. Unearthing such challenges provides a starting point for improvement of the planning processes, which is called for by e.g. the Auditor General of Norway ([Office of the Auditor General of Norway, 2011](#)). However, the commonly accepted theoretical recommendations summarised in this study and the convergent findings from the five cases corroborating prior research, may indicate that the findings have a generic nature thus making room for analytical generalisations. Still, this has to be discussed and validated through further research aiming to clarify to what extent the findings can be considered generic. Thus, other avenues for research could be a comparison of planning practices across public sectors, or looking into the front-end planning of other countries' hospital projects.

6. Conclusion

Being part of a larger study aiming for improvement of Norwegian hospital projects' front-end phase, this study set out to obtain more insight into the front-end planning processes. This further echoes the call from several authors and entities ([Elf and Malmqvist, 2009](#); [Larsen, 2011](#); [Office of the Auditor General of Norway, 2011](#); [Elf et al., 2012](#); [Edkins et al., 2013](#); [Pauget and Wald, 2013](#); [Norwegian Ministry of Health and Care Services, 2015](#); [Consulting Engineers' Association RIF, 2015](#); [Ernst and Young, 2016](#)) for more knowledge and improvement of major projects' front-end phase. Using a qualitative approach under an interpretive research paradigm, we studied front-end documents from five Norwegian hospital projects, which are essential documents for front-end decision-making processes. Our research questions pertained to finding out how front-end planning corresponded to governmental guidelines' expectations and investigating potential shortcomings in the planning processes in light of extant theoretical recommendations for front-end planning. Our findings mainly fall into two categories, one that relates to the planning process and the other to the exploration of the opportunity space and elaboration of concepts.

We found that the projects adhere well to the guidelines' expected contents. This indicates that the guidelines are important for Norwegian hospital planning, and seem to harmonise the planning processes, which aids the comparison of projects and enable cross-project learning, and is in line with the Ministry of Health and Care Services' intentions. However, the studied projects showed some differences regarding what was included in the front-end documents, pointing back at the possibility for interpretations of the guidelines' expectations.

Furthermore, we identified shortcomings in the planning processes in relation to theoretical recommendations, which might compromise the achievement of strategically successful projects. The projects' showed mutual challenges, especially related to vague objectives hierarchies, early narrowing of the opportunity space and early lock-in, early detailing, ambiguous concept definitions, low ability to take the outside view and an expressed economic focus suppressing the exploration of the opportunity space. To bridge the gap between theory and practice, action has to be taken by significant parties. This implies to provide tools for front-end planning and ensure that skills to use them are at hand or are easily obtained. Guidelines are an essential supportive tool, and should rely on theoretical recommendations. The guidelines' content and quality should be regularly evaluated and improved, related to the developing

knowledge of major projects' front-end. Implementing theoretical recommendations both in guidelines and in practice should be a desired and possible development to further improve hospital projects' front-end planning and strengthening the odds for success both on a tactical and strategic level.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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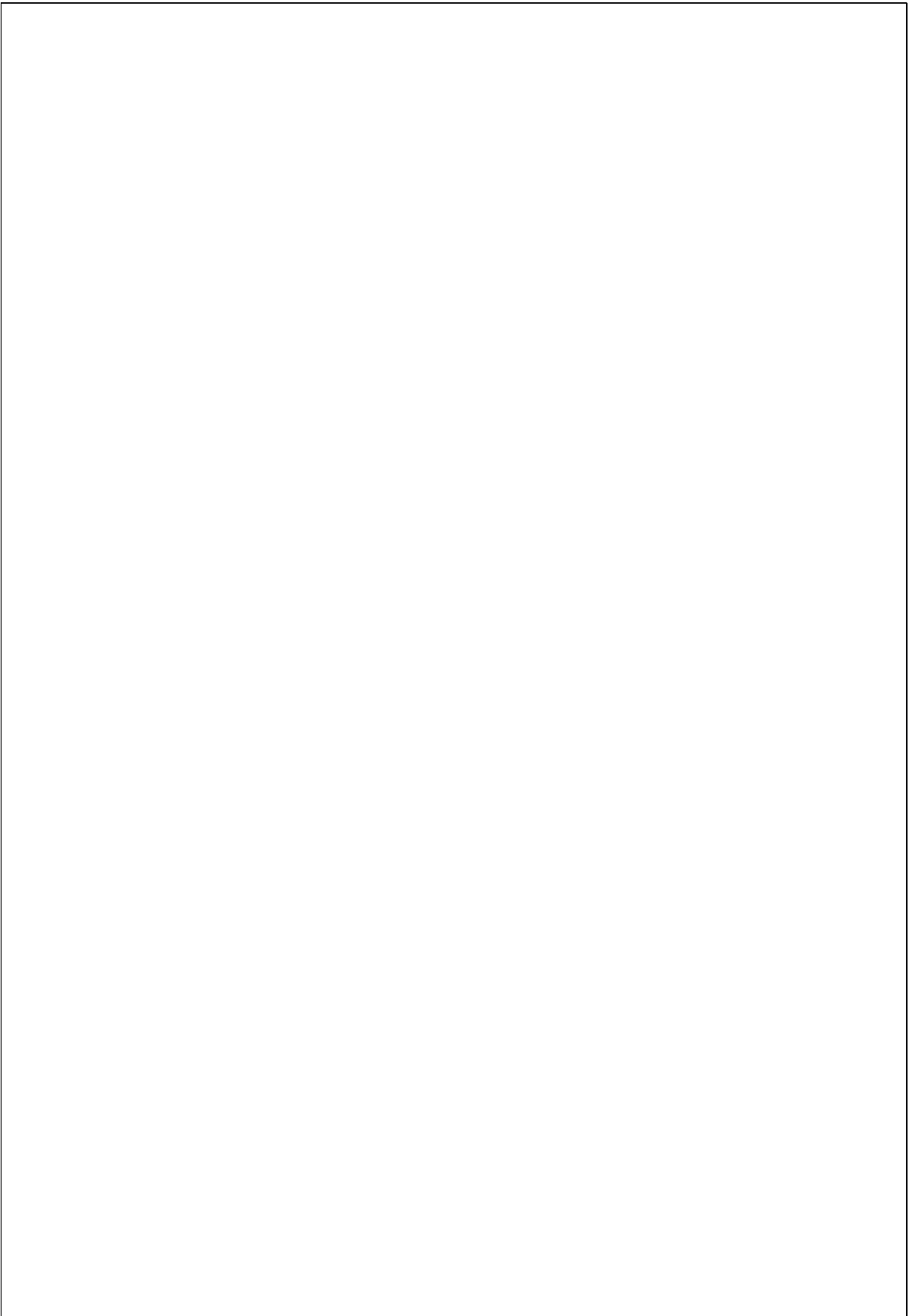
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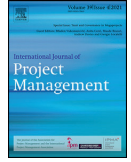
PAPER II





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Exploring collaboration in hospital projects' front-end phase

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ABSTRACT

Hospital projects, like other major projects, start with the front-end phase, which considerably affects projects' strategic success. There is an expressed need for more knowledge of the front-end to improve and thus strengthen the odds for strategic success. Hospital projects are complex and challenging to run much due to multiple stakeholders and societal impact. Hospital projects' stakeholder multiplicity makes collaboration a fundamental activity in the front-end. In this paper, we propose a framework for front-end collaboration in hospital projects constituting the following interdependent categories: contexts, structures, means and catalysts. The categories interact to *make collaboration happen* and *make collaboration work*, indicating that the different categories should be considered at different times in the planning process. Successful collaboration may positively affect project outcome and leads to innovation and learning, which are important assets for hospital projects in identifying successful future solutions, hence strengthening the projects' odds for long-term success.

1. Introduction

Despite established knowledge of the front-end's role in achieving project success (Edkins et al., 2013; Flyvbjerg, 2017; Miller & Hobbs, 2005; Samset & Volden, 2016), the front end phase and role of project management in this phase still appear to be insufficiently understood (Tzortzopoulos et al., 2006; Williams et al., 2019; Edkins et al., 2013).

Also in hospital projects, the importance of the front-end phase is recognised. Insufficient exploration of the opportunity space in terms of focussing on structural issues rather than looking into future concepts integrated with users' needs, may lead to poor outcomes (Elf et al., 2012; Elf & Malmqvist, 2009). Rapid changes in the health sector due to technological and medical advances challenge the development of hospital concepts suitable to meet future needs and the hospitals' long-life expectancy (Bayer et al., 2007; Ettelt et al., 2009; Pauget & Wald, 2013; Särkilähti, 2017). De Neufville and Scholtes (2011) illustrate the value of a flexible design in hospital projects.

Hospitals are complex organisations comprising a multitude of different activities, professionals and mindsets organised differently (Fréchette et al., 2020; Glouberman & Mintzberg, 2001; Mintzberg & Glouberman, 2001). This point of departure makes hospital projects complex at several levels, carrying multiple paradoxes (Aubry et al., 2014). Organisational, structural and managerial complexity due to e.g. multiple and heterogenic stakeholders (Aubry & Lavoie-Tremblay, 2018;

Aubry et al., 2014; Pauget & Wald, 2013; Särkilähti, 2017), as well as uncertainties and pace connected to future medical, technological and demographic development (Bayer et al., 2007; Eeckloo et al., 2007; Ernst & Young, 2016; Särkilähti, 2017), and the projects' socio-political position and inherent decision-making processes (Aubry & Lavoie-Tremblay, 2018; Eeckloo et al., 2007; Särkilähti, 2017), make these projects challenging to run. Coping with project complexity calls for further understanding of the more informal mechanisms embedded in the complexity (Bygballe & Swärd, 2019; Bygballe et al., 2016; Cicmil & Marshall, 2005).

Collaboration is viewed as a stakeholder management strategy (Aaltonen et al., 2015; Savage et al., 2010). Although regarded as fundamental for front-end managing (Edkins et al., 2013; Williams et al., 2019) and project success (Baccarini, 1999; Tzortzopoulos et al., 2006), managing stakeholders and their dynamics is not well understood for the front-end phase (Aaltonen et al., 2015). Stakeholder management strategies are also important means for project managers to shape and handle stakeholder dynamics and positions, in the front-end (Aaltonen et al., 2015) and generally (Olander & Landin, 2005; Savage et al., 1991). From a practitioner's viewpoint, collaboration is a characteristic of projects as complex social settings (Bygballe & Swärd, 2019; Cicmil et al., 2006).

Showing a duality being both a construction project and an organisational change project, hospital projects demand the integration of different skills, knowledge and project perspectives. Managing such integration in the front-end phase, where uncertainty is high and information is

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scant, places demands on the project participants both on an individual and organisational level. Inter-organisational collaboration is associated with both risk and complexity, and collaborative efforts are associated with high failure rates (Bygballe & Sward, 2019; Gulati et al., 2012). Efforts should be made to overcome these challenges in early project phases (Saukko et al., 2020).

Although we are aware of many possible challenges in the front-end phase of major projects that would be worth studying, ref. e.g. Flyvbjerg (2017), our study is limited to investigating collaboration in hospital projects' front-end from a practical viewpoint, taking into account hospital projects' multiple stakeholder nature. Several authors recognise collaboration as important and challenging and closely connected to successful project performance and outcome, however, these efforts mainly concentrate on the project execution phase (Bygballe et al., 2016; Dietrich et al., 2010; Haaskjold et al., 2019; Ika & Donnelly, 2017; Kokkonen & Vaagaasar, 2018; Lavikka et al., 2015; Merschbrock et al., 2018; Pauget & Wald, 2013; Sebastian, 2011). Ika and Donnelly (2017) found that structural, institutional and managerial conditions might enable project success, which can be both initial and emergent. Collaboration was assigned as one of four meta-conditions (multi-stakeholder commitment, collaboration, alignment and adaptation), incorporating the former conditions and providing a strong link between context and success factors (Ika & Donnelly, 2017).

So, how can we understand collaboration in hospital projects' front-end? We set out to answer this research question by studying three Norwegian hospital projects of different size and scope.

Several Norwegian hospital projects have commenced in the last 10–20 years, constituting a unique opportunity for studying the planning of hospital projects of different sizes and scope. Several authors and entities highlight the need for knowledge, innovation and reasonable use of resources in the planning processes Consulting Engineers' Association (RIF), 2015; Ernst & Young, 2016; (HOD), 2015; Larssen, 2011; Office of the Auditor General in, 2011; Pauget & Wald, 2013).

The paper starts with presenting the theoretical framing comprising three strains of literature: the front-end and decision-making, hospitals and complexity, and stakeholders and collaboration. The methods and data structure of the study is then presented, followed by our findings from 13 semi-structured interviews and subsequent analysis and discussion on how collaboration can be understood in hospital projects' front-end. Finally, we present our implications and concluding remarks, suggesting a framework for collaboration, and point to further avenues for research.

2. Theoretical background and literature review

The theoretical basis for our study combines three domains mainly viewed through a project management lens: the front-end phase and decision-making, hospitals and complexity, and stakeholder handling and collaboration, presented in the following section.

2.1. The front-end phase and decision-making

A literature study by Williams et al., 2019 states that front-end literature is sparse, and despite the front-end's critical impact on projects' strategic success, it is not fully understood. Projects' front-end shows several characteristics, among these are high uncertainty levels, low levels of information, stakeholder recognition and knowledge of their interests and preferences (Williams, Vo, Samset, & Edkins, 2019).

Front-end decision-making is especially important for projects' long-term success, as described by several authors and summarised by Williams, Vo, Samset, & Edkins, 2019. Moreover, the decisions are made in complex and sometimes turbulent environments (Williams & Samset, 2010). In public projects, the decisions are made on behalf of the society and should ensure beneficial long-term project outcomes, both financially and developmentally. Appreciation of the front-end's importance for project outcome has increased in recent years (Williams &

Samset, 2010). Samset and Volden (2016) point at several challenges in public projects due to deficiencies in front-end analytical and political processes. Denis et al. (2011) bring to our attention the concept of 'escalating indecision', describing perpetual strategic decision-making processes. When multiple actors with divergent views have to make decisions but are unable to arrive at a final agreement despite persistent decision-making efforts, their indecision will compromise project implementation (Denis et al., 2011). Inherent structural and dynamic complexities create uncertainty and unpredictability influencing decision-making and thus project management (Daniel & Daniel, 2018).

To support decision-making and ensure project success, analytical and political deficiencies should be met through proper governance that is balancing proper systems, processes and tools (Samset & Volden, 2016; Turner et al., 2013). Governance of projects is further connected to organisational behaviour and human resource management (Turner et al., 2013), which is in accordance with the need for considering what Williams & Samset, 2010 refer to as social geography in these processes.

2.2. Hospitals and complexity

Hospital projects are complex at several levels, much due to hospital organisations inherent diversities (Fréchette et al., 2020; Glouberman & Mintzberg, 2001; Mintzberg & Glouberman, 2001). Healthcare organisations are identified as complex systems, and making changes to these systems is challenging (Aubry et al., 2014). In addition, hospital projects are both construction projects and organisational transformation projects (Fréchette et al., 2020; Gordon & Pollack, 2018).

Complexity in project management is not clearly defined, and complexities are found in many forms such as structural complexities, dynamic complexities, pace, socio-political complexities and uncertainties (Daniel & Daniel, 2018; Gerald et al., 2011; Müller et al., 2011). To enable improvement of complex systems, such as hospital projects' front-end, both structural and dynamic complexity should be considered, affecting project managers and decision makers through the creation of unpredictability (Daniel & Daniel, 2018). Managing under uncertainty, as is the case in hospital projects' front-end, calls for organisational improvisation and the ability to model, experiment and learn in order to improve (Daniel & Daniel, 2018). The most successful planning processes are experienced when commitment to management and planning happens simultaneously through experimentation and mutual learning (Elf et al., 2015).

Skills required to manage complex projects go beyond those connected to project management, and beneficially combine with elements from change management (Bygballe, 2010; Olsson, 2008), especially in the projects' front-end and for the management of stakeholders (Gordon & Pollack, 2018).

Pauget and Wald (2013) stress different stakeholders' need for relational competence in complex surroundings. Projects need to be seen as social systems (Cicmil & Marshall, 2005) and people-oriented issues (Gordon & Pollack, 2018; Turner et al., 2013) require attention. The need for understanding human relationships in order to manage collaboration is emphasised by several authors (Bygballe, 2010; Bygballe et al., 2016; Olsson, 2008; Pauget & Wald, 2013; Pemsel et al., 2010). Informal relations may bring different stakeholders closer, and may facilitate communication, which is crucial in these complex environments (Barlow & Köberle-Gaiser, 2009; Bygballe, 2010; Elf et al., 2015; Elf & Malmqvist, 2009; Kokkonen & Vaagaasar, 2018; Pemsel et al., 2010).

The context is very important when designing organisations (Aubry & Lavoie-Tremblay, 2018). It shapes the organisation and should be described through a joint collaborative effort among project stakeholders (Aubry & Lavoie-Tremblay, 2018). The hospital organisation and project operate in pluralistic settings, characterised by diffuse power and divergent interests (Aubry et al., 2014; Denis et al., 2011). In such settings, strategy making is understood to be broadly participative compared to more hierarchical settings (Denis et al., 2011). In a Scandinavian con-

text, there is a pronounced tradition for user involvement as part of a strong democratic culture (Eriksson et al., 2015; Olsson, 2008; Strand & Freeman, 2015). Involvement is a process that lasts throughout the front-end phase, and is a key success factor both in hospital projects (Henriksen et al., 2006; Olsson et al., 2010), and for building design and briefing in general (Elf et al., 2012; Eriksson et al., 2012; Eriksson et al., 2015; Olsson et al., 2010; Tzortzopoulos et al., 2006).

2.3. Stakeholders and collaboration

Complexity, management and interaction of multiple stakeholders are well-known challenges in major projects (Cicmil & Marshall, 2005; Cooke-Davies, 2009; Dietrich et al., 2010; Engwall, 2003; Eskerod et al., 2015b; Flyvbjerg, 2017; Lenfle & Loch, 2017; Merschbrock et al., 2018). Stakeholder multiplicity and potential diversities in goal perception, interests and expectations challenge stakeholder handling (Gordon & Pollack, 2018; Smith & Lewis, 2011; Williams et al., 2019). Public projects' front-end phase also often involve major political and societal processes, considerably influencing the planning and decision-making processes (Williams et al., 2010). A wide variety of people and organisations often having conflicting perspectives on hospital projects, affect or are affected by the project. The external context, i.e. politics, is pronounced (Aubry & Lavoie-Tremblay, 2018), and political processes play an important role in the front-end phases (Aaltonen et al., 2015). Diversities or plurality may create tensions between organisations or individuals, such as multiple and competing goals, challenges to organisational identity following role change, a need for flexibility and an altering of stable routines (Aubry et al., 2014; Smith & Lewis, 2011).

Careful planning and flexibility regarding the management of stakeholders may lead to a successful front-end phase, but need different approaches and flexibility due to stakeholders' varying degree of salience (Aaltonen et al., 2015; Williams, Vo, Samset, & Edkins, 2019). Failing to manage the different views and understandings of multiple stakeholders may adversely affect long-term project success (Baccarini, 1999; Gareis et al., 2013; Klakegg, 2010; Silvius & Schipper, 2014; Toor & Ogunlana, 2010).

Although tensions are demanding to manage, and potentially harmful for project performance and outcome, they could be an asset for the projects if harnessed (Smith & Lewis, 2011), and co-existence of order and conflicts are found (van Marrewijk et al., 2016). van Marrewijk, Ybema, Smits, Clegg, & Pitsis, 2016, p.1747 also found that *'...Complexity, ambiguity and uncertainty... can drive collaboration in complex organisations'*. Smith & Lewis, 2011 suggest paradox theory as an approach to cope with such contradictions, which are becoming more common in today's complex environments. Managerial implications of paradoxes is to view management as a process where paradoxes continually are rearranged (Cicmil & Marshall, 2005).

Even if project management's role in handling stakeholders in complex settings is limited (Aaltonen et al., 2015), some efforts are needed. Several strategies for stakeholder handling exist (Savage et al., 1991), collaboration being one of these. Collaboration is not comprehensively defined, but can be seen as a human resource strategy (Bedwell et al., 2012). Bedwell et al. (2012, p.130) define collaboration as *'...an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal'*. Collaboration further makes organisations solve problems or achieve results they could not do alone (Savage et al., 2010), and is a way of coping with uncertainty and ambiguity (Walker et al., 2017). To counter potential conflicts of interests or tensions due to different stakeholder views compromising project performance, efforts to create a shared identity would be helpful (Bedwell et al., 2012).

Preparation for changes in the traditional organising, decisive authority and decision-making structures should be present to enable collaboration (Bygballe, 2010). Changes that break with established routines call for a considerable involvement of employees (Bygballe, 2010; Olsson et al., 2010). When designing the project organisation, it should

be acknowledged that the real collaboration happens between stakeholders even if it is arranged at the organisational level (Bygballe & Swärd, 2019; Bygballe et al., 2016; Kokkonen & Vaagaasar, 2018).

Front-end involvement enables the project organisation to record the different stakeholders' recommendations for the project, which may improve the project and save money (Bygballe (2010). Management in the front-end phase should be able to focus on more social and relational issues, e.g. building trust, mutual understanding, rather than the project itself (Bygballe et al., 2016; Matinheikki et al., 2016; Merschbrock et al., 2018; Pauget & Wald, 2013), as the importance of the social dynamics seen in such organisational settings are considered as important as structural dimensions (Aubry et al., 2014; Turner et al., 2013; Winch & Cha, 2020).

Coordination mechanisms, such as mutual decision-making, shared goals and co-location, have a positive impact on collaboration, and are needed early in the front-end (Lavikka et al., 2015). Managers should be aware of how to use these mechanisms and of the influential relational factors underlying them (Bygballe et al., 2016).

3. Methods

3.1. Research setting and approach

The findings presented in this paper, is part of a larger empirical study aiming to obtain further insight into hospital projects' front-end for the purpose of improvement. We address the collaboration phenomenon in hospital projects' front-end phase by leaning on theoretical underpinnings regarding collaboration's general importance in major projects. Due to the nature of our research question, and limited previous research on front-end collaboration, we have chosen to use a qualitative research design, following an exploratory purpose. This is a suitable approach, according to Mason (2018) and Saunders et al., 2009, when the aim is to generate data from relevant respondents' experiences and answers to questions. Using interviews for collecting data is suitable for gaining in-depth knowledge of the planning processes (Kvale & Brinkmann, 2015; Mason, 2018; Saunders et al., 2009; Tjora, 2012; Yin, 2014), and further allows for directly focussing on the study's topic and provide explanations as well as personal views Yin (2014).

Prior to data analysis, we did a literature study to create a reference frame for studying collaboration viewed through a project management lens. We found previous research to be limited although some efforts are made to describe collaboration in hospital projects, however not specifically for the front-end phase. Malterud's Systematic Text Condensation (STC)-method was used for data analysis. This method is inspired by phenomenological ideas, and offers a pragmatic and iterative approach, and a process of inter-subjectivity, reflexivity and feasibility while maintaining methodological rigour (Malterud, 2011; Malterud, 2012). STC is a descriptive and explorative method for analysing qualitative data focussing on participants' meanings and experience, which was suitable for this study (Malterud, 2011; Malterud, 2012). The method is further used in a range of qualitative research (Sari et al., 2017), and is considered structured and well-defined (Sagsveen et al., 2018). Several of the qualitative studies using STC belong to health sciences, which fits with this study's scope. The method implies an inductive approach, however, the link to findings from the literature study provided a lens for our interpretation (Malterud, 2001), and was further used as a preliminary template for the coding procedure. This balanced data openness and the need for some initial structure, partly reflecting topics from the interview guide and literature review (Fereday & Muir-Cochrane, 2006; King, 2004; King et al., 2002).

3.1.1. The Norwegian context

Norwegian public hospitals' structure consists of regional and local levels. Four Regional Health Authorities (RHAs) are formal owners of different Local Health Authorities (LHAs) that consist of one or more hospitals with different size and services. The RHAs derive their funding

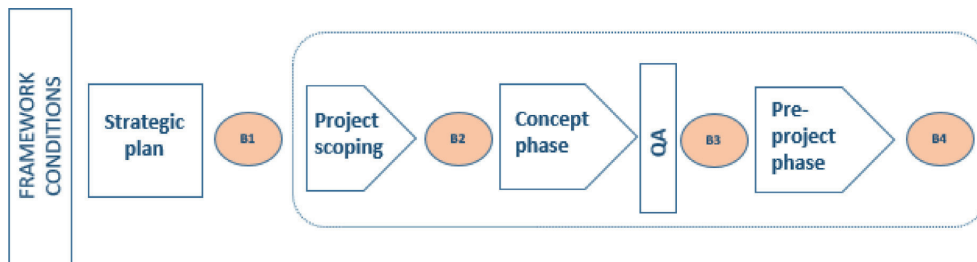


Fig. 1. Front-end planning according to the NHCA guidelines, adapted from NHCA (Sykehusbygg HF, 2017).

from the Norwegian Ministry of Health and Care services (Ministry). By law, RHAs have the superior responsibility for all investments needed in the hospitals in their area. The LHAs should elaborate on local requirements for health care services through a strategic plan stating the need for investment projects. When investment projects exceed 50 million Euros, there is a governmental demand to employ the national competence hub for hospital planning and building, the Norwegian Hospital Construction Agency (NHCA), founded in 2014. Norwegian hospitals are planned using guidelines issued by the NHCA in 2017. The planning process builds on a stage-gate model (Fig. 1). For projects exceeding 50 million Euros, it is obliged to carry out an external quality assurance (QA).

Based on reports elaborated in the concept phase and the QA, investment decisions are made at the regional level. Finally, the reports are presented to the Ministry, and serve as the basis for an application for loan and approval according to legislation.

The organisational structure of the planning process varies among Norwegian hospital projects. In a broad outline, project organisations comprise internal stakeholders from both the LHA, serving as senior user coordinators or as members of different stakeholder groups, and the expert organisation, (EO/NHCA) owned by RHAs, as well as architects and engineering consultants. The composition of the different stakeholder groups may vary, but they comprise mainly hospital employees from different disciplines (both medical and technical), patient representatives, representatives from the local municipalities, different spokespersons for hospital employees, and personnel safety representatives. In some projects, internal stakeholders from the LHA titled project managers manage these groups.

3.2. Data collection

Textual analysis of interviews with project participants from three different hospital projects has been the primary data source. This has enabled us to gather experiences from different project environments and to potentially shed light on cross-project differences and similarities. The projects were conveniently sampled (Marshall, 1996; Saunders et al., 2009), based on personal networks and publicly available front-end documents. It was an inclusion criterion that all projects should have completed an external quality assurance that is reached the B3-gate in the stage-gate model, Fig. 1.

To gain in-depth insight into hospital projects' front end collaboration, we interviewed 13 people engaged in the projects employed by either NHCA, LHA or RHA (Table 1). To recruit our respondents, we used a sampling strategy based on both convenience and judgement (Marshall, 1996; Saunders et al., 2009), interviewing persons that had approximately the same role in the different projects. Primarily the respondents from the NHCA answered from a specific project point of view. However, this did not exclude the possibility for them to compare or share experiences from other projects as a means for shedding light on the planning processes and collaboration. The interviews were per-

formed from February 2019 until October 2019. We also encouraged the respondents to suggest other respondents based on their experience and knowledge of the field; known as a 'snowballing' approach Tjora (2012).

Prior to interviewing, a study protocol was made in a manner similar to establishing a case study protocol, as recommended by Yin (2014) and Kallio et al. (2016), to increase the trustworthiness and reliability of the study. Transparency, both regarding the research process and theory, improves the reliability (Olsson & Spjelkavik, 2014). To strengthen the study's validity, we used multiple data sources to gather information such as publicly available front-end documents to prepare for the interviews and a literature study to create a point of departure for the data analysis.

We used semi-structured interviews with open ended questions with the possibility to change the questions' order, to provide for the required flexibility and ability to adapt to the situation (Saunders et al., 2009). The objective was not to quantify results but rather to get descriptions of the topic with different nuances/perspectives (Kvale & Brinkmann, 2015). Open questions aim to give the respondents the opportunity to speak freely and delve deeply into parts of the topic when they have thorough insight, meanings or experiences to share Tjora (2012). Semi-structured interviews also provide possibilities for permitting digressions in order to explore different angles of the main topic not thought of by the interviewer in advance Tjora (2012). The subjective experiences on collaboration are important for gaining deeper insight into its influence on the front-end, which is the main objective of our work.

All respondents received written information regarding the study and its objectives prior to the interview. This enabled them to prepare by gathering documentation and reflect on earlier events and processes before being interviewed, an approach known to increase study validity and reliability (Saunders et al., 2009). All respondents consented by signing a form. Information was treated confidentially according to national requirements and was approved by application to the Norwegian Centre for Research Data.

In accordance with Kallio et al. (2016), we additionally pilot-tested the interview guide on two respondents with considerable experience from hospital projects' front-end. The pilot interviews were carried out taking notes without audio recording and led to minor adjustments of the interview guide and to expanding the duration of the interview from 60 to 90 min.

Interviews were conducted using audio recording, with one researcher serving as the main interviewer in all interviews. All respondents agreed in advance to the presence of two or three researchers during the interview. Several interviewers called for a structured interview schedule, which was managed by jointly discussing the interview guide and the technique in order to strengthen reliability. One researcher carried out the transcription of the interviews by carefully listening to the recordings at slow speed and writing down everything that was said. Afterwards, while listening to the recording at normal speed, the completed transcriptions were read and checked.

Table 1
Overview of respondents.

Respondent	Organisation	Role	Interview type	No. of interviewers
1	LHA	Managing director	Notes (pilot)	1
2	LHA	Assistant managing director	Notes (pilot)	1
3	LHA	Senior user coordinator	Recording	2
4	LHA	Senior user coordinator	Recording	2
5	NHCA	Manager/Advisor	Recording	2
6	NHCA	Planner	Recording	2
7	NHCA	Planner	Recording	1
8	RHA	Property manager	Recording	1
9	LHA	Project manager infrastructure/Advisor	Recording, Skype	3
10	LHA	Project director	Recording, Skype	1
11	NHCA	Manager counselling	Recording	1
12	NHCA/RHA	Planner/ Project manager	Recording	1
13	NHCA/RHA	Planner/ Project manager	Recording	1

3.3. Data analysis

Wanting to gain deeper insight into the phenomenon of collaboration, we based our data analysis on Malterud's Systematic Text Condensation (STC)-method (Malterud, 2011). However, we did not use a purely inductive approach, applying both theory-driven and data-driven codes. The interview transcripts were coded using the template of theory-driven codes and simultaneously assigning inductive codes that emerged from the text. When new codes emerged, previous coded transcripts were re-analysed in light of the new codes, keeping in mind that it is important that the a priori codes are flexible and open to minor or major modifications, and can even be deleted, as the analytical process progresses (King et al., 2002). All data were coded using NVivo software version 12 (QSR International, 1999–2018).

Analysis of the complete set of codes ($n = 33$) made it clear that some of the codes were more or less interrelated, and hence could be grouped into twelve preliminary categories. Text assigned to each code in each category was read and the content condensed in order to make the most essential features of the phenomenon of collaboration in hospital projects emerge. Our professional point of departure, in our case project management in the front-end of projects, are known to influence these features (Malterud, 2011). Further analysis of the condensed contents of the different categories lead to a final clustering into four main categories describing collaboration in the front-end of hospital projects. The data structure is shown in Fig. 2.

4. Results and analysis

As shown in Fig. 2, four main categories, comprising sets of preliminary categories, emerged from our analysis. The contexts define the projects' opportunity space mounted mainly by political and analytical determinants, objectives and needs. The contexts set premises for collaboration, but are also a way of shaping the project using existing diversities to explore the opportunity space. Structures point at the expressed need for clarity in organisation and roles in order to collaborate, while means describe the necessity of involvement, management and competence. The last category, catalysts, comprises actions and relations needed for collaboration together with the ability and capacity to change. In the following, we elaborate on the four main categories.

4.1. Project contexts affect collaboration

The respondents described the front-end as both demanding and exciting and emphasised that balancing the multidisciplinary stakeholders, politics and directives made collaboration in the front-end a challenge.

'...it [the front end] is probably the most exciting and challenging part of the projects, at least in my opinion. Where...where in a way many topics are mixed; methods and politics and...and... the LHA, economy, and sort of everything that are supposed to be handled in

the front-end. So this is both challenging and exciting to be working with'

(Planner)

The projects' studied showed that it is common for hospital projects to have a turbulent history or being the cause of political conflicts about localisation or allocation of resources. The respondents stressed the severe impact this had on both the LHA and the project organisation, as well as and the local community, and held that it should be accounted for in the planning process. Stakeholders showed different priorities due to different perspectives, and the respondents had experienced demanding discussions and tensions between the project organisation and the LHA, between RHA and LHA, inside the LHA and towards the local communities and political level. For example, clinical managers from the LHA felt put up against each other having to make decisions regarding allocation of resources or localisation preferences, making them defensive and reducing their ability to think in conceptual terms.

'...there was some intense discussions on hospital functions uh... internally among the LHA managers too... of course..haha...You try to keep what belongs to you [your responsibility], in a way, the situation puts us up against each other'

(LHA stakeholder)

The clash of interests have been of such a strength that decision-makers have initiated re-assessments or made fuzzy decisions to please everyone and to stabilise the situation. This is considered both time-consuming and expensive, creating a perpetual decision-process. It may also alter the project's ability to find suitable conceptual solutions. The respondents elucidated that the wish for stabilising the conditions and avoid reviving old conflicts may lead to an indecisive and unclear project, aiming to please all participants and the local community. This can further have considerable consequences for project progress and the short-term and long-term project outcomes. Some LHA representatives experienced that being loyal to decisions made was challenging given the turbulent project context, but still necessary to navigate through the complexity of the front-end phase.

'Not following current decisions would have made us all fall flat on our faces long ago'

(LHA stakeholder)

All respondents highlighted the importance of the project owner's (the LHA and/or the RHA) strategic responsibility, that is to point out the direction and be future-oriented. The respondents claimed that the LHA does not fully utilise possibilities that lie within the project, leading to dissension in the internal and external contexts. When the projects lack strategic capability the projects seem to experience a time-consuming 'consolidation phase' when starting the front-end. This may further become a 'survival of the fittest' process potentially compromis-

ing the search for suitable concepts and exploitation of the opportunity space.

‘We have started to [...] introduce this corporate strategy thing. We more or less try to...to...inform our principal about the need for a corporate strategy that guides us when things happen in the future [...] what happens if we do not get all the functions we have said that we will, you know...[...] it has been like no one wants to touch this, it is politically challenging, challenging for the workforce and everything...and then you get these breaks and delays and the hard discussions and decisions if you haven’t made a good strategy up-front’

(Planner)

‘...my most important message has to be to really use time early on to set direction and premises and discuss the opportunity space before the concept phase is started...’

(Planner)

Independent of organisational belonging, the respondents highlighted involved users’ difficulties in meeting the front-end’s expected level of abstractness. The front-end requires skills that differ considerably from the hospital’s core business. Still, involvement of hospital personnel is considered critical to gain the necessary insight into daily operations and future professional development. If decisions result from a process perceived as involving and focussed, they seem to appear stronger. This may also mitigate re-opening difficult (political) discussions, ease project managers’ work, and positively influence project progress. The respondents pointed out that involved users from the hospital came from daily operations and struggled to let go of day-to-day challenges, which made it difficult to fully exploit the possibilities of identifying possible future concepts. As pointed out by one respondent, hospital employees have a tradition for being solution-oriented and practical, making the front-end’s level of abstraction challenging. Early on, they express a need for concretising in terms of calculations and drawings, which may be unfortunate for keeping the opportunity space open for as long as possible.

‘...the moment lines are drawn on paper, a lot appear to be locked. And then people start to think about the lines instead of function’

(Planner)

Another example is the LHA’s financial situation, which considerably affects the ability to exploit the opportunity space sufficiently. In one case, for parts of the LHA, the project became an explanation or scapegoat for the bad financial situation. Others looked at the project as part of the solution for solving the financial situation. Such different views make collaboration challenging on several levels. Thus, the projects are capable of introducing an ambivalence or paradox into the LHA and have the power to split the organisation. Paradoxes are also experienced because of different maturity levels, especially between the EO and the users. The projects need to keep a certain timeline to reach the National budget, and the LHA representatives have felt time pressure. They describe that the need for making the National budget force them to make judgements quickly missing the possibility for reflecting on potential consequences. The EO, on the other hand, has gradually gained more experience and competence in executing the planning process, while hospital employees need time to grasp the bigger picture and process different solutions. This may become a dilemma in the planning process, balancing the time needed for maturity and hereby the creation of ownership, with the need for keeping the timeline.

‘... it feels like decisions are made to fit the process so that you can continue the project without really looking at consequences. At least this is how it appears to me...’

(LHA stakeholder)

To some extent, the EO shares this view by the development of concepts not being optimal.

‘Well, in a way you don’t get... there is no room for the ‘brainstorming’-phase? Where you really get to take the challenge in finding new solutions...uh... having some time and space to be flexible...’

(Planner)

Furthermore, the respondents mentioned the parent organisation’s culture, a component of the inner context, as a strong influential force on the project planning and collaboration. Some respondents highlighted that poor organisational culture, shown as mismanagement or unclear decision lines, are generally unfortunate for collaboration. Using existing organisational assets to run the project is unfortunate without taking precautions and preparing the planning process in some sort of way.

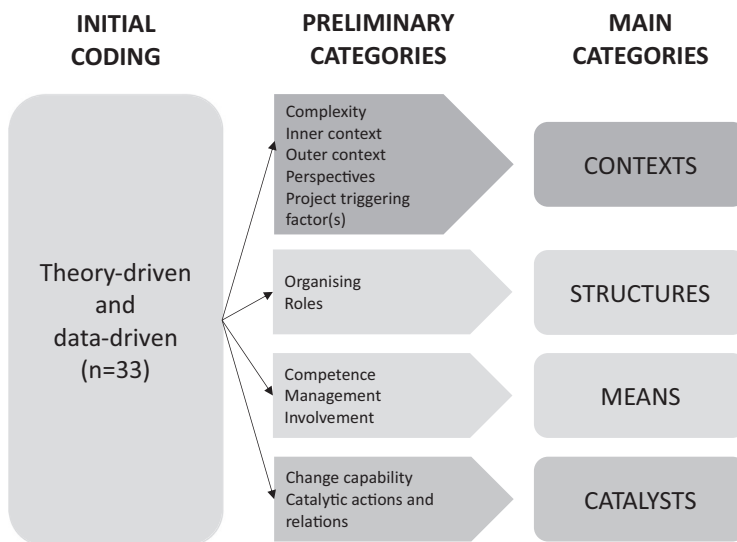


Fig. 2. Data structure.

The respondents pointed to establishment of a project strategy, structure and clarity as tools for handling difficult contextual factors by creating a mutual understanding of the premises and project goal.

4.2. Structures and means

Our respondents guided us into finding both formal and more informal categories describing collaboration such as structure and means. Shortcomings in these categories might compromise collaboration or make it more difficult.

4.2.1. Expressed need for structures

The projects studied are organised differently. There are differences in the involvement of the EO, financial responsibilities, project ownership and the establishment of a project board. The respondents offered no unified explanation for this, but indicated that it is about to be standardised throughout the country. The respondents further emphasised that a structure for stakeholder involvement and collaboration should be available early in the planning process.

Independent of organisational belonging, all respondents mentioned clarity in organisation and roles as an important feature for project collaboration and progress.

'I believe that different views on roles and responsibilities between the parent organisation and the project organisation and their interaction [...] the fact that we lack a structure for governing the project... generate trouble'

(Planner)

Due to the challenging history and inherent complexity of some projects, this is especially important in order to build trust and create predictability, factors deemed crucial for collaboration by the respondents. Predictability in the planning processes, both regarding organisation, roles, successive outputs, authority and responsibilities, help navigate project complexity and is viewed as beneficial for project progress. Roles and organisational structure should be clarified before starting the actual front-end planning. The respondents highlighted that the combination of time-pressure and lack of structural clarity sometimes forced the project organisation to spend valuable time clarifying this instead of doing the actual front-end planning. Clarity is considered to strengthen predictability, while lack of clarity influences the working relationships negatively by creating suspiciousness and doubts; adversely affecting trust building. Potentially, lack of clarity also created arenas for reverse decisions. Lack of structure seemed to make the projects more vulnerable to changes.

All respondents strongly emphasised that organisational roles should be clear regarding content and authority, since this is believed to clarify mutual expectations, and is important for creating predictability. Fuzzy roles is said to adversely affect the relationship between collaborating parties, and may cause conflicts and suspiciousness, negatively affecting project progress. The respondents further explained that fuzzy roles challenged information flow and negatively influenced trust among the stakeholders. The fuzziness was also said to affect the 'lines of command', making a complex organisation even more complex. Moreover, role clarity was perceived as key to inhibiting potential conflicts of interest and for aligning project goals and perspectives among the different stakeholders. Hospital employees serving as project managers expressed that their role was not to be a project manager in classical terms, but rather a facilitator or interpreter.

'My job is to be a conductor. To balance carrots and sticks... and hope that people do their job'

(Project director)

When the actual content of the role is unclear, the LHA risks recruiting the wrong competence to the project. The LHAs' project managers experienced unclear expectations regarding the project manager-role as frustrating.

'Suddenly we were supposed to write minutes, which was clearly stated that we should not do. So our role in the meetings was sort of very unclear...'

(LHA stakeholder)

Some respondents from the LHA experienced the fuzziness as a challenge for their legitimacy when collaborating with the EO and in the stakeholder groups, which they were expected to manage. The project managers had to defend their attendance, and were assigned tasks outside their mandate. They furthermore emphasised their local knowledge of the LHA and its history as an important asset for the project, which could serve as a 'buffer' for the EO and other stakeholders in coping with the context. In one project, the fuzziness in roles made the project managers feel that they did not get the chance to contribute to the project with this knowledge. The EO's role in the different projects varied from mere consulting to full-time project managing. Expectations regarding the EO's contributions varied, but the majority of LHA respondents held that the EO should possess systemic knowledge in the ability to share experiences from other projects. Both the EO and the project managers acknowledged that this has potential for improvement. The EO is a young organisation, currently trying to find its role in the project organisations by demonstrating its competence and hence gaining sufficient trust. In some cases, the EO experienced that the LHAs expressed a need for some sort of control of the process and premises. Finding a proper balance between consulting and challenging is described as demanding, further influencing the relationship between the EO and the LHA, and may negatively influence collaboration.

Unclear authority is also believed to potentially affect the opportunity space by making stakeholders conservative and less creative. This is unfortunate, as creativity is seen as an important asset in the front-end phase when searching for suitable concepts. Several respondents stress that lack of sufficient authority prevents stakeholders from moving outside their 'comfort zone', being afraid of becoming hostages for the choices made when the project is finished, due to the complexity and differences experienced in these projects. Unclear latitude might also lead to inability to act or, on the other hand, a need for showing efficiency by taking too wide-ranging actions, both aspects influencing collaboration negatively.

4.2.2. Means of collaboration

The respondents highlighted means necessary or beneficial for collaboration. Among these are involvement, management and competence considered most important. Mutual understanding, ownership and empowerment are sub-dimensions of involvement.

4.2.2.1. Mutual understanding through user involvement. The respondents maintained that the multiple stakeholders' different perspectives are not always easy to unite, challenging the achievement of mutual understanding. Mutual understanding of the project direction and goal is important to project progress and collaboration. The respondents feared that the diversity may challenge the ability to align goals due to different project perspectives, task priority and differences in organisational maturity. The respondents highlighted user involvement in the planning process as necessary means for establishing mutual understanding of the project and for strengthening collaboration, which can damage the project if omitted or neglected. The projects studied show broad user involvement in the processes, which is seen as necessary for creating mutual understanding of the front-end's purpose, ensuring continuity (important when the project reaches the operating phase), and creating necessary stakeholders' ownership of the project. The respondents pointed to the need for realistic processes holding that when involving a large number of users, there will be a large amount of expectations. To avoid disappointment and loss of motivation and to secure project progress, clarification and reconciliation of the expectations within the realistic possibilities of the project is viewed as necessary. Trust was also considered as important for collaboration, and the respondents closely connected involvement to trust building.

'We wanted extensive user involvement [...] and we genuinely meant it [...] but when it includes 200 people [...] it generates expectations... There will be trouble and people get disappointed... We create expectations that cannot be fulfilled'

(Advisor)

Even if user involvement was considered necessary, it was also looked upon as a challenge. One of the respondents referred to it as an independent discipline. The challenge pertained to the level of involvement, when to start, who and how many should be involved, and which topics should be handled. The respondents put forth that user involvement should be a structured and predictable process in order to avoid reverse decisions and waste of time and money.

Information and communication, clarity and predictability are also elements required for ensuring proper involvement when handling the more remote stakeholders.

4.2.2.2. Importance of management. The majority of respondents held that the societal and organisational impact of the projects set standards for the LHA management in being clear about their ambitions and intentions with the project and the project's place in the parent organisation. The management should allocate sufficient time, resources and competence to the projects, and the projects should not be treated as any ordinary issue on the busy managerial agenda.

'When the LHA management is supposed to run these processes, it gets mixed with other issues. You don't get a 'clean project focus' [...] it becomes a part of an ordinary meeting agenda together with ordinary budget discussions for example[...] I believe that it would be beneficial to handle the project exclusively, ordinary management meetings are not a good venue for these discussions'

(LHA stakeholder)

This was experienced as a challenge, which in turn may negatively affect the planning process and compromise the projects' outcome. The respondents also highlighted the management's role in communicating the project in the parent organisation to avoid suspiciousness and erroneous assumptions. Clarity is said to facilitate project progress and establishes advantageous conditions for collaborating stakeholders to find suitable conceptual solutions. Anchoring the project within the parent organisation is considered especially important due to a frequently demanding context, both to prevent project opponents from initiating exhausting processes for reverse decisions and to support the project managers' (from the health authority) role towards the EO and the different stakeholder groups. According to the respondents, lack of management support adversely affected the project managers' motivation and project progress, created room for doubt and provided a breeding ground for reverse decisions.

4.2.2.3. Competence. The respondents highlighted a lack of formal project management and planning competence in the hospital organisations and difficulties in understanding the purpose of the front-end due to its abstract nature. Lack of competence or insufficient knowledge of the planning process or project management created a fear of making the wrong decisions. The respondents also pointed at user representatives being afraid of becoming hostages in the planning processes, being involved without real empowerment or the possibility to fully understand the processes they are part of. Diversity of perspectives due to the multiplicity of stakeholders, pose a challenge to the collaboration, but is also perceived as a valuable asset in finding solutions different stakeholders could not have come up with by themselves. Competence sharing and multidisciplinary collaboration are appreciated, and considered necessary means to meet project goals.

Several respondents emphasised the importance of gaining organisational maturity in these processes as necessary but time-consuming, and that due to diversity in knowledge and experience among the collaborating stakeholders, it may become a potential area of conflict.

4.3. Catalysts

Respondents elucidated the considerable change the projects exerted on parent organisations, challenging them and their employees' capacity and ability for change, which is strongly connected to the fear of losing responsibilities and position. Such fear is said to promote defensiveness and conservatism, which are poor qualities for front-end collaboration and performance. As some respondents expressed, changes are perceived as painful and have to be carefully handled in order to avoid project delays.

The interviews further revealed a heterogeneous group of catalytic actions and relations connected to both the individual and organisational level that influence collaboration in the front-end. These are labelled catalysts. All findings are presented in [Table 2](#).

5. Discussion and implications

This study set out to echo the call for more understanding of complex projects' front-end phase ([Williams et al., 2019](#)), by studying collaboration in this part of the project life cycle. Informal mechanisms, such as collaboration, should be understood in order to cope with complexity ([Bygballe & Swård, 2019](#); [Bygballe et al., 2016](#); [Cicmil & Marshall, 2005](#)). Hospital projects' complexity partly results from the many stakeholders involved, and collaboration is also viewed as a stakeholder management strategy where dynamics connected to stakeholder management are insufficiently understood in the front-end phase ([Aaltonen et al., 2015](#)).

The concept of collaboration has not reached a unified, multidisciplinary understanding, although conceptualising collaboration as a process retains the dynamics associated with collaboration found in definitions across disciplines ([Bedwell et al., 2012](#)). Our analysis identified four main categories (see [Fig. 2](#)) describing collaboration in hospital projects' front-end. The categories do not constitute separate entities, but are interdependent and interact making collaboration happen and making collaboration work. The nuance between making collaboration happen and making collaboration work indicates that the different categories should be considered at different times during the front-end phase to facilitate collaboration. Thus, we adopt the view of collaboration as an evolving process ([Bedwell et al., 2012](#); [Gray, 1985](#); [Mintzberg et al., 1996](#)). To initiate collaboration, that is to make it happen, structures and means seem to play an important role, while for making collaboration work, catalytic actions and relations (see [Table 2](#)) come more into play. Throughout the front-end phase, the projects' external and internal contexts should be taken into account due to their considerable impact on collaboration.

The following sections discuss the four categories and their interactions in order to describe collaboration in hospital projects' front-end.

5.1. Contexts

The projects' external (socio-political position and more remote stakeholders) and internal (inter-/intra-organisational) contexts affect both the initiation and maintenance of collaboration, and encompass the other categories describing collaboration in the front-end. According to [Bedwell et al. \(2012\)](#), collaboration may look different as the context changes. Thus, the context should be thoroughly analysed and considered throughout the front-end phase. In line with literature ([Aaltonen et al., 2015](#); [Aubry & Lavoie-Tremblay, 2018](#); [Cicmil et al., 2006](#); [Engwall, 2003](#); [Williams et al., 2019](#)), we find that context is important whereby the planning processes must take hospitals' political implications and impact on the surroundings into account. Conflicts of interest among the many involved stakeholders due to different project perspectives or priorities can have severe impact on the planning processes, forcing decision-makers to start new assessments, reverse decisions or other drastic actions, making the project indecisive and unclear and further compromise its implementation ([Denis et al., 2011](#)). This is

Table 2
Main categories and preliminary categories affecting collaboration in the front-end phase of hospital projects

CONTEXT	Complexity Inner context Outer context Perspectives Project triggering factor(s)	
STRUCTURES	Organising Roles	
MEANS	Competence Management Involvement	<ul style="list-style-type: none"> • Ownership • Mutual understanding • Empowerment
CATALYSTS	Change capacity/ability Catalytic actions	<ul style="list-style-type: none"> • Coordination • Documentation • Doing things in the right order • Keeping the pace/being subject to keeping pace
	Catalytic relations	<ul style="list-style-type: none"> • Trust • Motives • Relations • Reliability • Disagreement • Communication • Personal chemistry • Clarity in conduct and process • Openness among stakeholders • Individual or organisational maturation

time-consuming and expensive and may alter the focus of the project, risking a failure in identifying suitable long-term solutions, thus compromising the front-end's intention (Williams et al., 2019).

Project complexity requires flexibility and dynamic capabilities in the front-end to be able to meet the projects' changing environments in order to avoid compromising the exploration of the opportunity space and the identification of new sustainable solutions. The complex nature of hospital projects may lead to resistance in finding new solutions (Bygballe, 2010). For the projects to manage this, the different stakeholders need to share their different perspectives, experiences and competencies, thus utilising the projects' multidisciplinary nature. Acknowledging the different perspectives, helps establish the broad focus needed to fulfil the front-end's goal. The decision-makers should balance the interests of different stakeholders in order to maintain the project purpose (Aaltonen et al., 2015), and means such as management, involvement and competence support multidisciplinary action. Project management skills needed in the front-end (Edkins et al., 2013), differ from those needed in an execution point of view, or at least the skills need to be accentuated differently than in the execution phase. Coping with social dynamics and people orientation should be emphasised (Aubry et al., 2014; Bygballe et al., 2016; Cicmil & Marshall, 2005; Cicmil et al., 2006; Matinheikki et al., 2016; Merschbrock et al., 2018; Pauget & Wald, 2013; Turner et al., 2013), and might be a source of conflict if not handled (Aubry & Lavoie-Tremblay, 2018; Olsson, 2008; Pemsel et al., 2010). Thus, from a project manager's point of view, the clue is to balance the different views while at the same time avoiding delays of necessary decisions and stalling the project. It is argued that postponement of decisions and thinking that agreements will come downstream is risky (Bygballe, 2010).

Further, suitable governance should accommodate political and analytical deficiencies (Samset & Volden, 2016; Turner et al., 2013). However, it is also argued that these ambiguities cannot be met with conventional 'ordering' (Cicmil & Marshall, 2005; Hartmann, 2012). The strategic ambiguity or vagueness experienced around front-end decisions, are often a result of the complexity and divergent perspectives. This may be a necessity in accommodating multiple stakeholders' views and keeping stakeholders in the planning process to enable further discussions and process maturity. Being able to handle tensions and exploit the inherent ambiguities for the benefit of the project, may strengthen the projects' change capability and thus nurture collaboration (Denis et al., 2011;

Smith & Lewis, 2011). Inherent tensions might actually drive collaboration in projects (Smith & Lewis, 2011; van Marrewijk et al., 2016). To cope with tensions, a more open management strategy viewing tensions as continually rearranging issues in the project might be beneficial (Cicmil & Marshall, 2005).

5.2. Making collaboration happen and making collaboration work

All respondents emphasise the need for clarity in structures and roles early in the planning process. This implies a necessity for structuring to make collaboration happen, which is in line with findings from Gray (1985). Structures help to position the project towards the parent organisation, and further provide a clarity through creating a degree of predictability for interdependent stakeholders with different professional background and project perspectives Gray (1985).

Without sufficient clarity in structure, time will be wasted and project progress and quality may suffer (Bygballe, 2010; Pemsel et al., 2010). Clarity further contributes to enhancing mutual understanding, which corresponds to findings by Bygballe et al. (2016) and Dietrich et al. (2010). Lack of clarity, on the other hand, reduces levels of trust, described as a crucial factor for collaboration by the respondents. We have found trust to be an important relational catalyst for collaboration (see Table 2), to maintain collaboration or making it work. This is an illustration of the processual nature of collaboration, where structures and clarity initiate collaboration and contribute to the generation of trust, which further helps collaboration work in the planning process. The role of trust corresponds to findings from several authors (Bygballe & Swärd, 2019; Dietrich et al., 2010; Haaskjold et al., 2019; Nevstad et al., 2018; van Eyk & Baum, 2002).

The need for structure may also be perceived as a reflection of the stakeholders' competence, harnessing project complexity with familiar tools, which in this case mostly relate to those found in classical project management in an execution point of view. This is manifested by hospital employees' expressed need for concretising early on in terms of calculations and drawings, thus challenging the front-end's level of abstraction, which may be unfortunate for keeping the opportunity space open for as long as possible. The front-end presents a terminology and requires a mindset and set of skills considerably different from the hospital core business, unfamiliar to several of the stakeholders. The respondents point to the lack of needed competence for front-end intentions and ac-

tivities, and consider it challenging to relate to the front-end’s need for abstractness in seeking future solutions. In addition, the hospital employees may find themselves taking on two roles, as knowledge providing experts pointing out the hospital’s future professional direction, but also as appointed organisational representatives participating in the planning processes and further contributing to justification of decisions made (Olsson et al., 2010). This is perceived as a challenge. As representatives, the LHAs’ project managers fear to become hostages for the decisions made, lacking sufficient empowerment or understanding of the planning process, which also is elucidated by Henriksen et al. (2006) and Olsson et al. (2010). Thus, the respondents highlighted the need for the parent organisation’s management to be clear about its ambitions and intentions with the project to achieve a successful planning process (Elf et al., 2015; Winch & Cha, 2020).

We also discovered another dimension of the hospital employees’ role as project managers. There is need for a supportive and interpretive orientation acting as facilitators and bridging gaps between the LHA and the project organisation. This is similar to the relational competence described by Pauget and Wald (2013), and the alternative view of project managers’ skills described by Cicmil et al. (2006).

Early user involvement is seen as essential for a successful project outcome by specifying demands, creating ownership and continuity and building project culture, in line with literature (Bygballe, 2010; Henriksen et al., 2006; Olsson et al., 2010; Pemsel et al., 2010; Tzortzopoulos et al., 2006; Zou et al., 2014). However, some challenges should be addressed. There are differences in maturity level between the EO and the hospital employees when it comes to the planning process. This pose a dilemma when balancing the time needed for maturity and creation of ownership, with the need for keeping the timeline in order to reach deadlines such as the National budget (Barlow & Köberle-Gaiser, 2009; Pemsel et al., 2010). Further, it is pointed out that involvement in planning generates expectations, which also is supported in literature (Dietrich et al., 2010; Eriksson et al., 2012; Eriksson et al., 2015; Eskerod et al., 2015a; Eskerod et al., 2015b; Henriksen et al., 2006). The risk of false expectations should be taken into account when involving a large amount of stakeholders with different perspectives (Daniel & Daniel, 2018), and one should reflect upon what constitutes the optimal level of planning (Serrador & Turner, 2015). Mutual understanding of the projects’ goals and limitations may balance this, avoiding disappointment and lack of motivation among stakeholders caused by unrealistic expectations.

5.3. Potential outcomes from collaboration

Collaboration may lead to learning, innovation and value-creation, and may strengthen the odds for project success (Bygballe, 2010;

Dietrich et al., 2010; Elf et al., 2012; Kanter, 1994; Matinheikki et al., 2016). Learning is beneficial for both the long-lasting hospital project, to future projects and the parent organisation, as well as for the efficient use of societal resources. The respondents actually requested experiences and lessons learned from other projects to lean on, in order to make them more capable of executing front-end planning. Enabling innovation is beneficial for hospital projects in order to cope with the rapidly changing medical and technological environment surrounding these projects (Barlow & Köberle-Gaiser, 2009; Bygballe, 2010), thus reaching for long-term successful and sustainable solutions.

5.4. Linking to other findings

In a value-creating perspective, Matinheikki et al. (2016) point to focussing on both structural, relational and cognitive factors in the front-end. The categories from our study partly correspond to these dimensions, and also partly resemble Ika & Donnelly’s (2017) conditions for project success (structural, institutional and managerial). We suggest that structural issues are important for collaboration to happen and relational issues (means, catalysts, see Fig. 2) are important both to make collaboration happen (means) and to make it work (catalysts). The cognitive dimension (Matinheikki et al., 2016) pertains to building and sharing a vision among stakeholders, which corresponds to the contexts category in our framework when it comes to embracing the different perspectives and contexts to create a common goal through the achievement of mutual understanding. Being able to manage project context and complexity by acknowledging the diversity of project stakeholders strengthens the focus of the project and makes it possible to better exploit the opportunity space and avoid early lock-in, important actions for achieving long-term project success (Aaltonen et al., 2015; Flyvbjerg, 2014; Gareis et al., 2013; Klakegg, 2010; Silvius & Schipper, 2014; Toor & Ogunlana, 2010).

5.5. Implications

Given hospital projects’ complexity, we assume that collaboration is key to strengthening front-end performance thus paving the way for strategic successful projects. This study advances our understanding of the front-end of complex projects by exploring collaboration, viewing it as a process, emphasising its inherent dynamic and evolving characteristics. The study further adds to the general understanding of collaboration pointing at the need for differentiating efforts along a (project) planning timeline. More insight contributes to enabling improvement of the front-end phase thus strengthening the sector’s project performance and further sector development and project value for money. Obtain-

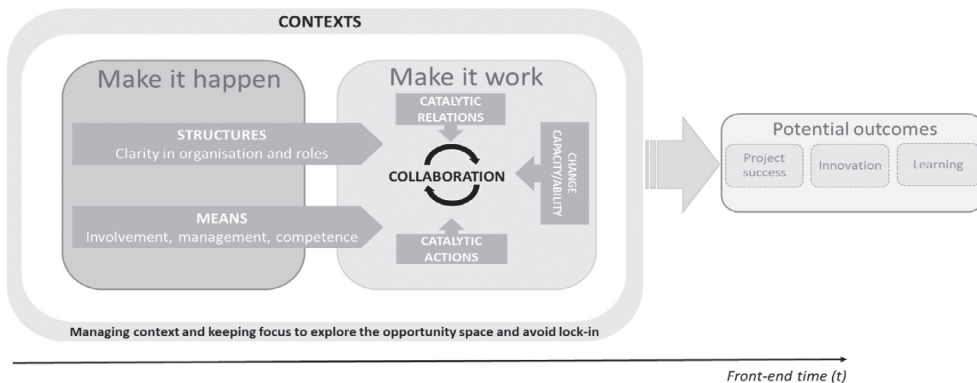


Fig. 3. Framework for collaboration in hospital projects’ front-end phase.

ing more knowledge will also potentially enable cross-project learning, which is a desired development for the sector.

Our analysis and findings on categories and their interactions are summarised in Fig. 3, proposing a conceptualisation and providing a framework for collaboration in the front-end of hospital projects. The framework illustrates how categories relate and interact to make collaboration happen and make collaboration work, and points at the potential outcomes from functioning collaboration.

The distinction between making collaboration happen and making collaboration work that is what should be thought of when initiating the projects' front-end and what should be thought of and acted on after the initiation to further fuel collaboration in the front-end, illustrate collaboration's processual nature. We believe that it is possible to engineer and prepare collaboration to a certain extent to help the project get off to a good start, and to maintain the pace further on. The managerial implications relate to the proposed framework serving as a practical guide for project managers to prepare and retain collaboration throughout the front-end phase. Tensions or paradoxes are inevitable due to hospital projects' inherent complexity. The front-end is further characterised by uncertainty and lack of information. Combined, these issues constitute a relatively challenging point of departure for hospital projects. More knowledge of the planning process and potential pitfalls mitigate the challenges by enabling harnessing what may be harnessed. Further, there is potential for strengthening project performance by learning to accept and exploit differences among stakeholders and organisations. The project managers should be able to balance such differences, and the framework may help by clarifying different issues that should be included for preparing and continuing front-end collaboration.

6. Conclusion

In our study, we set out to answer the question of how collaboration can be understood in hospital projects' front-end. In order to answer this question, we did a literature study and performed 13 in-depth interviews with persons involved in hospital front-end planning in Norway.

We found that four categories interact to make collaboration happen and make collaboration work. This points at a nuance in initiating and continuing collaboration throughout the front-end where aspects affecting collaboration should be emphasised differently. The suggested categories address both structural and relational aspects. Structures and means are needed to make collaboration happen, and catalysts are necessary for making collaboration work throughout the planning process. Contexts set premises for collaboration, but are also a way of shaping the project using existing diversities to explore the opportunity space, which is an essential part of the front-end phase. Collaboration is also a vessel for bringing the project forward, release potentials, and create values larger than the project itself.

Our findings suggest that collaboration has a processual nature, and may be engineered to a certain extent, thus calling on the need for project managers to have proper knowledge and skills to cope with this issue. Our findings may support project managers by elucidating the different aspects that should be thought of when initiating and continuing collaboration.

7. Limitations and further research

We chose to study collaboration in hospital projects' front-end from a practical project manager's point of view. Viewing this through other theoretical lenses such as organisational theory or management theory, might be fruitful and provide deeper insight into the collaboration phenomenon.

There are several ongoing projects in Norway that we have not looked into. Doing so would have provided more variation and would have been beneficial for validating the results in a Norwegian context. The small sample of respondents and our focus on one type of project and one stage of the project lifecycle in a Norwegian context may limit

the generalisability of our findings. The respondents are also people working in the projects, thus we might have gotten a wider perspective on collaboration if we included patients and relatives as interviewees. The interviews were conducted in the Norwegian language and quoting and references made to the respondents' answers are translated, introducing a potential source of error. All projects had finished the front-end phase and moved on to subsequent phases. This represents long periods of time, thus it may be challenging for the respondents to remember all details when interviewed in retrospect. Observation studies or longitudinal approaches would have improved the study's reliability. A further triangulation of methods and data collection would strengthen the validity, and may serve as an approach for expanding our preliminary findings.

Testing our preliminary results on other projects could be an avenue for further research. Comparisons with other sectors' front-end or collaboration in other project phases would be valuable, thus reviewing our findings in light of established knowledge and in a wider context. Looking for answers to why or why not collaboration in hospital projects differs from collaboration in complex, major projects in other sectors would be interesting. Looking at hospital projects internationally to gather experiences and enable learning from other practices would also be interesting. Conducting interviews with a wider category of respondents would also be valuable to elucidate more perspectives on collaboration.

Declaration of Competing Interest

None.

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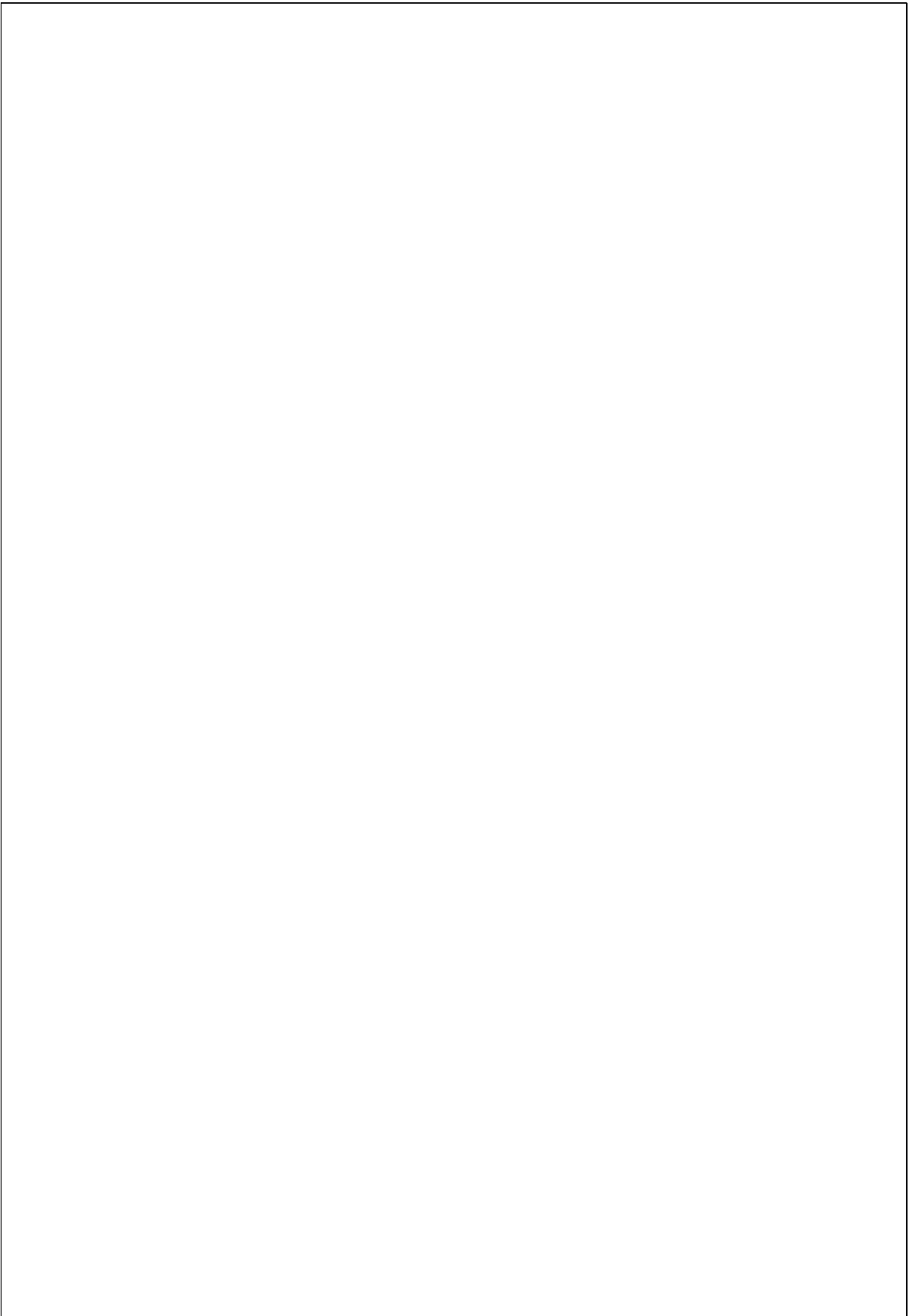
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PAPER III



Article

Project Governance in State-Owned Enterprises: The Case of Major Public Projects' Governance Arrangements and Quality Assurance Schemes

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Abstract: Societal development is increasingly undertaken as major public projects in different sectors. Project governance is important for strategically successful outcomes; thus, a broad societal perspective should be kept throughout the governance process. State ownership exists in many forms, and major public projects' governance arrangements differ. Quality assurance is a recommended part of the arrangements, yet knowledge of them is limited. This study investigates relatively recent governance arrangements in state-owned enterprises in Norway, emphasizing their content and organization of quality assurance. The arrangements are compared with the more established "State Project Model", a governance arrangement set up by the Ministry of Finance in 2000, including major public projects with budgets exceeding USD 110 million. Through case studies, comprising documents and interviews, and using the State Project Model as a reference frame, differences in the studied arrangements' comprehensiveness were found. Finding the appropriate level of governance is challenging, yet potential for mutual learning and improvement across different arrangements is revealed. For state-owned enterprises with sectoral policy objectives, the government should ensure that political control is not undermined. This study provides recommendations for further improvement of governance arrangements and adds to the general understanding of state-owned enterprises and major public projects' front-end phase.

Keywords: project governance; state-owned enterprises; public projects; quality assurance



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1. Introduction

Worldwide, there is an increase in societal development undertaken as major public projects, comprising among others public construction projects, transport infrastructure, and major ICT projects. Further, the projects have become constantly larger in scope and monetary terms (Flyvbjerg 2014). However, public projects have gained a bad reputation due to cost overruns and time delays, "over budget, over time, over and over again" (Flyvbjerg 2014, p. 6; 2017), and poor value for money (Volden 2019a). Although private-sector projects do not face the multifaceted challenges experienced in public projects, mainly resulting from political aspects, some of the discovered challenges also exist for private-sector projects (Volden and Samset 2017b).

Governance regimes for major projects are means for giving direction and help to improve processes and systems affiliated with such projects to ensure successful investments (Locatelli et al. 2014; Samset et al. 2006). A project governance regime comprises processes, systems and regulations that need to be in place for the project owner to ensure that the best project is chosen and implemented efficiently (Volden and Andersen 2018). Different approaches to governance due to organizational or sector characteristics, such

as shareholder orientation or orientation towards societal responsibilities, are needed and have been identified (Campbell et al. 2010; Müller 2014).

The private sector often expresses objectives connected to financial profitability and is guided by market signals, aiming to maximize return on investments (Campbell et al. 2010; Klakegg et al. 2016). Impacts are measured in monetary terms such as return on investment and incentives are connected to productivity and effectiveness, and organizations face less red tape (Campbell et al. 2010).

Public projects are complex due to, for example, multiple objectives, multiple stakeholders and difficulties in measuring success (Klakegg and Volden 2017). Political influence is prominent in public settings (Ongaro and Ferlie 2019), and must be considered as part of the projects' strategic efforts. Furthermore, the public sector demonstrates internal challenges due to a lack of skills and insufficient coordination between levels and among different actors (Volden and Andersen 2018). The inherent complexity represents a differentiation from the private sector, thus placing specific emphasis on governance (Crawford and Helm 2009). Furthermore, the complexity makes governance regimes or systems important for making things more predictable, which in turn positively affects the decision-making processes, thus safeguarding the interests of the project owner, namely the wider society and all taxpayers (Volden and Andersen 2018).

Previous research has looked at governance regimes for public projects and the effects that can be obtained, but also their weaknesses and limits. For example, Volden and Samset (2017b) present and discuss governance regimes in six countries, and find that the studied different regimes shared many characteristics and were mainly in compliance with recommendations from literature. For example, it was found that all schemes required independent quality assurance (QA) of decision documents, which is also highlighted by Narayanan and DeFillippi (2012), and by Haanæs et al. (2006).

In Norway, the Ministry of Finance established the State Project Model (SPM) in the year 2000. The SPM, also termed the "quality assurance scheme", aims at countering the problems and challenges experienced in major public projects that potentially lead to unfortunate project outcomes. In the last 20 years, trailing research has been performed on the SPM, showing that the preliminary effects of using this type of governance arrangement are positive: cost control is achieved on the portfolio level, there is more focus on problems than solutions, and the government is involved earlier (Volden and Samset 2017a). However, the regime is perceived as both time and resource demanding, and some researchers refer to the scheme as characterized by red tape (ibid.).

The SPM in many ways reflects public reforms: it partly rests on New Public Management (NPM) thinking (by requiring truly external QA in projects' front-end phase, using external experts), but also keeps a strong political aspect in that societal needs and goals are the basis for the experts' assessments (Christensen 2009). Public governance regimes should find the proper balance between efficiency and political control, which has proven a difficult task (ibid.). The SPM aims at managing this balance, but results show that governance tasks are extensively delegated to subordinate agencies, including strategical tasks that should be handled at the ministry level, thus risking a too narrow and internal focus (Volden and Andersen 2018).

As a result of different waves of public reforms, the public sector in many countries has been restructured through devolutionary elements in the form of new or reorganized state-owned enterprises (SOEs) (Christensen and Læg Reid 2003). SOEs were established to encourage more rational and efficient decisions due to growing public deficits and a belief in private sector superiority over the public sector in terms of efficiency, and the need to reorganize in order to facilitate growing cooperation between the private and public sectors as a result of structural transformations (Grossi et al. 2015; Rentsch and Finger 2015). Today, the presence of SOEs is considerable worldwide, as described by several authors, e.g., Ciolomic and Beleiu (2020), Nasir (2017), and Vagliasindi (2008), concentrated in sectors regarded as either strategical or important for the broader economy (Bernier and Reeves 2018; OECD 2014). SOEs are partially or wholly owned by the state, and consequently take

many forms (OECD 2018). Generally, they are organized as independent entities, subject to performance targets, and at arm's length from politics. The SOE represents a hybrid organization in which both commercial and societal objectives should be considered, thus differing from both the private sector and ordinary public agencies (Nasir 2017).

Major projects undertaken in Norwegian SOEs are not included in the SPM, hence there is limited knowledge of how project governance is performed in this setting. Furthermore, there is limited knowledge regarding the QA element in governance arrangements in general, and in SOEs in particular, which serves as the motivation for this study.

This study aims at learning more about the SOEs' governance arrangements by exploring different arrangements' scope, actors and content, which also echoes the call for more knowledge of SOEs in general (e.g., Bernier and Reeves 2018; Grossi et al. 2015). The present study focuses on five Norwegian SOEs, comparing them with the more established Norwegian SPM. Knowledge of the latter model, following several years of trailing research, makes it a beneficial starting point for comparison, also considering earlier findings suggesting that the SPM corresponds to recommendations found in extant governance literature (Volden and Samset 2017b; Volden and Andersen 2018). Studying any similarities and differences between the SOEs' arrangements and the SPM is a suitable point of departure for improvement and mutual learning between the arrangements. Gaining more insights into the different arrangements will create a basis for knowledge sharing, which is shown to have a positive impact on performance of both public and private organizations (Amayah 2013; Nesheim and Hunskaar 2015). In a project environment, knowledge sharing is proven to be beneficial in many ways on the individual level, and for some projects, it is shown that knowledge sharing improves project performance (Ali et al. 2018; Hussein 2020; Imam and Zaheer 2021).

Drawing on the established knowledge of public governance arrangements, some preliminary expectations as to potential differences between the arrangements and the SOEs' arrangements existed. Due to the SOEs' organizational independence and intentions of improved efficiency, it could be expected that the governance arrangements in these enterprises would focus more heavily on efficiency and in different aspects: efficient projects, but also efficient implementation of QA and other governance activities. The organizational independence also makes it interesting to look into how political control is ensured in SOEs' projects, and how external expertise is utilized.

Hence, to explore governance arrangements in SOEs, this study aimed at gaining more insights into the following topics:

- A description of different SOEs' arrangements' and their purpose, especially on how external QA is organized and performed;
- Actors and roles, including their political aspect;
- The arrangements' scope, and cost and time efficiency.

Five Norwegian SOEs that used to be government agencies but were reorganized to SOEs in the period 1992–2017, and thus became responsible for establishing their own governance arrangements for major projects were studied. The SOEs were compared with the SPM. All five SOEs have sectoral policy objectives and are owned by the line ministry responsible for the sectoral policy in the relevant area. The SOEs' investment projects comprise airports, specialist health care, the national electricity grid, highways, and railroads.

This paper starts by reviewing the theoretical foundation for the current study, comprising three strains of literature: governance of projects, projects in the private and public sectors and finally the state-owned enterprises. The research design, data collection and data analysis are then presented, followed by study findings from document reviews and interviews, and subsequent discussion including the researchers' assessments. Finally, some concluding remarks are presented together with this study's implications.

2. Theoretical Background and Literature Review

This study is underpinned by three theoretical topics—governance of projects, projects in the private and public sectors, and state-owned enterprises. It is argued that the intersection of these topics reveals a research gap connected to limited knowledge of the performance of project governance in SOEs, the poor understanding of the QA element in governance arrangements in general and the general call for more insight into the SOEs, as mentioned in the Introduction section.

In this section, this study first looks into the rather recent topic of project governance. Thereafter, this study looks at private and public organizations' inherent differences that presumably affect the different sectors' projects and their governance regimes. This study then delve into the SOEs, as the main organizational object of this study, which are hybrid organizations comprising elements both from private and public organizations.

2.1. Governance of Projects

In general, governance refers to the administrative and process-oriented elements of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organization, or territory, and whether through laws, norms, power, or language (Bevir 2013). Governance can be defined on many levels, is found both in public and private sectors, comprises many fields (e.g., corporate, public, administrative), and is a relative concept, meaning that "one size does not fit all" (Klakegg et al. 2008). Further, governance should cover all organizational levels.

Project governance is a rather recent research topic in the project management community. Initial theoretical contributions are mainly found after the year 2000, with a much-cited textbook by Müller published in 2009 (Müller 2009). Klakegg et al. (2008) refer to a paper by Miller and Hobbs (2005, p. 47), where it says that: "*Project governance has only recently become an issue of importance in the project management community and literature. Over the last ten years there has been more interest in the governance of projects in general and the governance of large complex public projects in particular*". Project governance can further be seen as a subset of corporate governance (Müller 2009), and concerns areas related to project activities that should ensure the alignment of the organization's project portfolio to its objectives (Klakegg et al. 2008).

Project governance literature appears fragmented (Ahola et al. 2014; Volden and Andersen 2018). Among the different streams of literature dealing with *project governance*, a distinction is made between governance of projects and governance *through* projects (Williams et al. 2010). This corresponds to levels of project success, as suggested by Samset (2010), which comprise the operational project perspectives (i.e., efficiency and cost compliance) versus the tactical and strategical perspectives (i.e., the extent to which the conceptual choice provides relevant and sustainable outcomes for society). The latter implies "doing the right project", wherein, among other issues, dealing with complex decisions plays a major part (Williams and Samset 2010). Other distinctions are pointed at by Ahola et al. (2014), where project governance is found to either be external to any specific project (literature within project management) or internal to a specific project (literature also includes transaction cost economics).

Project governance refers to the processes, systems and regulations that the financing party must have in place to ensure that projects are successful (Samset and Volden 2016). Typically, these include a regulatory framework to ensure adequate quality at entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, and standards for quality review of key appraisal documents (Samset and Volden 2016). A recent paper by Khan et al. (2019) summarizes work on project governance and which elements should be included in governance arrangements. Haanaes et al. (2006), who reviewed different models for decision making in major public projects based on best practice in Norway and other countries, also contribute to the topic by suggesting the following minimum requirements:

- Clearly defined project phases,

- Clearly defined decision points between the phases,
- Quality-assured basis for the decisions,
- Simplicity, and
- A certain standardization and common terminology.

The different publications show similarities in their content requirements for governance schemes. The need to include QA of the decision basis is pointed out by [Haanæs et al. \(2006\)](#) and by [Narayanan and DeFillippi \(2012\)](#). Experiences relating to the Norwegian SPM show that QA is beneficial for project performance. Studies show both improvement in cost management (80% of projects are completed within the cost frame, and on the portfolio level, the State is now in good control) ([Samset and Volden 2013a](#)), and the benefits of the systematic appraisal of conceptual solutions. The early appraisals force planners to view the potential investment in a holistic societal perspective rather than drawing specific technical conclusions directly, and it is shown that quality assurers' recommendations on conceptual choices are largely taken into account by decision makers ([Samset and Volden 2013a](#)).

The importance of early appraisals makes certain project phases more critical and in need of governance arrangements than others. A number of authors have highlighted the crucial role of the front-end phase ([Morris 2013](#); [Samset and Volden 2016](#); [Williams et al. 2019](#)). This is the stage from when the idea is conceived until a final implementation decision is made, and during which it is still possible to make changes or to terminate the project, at an affordable cost.

Many of the factors that later create problems in the construction phase, leading to cost overruns and other problems, are typically present early in the project definition stage ([Morris 2009](#)). Several authors ([Klakegg and Haavaldsen 2011](#); [Samset and Christensen 2017](#); [Williams and Samset 2010](#)) note that the choice of concept has the largest impact on strategic project success and is thus highly critical. Strategic project success refers to the achievement of successful project outcomes over a project's life cycle ([Jugdev and Müller 2005](#)) and connects to long-term value creation and sustainability of the actual project result ([Williams and Samset 2010](#)). Project management success, on the other hand, refers to the delivery of an expected project output often connected to the iron-triangle of time, cost and quality ([Williams and Samset 2010](#)). Sufficient exploration of the opportunity space by developing and evaluating alternative concepts serves to increase the odds of finding the best concept, but findings indicate that unfortunately this is not always the case ([Samset et al. 2014](#)). Furthermore, [Müller \(2009\)](#) emphasizes that the selection and prioritization of projects are key issues in a project governance scheme, and are closely related to the organization's portfolio management. Further, decision making is viewed as the link connecting governance and improved project performance ([Turner 2020a, 2020b](#)). The front-end's inherent complexity and uncertainty make decision-making challenging, thus the front-end becomes reliant on knowledge sharing ([Serugga et al. 2020](#)), which is also recommended to overcome uncertainty ([Stock et al. 2021](#)). To further help overcome front-end challenges, the value of judgmental information is put forward, and the ability for groups to provide better probability assessments by working together and sharing knowledge and experiences, rather than the individual working alone ([Imam and Zaheer 2021](#); [Samset 2009](#)). Facilitating knowledge sharing through suitable arenas to provide for improved performance is connected to the management's role ([Hussein 2020](#); [Söderlund 2002](#)), thus part of the governance regime.

Most of the project governance literature has its origins in the private sector, but the findings and recommendations may also be relevant to the public sector. Some studies focus on the governance of state-funded projects at the country level in relation to political processes and policy forming ([Klakegg et al. 2016](#); [Volden and Samset 2017a](#); [Williams et al. 2010](#)). Their perspective is on overarching institutional arrangements established by central governments to ensure that projects succeed across different public organizations. In general, [Frey \(2005\)](#) claims that possibilities exist for the private sector and corporate governance to learn from public-sector governance by constraining managerial power

through the division of power, rules and institutionalized competition, widening the extrinsic motivation to include more than monetary incentives, and by using goal-oriented intrinsic motivation, as opposed to extrinsic incentives.

The complexity surrounding major public projects affects the decision-making processes by creating uncertainty and unpredictability (Daniel and Daniel 2018) and is further complicated by analytical and political deficiencies (Samset and Volden 2016). Thus, the final decisions often become the result of policy and preferences (Samset et al. 2014), which highlights the well-known challenge of balancing concept elaboration and political decision making (Klakegg et al. 2016). The complexity may also pose a challenge for QA instruments, and thus there is need for continuous improvement in order to remain effective (Klakegg et al. 2016; Williams et al. 2010). This further emphasizes the need for governance regimes, with proper systems, processes and tools, able to meet these challenges (Khan et al. 2019; Turner et al. 2013; Volden and Andersen 2018). Governance frameworks serve as a guide to navigation through the complex landscape that encompasses public projects, thereby strengthening their odds of success by creating predictability and a sufficient analytical basis for decision making, and thus securing political control. However, there is no guarantee of improved decision making through such systems (Christensen 2011).

2.2. Private versus Public-Sector Projects

Both in the private and public sectors, projects are the means for change and development. Projects are instruments for implementing both strategies and policies. However, there are some fundamental differences between the two sectors and the differences affect how project governance is performed (Crawford and Helm 2009). These differences are becoming increasingly blurred due to a growing similarity in roles and context, and due to public reforms, privatization and corporatization (Campbell et al. 2010). Project governance should ensure that a project contributes as expected by defining standards with which the project should comply and further monitor this compliance, which makes the project's organizational structure, its shaping and institutional framework, and its ability to self-regulate all necessary elements in project governance (Too et al. 2017).

When looking at projects as important tools for strategical decision making, differences between the private and public sectors can be described, in line with Nutt (2006), in terms of environmental, transactional and process factors. Environmental (external) factors comprise, among other things, the considerations of a multitude of stakeholders, collaboration instead of competition, limitations in autonomy and flexibility aiming for consensus, and the need to balance political demands and user needs in a public context. The political influence is more prominent in the public sector than in the private sector, and modifies strategical management (Ongaro and Ferlie 2019). The transactional factors point at public scrutiny and the involvement of several actors in decision-making processes in the public setting, whereas private organizations mainly serve shareholders' aims for financial benefits. Furthermore, organizational processes are often seen as more comprehensive in a public organization, due to multiple and changing goals, and conflicts resulting from multiple stakeholders with different views and diffused power, which affects decisions. Hence, the complexity inherent in public organizations will affect governance regimes making them more comprehensive and probably less effective than those in private organizations, where the overall aim is to maximize return on investment (Campbell et al. 2010).

Public projects should also provide value for money, defined by *social* benefit–cost analysis (Volden 2019b). Additionally, the projects need to cope within the broad societal context, and should be successful at an operational, tactical and strategical level (e.g., Samset and Volden 2016; Volden and Andersen 2018; Williams and Samset 2010), which also indicates that the traditional ideal technocratic planning model is unrealistic (Christensen 2009).

2.3. State-Owned Enterprises (SOEs)

SOEs are partially or wholly owned by the state. Several organizations provide definitions of SOEs. However, a shared definition is absent (McLaughlin 2019). This research, with its primary focus on project governance, uses the definition provided by OECD since governance connected to SOEs is studied and reported by the OECD (McLaughlin 2019; OECD 2018), and since Norway is a member of the OECD. SOEs were established to encourage more rational and efficient decisions, due to growing public deficits and a belief in private sector superiority over the public sector in terms of efficiency and the need to reorganize in order to facilitate growing cooperation between the private and public sectors as a result of structural transformations (Grossi et al. 2015; Rentsch and Finger 2015). Additional reasons for establishing such enterprises are change of markets, desire to improve effectiveness and efficiency and to provide better services, the need for a clearer division of responsibility between owner (ministry) and management, and political considerations involving the transference of responsibility and decision making to enterprises in order to unburden political responsibilities (Statskonsult 1998). Moreover, SOEs take many forms (OECD 2018), and are considered important means for sectors that are essential and strategically important to government (Bernier and Reeves 2018). In a study of 34 countries' SOEs, it was found that 6 million people were employed in the enterprises, although the variations among countries were large, and the largest SOE sectors seemed to be found in the countries with the largest economies (OECD 2014).

The organization of the SOEs may be considered a gray area between state ownership and autonomy, as illustrated in Figure 1.

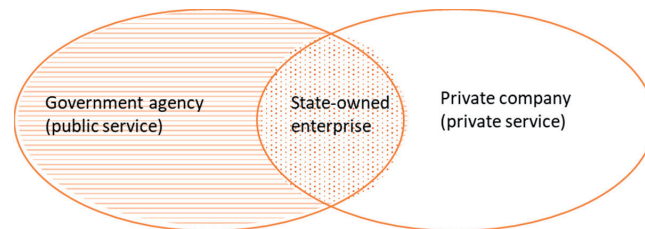


Figure 1. The SOE at a public-to-private organizational scale.

Although the SOEs manage important public interests, they largely run their own investments and decision processes happen at political arm's length. Their owners (i.e., ministries) define their goals, which may or may not reflect broad, societal objectives, and may require that decisions with political aspects are elevated to the political level. Thus, the SOEs' governance arrangements represent trade-offs between the decentralization and centralization of decision making, which should be handled with caution. Such distancing may affect how agency officials pay attention to political principals (Overman 2016), also considering that too much identification with an organizational subunit might lead to decisions that benefit the subunit rather than the larger organization (Simon 1944).

How decision-making authority should be delegated may follow several principles or instruments. The level of uncertainty and level of conflict are seemingly important issues for delegating authority (Huber and Shipan 2013). It is also argued that self-autonomy is less both when the enterprises are large and dependent on subsidies and when societal objectives lead to political visibility (Sørensen 2010). Reduced self-autonomy might compromise efficiency due to the enterprise having less ability to adapt decisions for the environment, while too much self-autonomy might lead the enterprise to make decisions that are not in line with the state's objectives (Sørensen 2010). This in turn elucidates some of the factors constituting the ambiguity found in the relationship between the state and the SOEs, where the SOE strives to balance its independency with non-market strategies and the need for protection and security (Rentsch and Finger 2015).

The SOEs are in charge of considerable public values, which makes demands on their effectiveness and efficiency, sustainability, and transparency (Grossi et al. 2015). This affects the governance frameworks encompassing the major projects undertaken in these enterprises, in line with the three dimensions of efficiency, legitimacy and accountability, discussed by Brunet and Aubry (2016), who argue that performance should be considered from other perspectives than merely the efficiency perspective.

3. Methodology

The following subsections present the research design, data collection, data analysis and limitations of this study. The methodological steps of the research are summarized and presented in Figure 2, at the end of this section.

3.1. Research Design and Data Collection

The research for this study was designed as a qualitative case study using an exploratory and descriptive approach (Saunders et al. 2019; Yin 2014). Each SOE's project governance scheme was treated as a case, using the SPM as a frame of reference. The purpose of this study was to seek deeper insights into the governance arrangements in the SOEs, which justified the use of an exploratory case study approach (Saunders et al. 2019; Yin 2014).

The selected SOEs are "category 3 companies", which are non-competing companies for which the Norwegian State has sectoral policy objectives. All studied SOEs are wholly owned by the state (category 3 also comprises companies with different levels of state ownership), and all companies were reorganized as SOEs by government agencies in the period 1992–2017. Investment projects undertaken in the selected SOEs can all be characterized as major projects that would normally be subject to the SPM.

This study's mandate was thoroughly prepared by the researchers and further extensively discussed in a reference group that was established prior to data collection and comprised representatives from all the involved ministries. The reference group arranged for contacts in the SOEs when needed and was given the opportunity to give comments leading to the final study report.

Empirical data were sourced from document reviews and interviews. Document studies are particularly suitable for case studies aiming for thorough insights into a topic, and are efficient and cost-effective means for research (Bowen 2009). Documents from each governance scheme were studied, including the SOEs' project governance models with inherent guidelines, reports from the quality assurers, and minutes from board meetings or other decisive entities in which reports are used as part of the decision basis. The documents were accessed by contacting SOEs directly, using information provided by the reference group when needed.

Interviews are suitable as a data collection method aiming for deeper insights into a specific topic (Kvale and Brinkmann 2015; Saunders et al. 2019). We interviewed 45 respondents comprising representatives from line ministries and SOEs, and quality assurers with knowledge of several arrangements (Table 1). The respondents were sampled using a purposive sampling strategy (Marshall 1996; Saunders et al. 2019), for which the external quality assurers should have been familiar with at least two of the governance arrangements studied as an inclusion criteria. Generally, the document studies were conducted prior to interviews. Data were collected between March and November 2019.

Table 1. Overview of the respondents.

		Sector	No. of Respondents
Ministries	Transport and communications	Road, rail, air	11
	Petroleum and energy	Electricity grid	
	Health and care services	Hospitals	
	Finance	SPM	
SOEs	Regional health authorities	Hospitals	18
	Norwegian Hospital Construction Agency	Hospitals	
	Avinor	Air	
	Nye Veier	Road	
	Bane NOR	Rail	
	Statnett	Electricity grid	
Regulative authorities	Norwegian Water Resources and Energy Directorate	Electricity grid	4
	Railway Directorate	Rail	
Others	Researchers		2
Quality assurers	Holte Consulting		10
	Metier OEC		
	Atkins Norway		
	WSP Norway		
	DNV GL		
	Vista Analyse		

Our contacts in the SOEs also suggested potential interviewees. In addition, quality assurers with experience of several of the QA arrangements were invited to be interviewed, in order to enable comparisons and provide for inputs on strengths and weaknesses in the different arrangements. The interviews were semi-structured, which enabled the use of open-ended questions and allowed for flexibility to change the order of the questions and adaptation to the situation (Saunders et al. 2019; Tjora 2012). All respondents were informed prior to the interviews, enabling them to prepare by gathering documentation and reflecting on earlier events, which has strengthened this study's validity and reliability (Saunders et al. 2019). An interview guide was used as a point of departure based on topics from this study's mandate, but the respondents could also speak freely, thus enabling them to delve deeply into topics in which they had thorough insights. Semi-structured interviews also provided opportunities for the respondents to discuss/draw attention to topics that were not directly asked about, thereby permitting digressions that enabled the exploration of different angles of the main topic not thought of beforehand (Tjora 2012). To clarify any uncertainties resulting from the document studies and to verify our own understanding, the respondents were also asked directly about the uncertainties in the interviews. Each interview lasted 1–2 h and was conducted by two or more researchers, one of whom made detailed notes. The findings from the document studies and interviews were used to make comprehensive case descriptions. The respondents were offered the chance to read the interview notes, but the majority were satisfied with just reading and commenting on the case descriptions.

Individual projects were not studied, only project governance arrangements set up by the line ministry and/or SOEs themselves. It should be noted that some schemes are quite recent, thus experiences so far are limited. Therefore, only the characteristics of the arrangements, not the effects of the arrangements, are discussed. The steps of the research are illustrated in Figure 2.

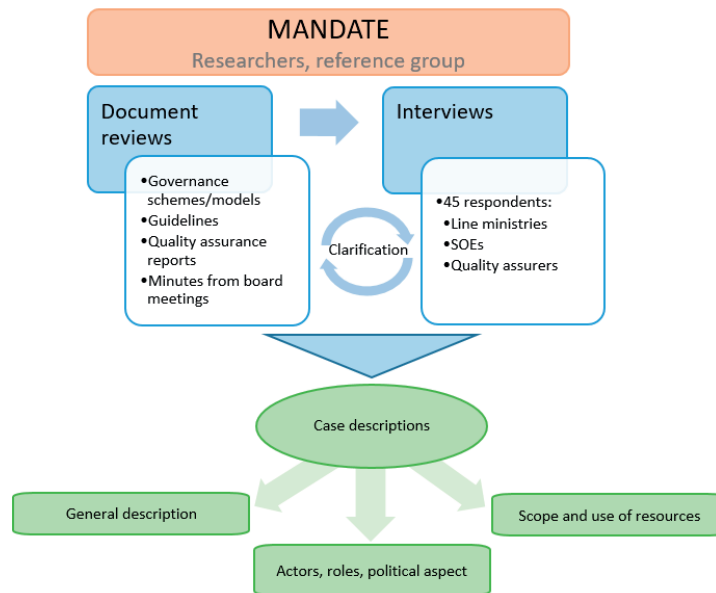


Figure 2. Research steps.

3.2. Data Analysis

The collected data were analyzed following two paths. The governance schemes' formalities were compared by using tables, looking at organizational issues and timelines and other aspects characteristic of the respective arrangements. This revealed the schemes' similarities and actual differences related to the schemes' content, performance and process.

The interviews were analyzed by coding the respondents' different statements, and further by clustering similar statements. The findings from the interviews partly helped to clarify or supplement the findings from the document study, but topics emerged that were not found in the document study and enabled us to gain deeper insight into aforementioned findings and thus the QA process.

Using data from multiple sources and combining methodologies are means for triangulation, which is important for validation and hence strengthens a study's trustworthiness (Saunders et al. 2019). Triangulation further enables a broad perspective and adds depth to the research (Ibid.). Moreover, studying several cases enables researchers to note similarities or convergence of information that could strengthen their study's credibility (Bowen 2009), as was experienced in our research.

3.3. Limitations

This study is limited to one country, and some of the arrangements are quite recent, which makes it too early to assess their effects. Therefore, the findings should be interpreted with caution, and they are not generalizable beyond the studied context.

Since the interviews were not audio recorded, there might have been an increased risk of introducing bias from the interviewer, as well as potential lack of accuracy. However, two researchers were always present in the interviews, during which one was responsible for taking notes, and all interviewees were given the opportunity to read the interview notes afterwards to mitigate the aforementioned limitations. Some of the interviewees, especially the quality assurers, provided personal interpretations of the studied arrangements. These interpretations were often in accordance with the researchers' interpretations, which occasionally made it difficult to separate explicitly the interviewees' interpretations from the researchers' interpretations. An effort is made to state the researchers' interpretations and assessments clearly by having separate subsections in the "Results and discussion" section.

4. Results and Discussion

This section provides the results and discussion of this study findings. First, the studied cases are described, then the three main topics and subtopics that emerged from the analyses are described and discussed.

4.1. Case Descriptions

The studied cases comprise the SPM and five SOEs with sectoral policy objectives (category 3 companies), which are explained in the following sections.

4.1.1. The State Project Model (SPM)

Every year, the Norwegian State invests millions of USD in major public projects from different sectors. To prevent future problems connected to cost overruns, delays and unrealized benefits, the Norwegian Ministry of Finance (hereafter abbreviated as MoF) established the SPM for major public investments in the year 2000 and further expanded it in 2005 to include the choice of concept. The model's purpose is to ensure quality and consistency of analysis and decisions in the front-end phase of projects, and it comprises a stage-gate model with two decision points (QA1 and QA2) (Figure 3).

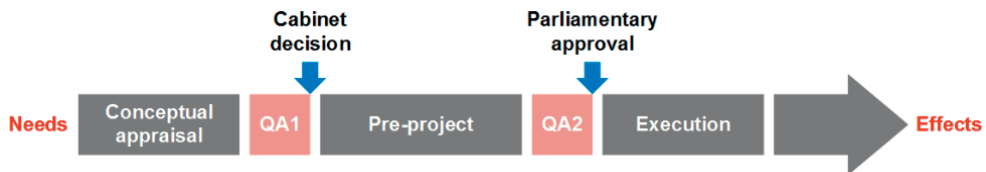


Figure 3. The State Project Model.

The regime has undergone some minor changes over the years, but the decision points have remained. QA1 concerns the choice of concept, where the purpose is to give the central political level real control over investment decisions. QA2 concerns the management base and cost estimates, where the purpose is to ensure budget realism and to obtain a more efficient use of resources.

Today, major public projects performed by ministries or governmental enterprises that are expected to exceed an investment cost of USD 110 million are subject to external QA through the State Project Model, with the intention to ensure quality-at-entry prior to the final funding decision (Ministry of Finance 2019). The MoF has entered into framework agreements with private consultants who perform the external QA, but the final decision is a political one. The QA is an assessment of the projects' decision documents comprising certain contents defined by the MoF, and independent analyses performed by the private consultants.

The SPM shows encouraging results. According to Volden and Samset (2017a), control over cost is achieved, and alignment with the government's strategic and political goals is ensured. The introduction of QA1 has provided a more systematic approach to an early identification of project ideas, making planners take a broader societal perspective instead of presenting technical solutions directly, thus strengthening the odds of including the most efficient alternative in the analyses. Spin-off effects are seen also in other sectors and administrative levels (municipalities), where similar arrangements inspired by the SPM are voluntarily introduced.

Although preliminary results are positive, the SPM has been criticized for being too rigid and using large amounts of time and resources (Samset and Volden 2013b). The SPM is also said to allow for too much political involvement, and politicians do not always follow recommendations from rational analyses (Volden and Samset 2017a; Volden 2019b).

Norwegian SOEs' major projects are not covered by the SPM. However, line ministries may impose governance arrangements on SOEs' projects as owner and/or regulator.

Beyond that, SOEs are responsible for their own investments, including their own QA schemes.

4.1.2. The SOEs

Public ownership is prominent in Norway, and the Norwegian State has considerable interests in traditional business activities, public infrastructure and traditional public sectors (Sørensen and Dalen 2001). Over the last 20–30 years, several Norwegian government agencies have been reorganized as SOEs with sectoral policy objectives, resulting from a number of large public reforms. In Norway, SOEs account for almost 10% of national employment, which is considerably higher than in other countries, where the share is below 5% (OECD 2014). The wide-ranging state ownership found in Norway is claimed to be the result of pragmatic choices in a number of individual cases rather than the result of a long-term plan (Norwegian Ministry of Trade Industry and Fisheries 2019b). State ownership in Norway was further professionalized from the late 1990s, and the introduced state ownership practices/frameworks have been pursued despite changes of governments (Norwegian Ministry of Trade Industry and Fisheries 2019a).

The organization of state responsibilities in enterprises in Norway is further explained as a way of providing the enterprise with a higher degree of strategical, operational and professional independence than would be possible in government agencies. SOEs, as independent legal entities, are competent and responsible decision makers, whereas in the case of government agencies, the decisions are made on behalf of the state and authorized by the cabinet minister (Norwegian Ministry of Trade Industry and Fisheries 2019b). Compared with government agencies, the enterprise organization is more efficient when governmental tasks require specialized expertise and adaption to heterogeneous and changing environments, and when it is possible to govern by subsequent result assessments (Sørensen 2010). However, organizing state responsibilities in enterprises leads to a greater distance between the enterprise and the ministries (Norwegian Ministry of Trade Industry and Fisheries 2019b).

For the State to exploit the enterprises' inherent expertise and competence, the SOEs experience a strong degree of autonomy (Sørensen 2010). By assessing major public projects through the SPM, political governance is ensured by the State/government. However, the SOEs projects are not subject to this regime. The SOEs administer their own governance arrangements and thus have a far more independent role towards the State/government. This might constitute a potential risk for the SOEs to compromise the broad societal perspective that should be present for assessing their projects in order to achieve strategical success.

Norwegian SOEs are sorted into three categories based on the State's goals as owner and whether the State has a rationale for its ownership. The categories differ, dependent on the State's objectives, where categories 1 and 2 have mostly commercial objectives aiming for the highest possible returns over time and the companies are set in a competitive environment, whereas category 3 companies' objectives are to attain public policy goals as efficiently as possible and do not primarily operate in competition with other companies (Norwegian Ministry of Trade Industry and Fisheries 2019a). The line ministries responsible for the sectoral policy in the relevant area own the category 3 companies. The category 1 companies are companies with commercial objectives, and category 2 companies are those with commercial objectives and other specifically defined objectives, and all are owned by the Ministry of Trade, Industry and Fisheries.

The five studied SOEs are presented in Table 2. All five enterprises used to be government agencies, but were reorganized as SOEs in the period 1992–2017. Some are funded by user fees (revenues regulated by the authorities), others by the national budget (in compensation for public service obligations), or in the case of Avinor by extensive commercial activities at the airport (e.g., duty-free sales, car parking, hotels). Some of the studied enterprises generate profits for the government (e.g., Avinor, Statnett); the others are only required to be financially "in balance".

Table 2. Overview of the studied SOEs.

SOE	Responsibility	Objective of State Ownership
Avinor	Aviation company with aviation operations business encompassing 44 airports in Norway, as well as air traffic control towers, control centers and other technical infrastructure for safe air navigation; the company also performs a number of socially mandated tasks	To own, operate and develop a nationwide network of airports for the civilian sector and provide joint air navigation services for the civilian and military sectors
Bane NOR	Responsible for the planning, development, management, operation, and maintenance of the national railroad network, traffic management and the management of railroad property	To ensure a cost-effective and customer-oriented infrastructure manager for the railroads and the development of good transport hubs
Nye Veier	Undertakes the planning, construction, operation, and maintenance of sections of national highways covered by the company's portfolio	To achieve more cohesive and cost-efficient development of safe national highways and create added value compared with a traditional approach to road construction
Statnett	Transmission system operator in the Norwegian power system and is responsible for the socioeconomically rational operation and development of the central power transmission grid	To contribute to the socioeconomically rational operation and development of the central transmission grid
Regional health authorities (4)	Responsible for specialized health care services in the country	To guarantee specialized health services for the four regions' populations by offering high-quality and equitable specialized health services to all who need them and when they need them, regardless of age, gender, place of residence, personal finances, or ethnic background, and to facilitate research and training

4.2. A General Description of the Different SOE Arrangements' Purpose and Content

Table 3 lists some characteristics of the different cases' governance arrangements.

Table 3. Overview of the case SOEs' arrangements.

Case	SOE Established (Year)	Project Governance Arrangement Established (Year)	Projects with Completed Qas (Number)	Threshold Value (for Governance Arrangements to Apply)
State Project Model	–	2000	QA1: ~100 QA2: ~200	USD 110 million (ICT projects) USD 35 million)
Avinor	2003	2013	QA1: 4 QA2: 10	USD 35 million
Bane NOR	2016	2017	5	USD 90 million
Nye Veier	2015	2016	9	N/A
Statnett	1991	2013	3	300 kV voltage level, and minimum 20 km grid length
Regional health authorities	2001–2007	2002, 2011, 2015	ca. 20 (16 after 2015)	USD 60 million

The positive experiences with the SPM have been an argument for other public organizations outside the SPM to introduce similar arrangements, which they do voluntarily. The majority of the studied SOEs' governance arrangements share the same purpose of providing a sufficient decision basis for conceptual and investment decisions. The exception is Statnett, where the purpose is to anchor the need for measures and solutions sufficiently, both in a political and societal manner. As can be seen from the year of establishment of the arrangements and the number of projects with completed QAs shown in Table 3, the majority of arrangements are new and have not gained the same amount of experience as the SPM.

As opposed to the SPM, the target group for the QA for the majority of the studied SOEs is the SOEs themselves, with one exception (Statnett). Still, the line ministries require the SOEs to have governance arrangements to ensure realistic budgets and cost control. The exception is Avinor, which initiated its arrangement on its own initiative. The SOEs' arrangements generally appear less comprehensive than the SPM, and the differences are discussed in the following subsections.

4.2.1. Stage-Gate Models

All five SOEs have governance frameworks based on a stage-gate model performing external QA at selected decision gates, as shown in Figure 4, together with the SPM.

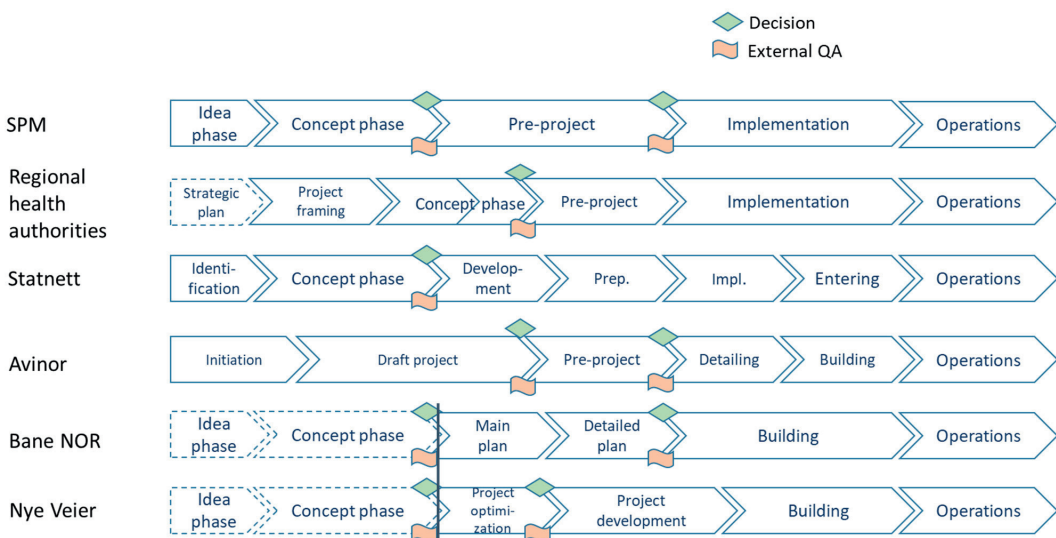


Figure 4. The stage-gate models for project governance for the case SOEs and the Norwegian State, showing the different project phases, when external QA is performed and different decision points.

Three SOEs (regional health authorities, Statnett and Avinor) perform external QA of the business case in the same way as the SPM (QA1), although somewhat later, while two SOEs (Bane Nor and Nye Veier) are only responsible for pursuing projects selected by the Government after an ordinary SPM QA1 process (vertical line in Figure 4).

4.2.2. Contents of the Quality Assurance (QA)

Table 4 shows the different arrangements' topics subject to QA.

Table 4. Different arrangements' topics subject to QA.

Case	“Doing the Right Project”	“Doing the Project Right”
State Project Model	Needs objectives, feasibility analyses, financial terms QA of choice of concept before Cabinet decision to start the pre-project	Management base, contractual strategy, cost estimations, uncertainties, change records, benefits/conceptual choice QA of the management base and cost estimates before the project is submitted to Parliament for approval and funding
Avinor	Needs analysis, strategy, demands, feasibility studies, recommendations for pre-project	Management base, contractual strategy, cost limits, uncertainties, success factors
Bane NOR	Performs QA1 as the State Project Model	Management base, objectives, contractual strategy, uncertainties, simplifications, organization/governance, cost limits
Nye Veier	Performs QA1 as the State Project Model	Costs and uncertainties, socioeconomic analysis and basis for traffic, organization, governance, contractual strategy, funding
Statnett	Needs analysis, objectives, project framing, feasibility studies, recommendations for pre-project	No QA2
Regional Health Authorities	Agreement according to strategical plan, objectives hierarchy, feasibility studies as a function of the health authorities' financial capacity/sustainability, localization, patient safety	

The SOEs' QA process is parallel, unlike the SPM. For the enterprises performing QA of the business case, the topics covered are similar to those found in the SPM, but the scope and terminology differ, as discussed in the following subsections. QA of the management base and cost estimates (i.e., QA2 in the SPM, where the purpose is to ensure budget realism and to ensure a more efficient use of resources) share even more similarities with the SPM.

4.2.3. Researchers' Assessments

All SOEs have governance arrangements based on the SPM regime regarding which phases should be subject to QA and which topics should be covered, with the exception of the regional health authorities.

However, some differences were found especially connected to “doing the right project”. To ensure strategical project success, it is essential to find a relevant and sustainable solution to the given problem that the project is set to solve, by exploring the opportunity space in order to find a concept that serves the purpose (Samset et al. 2014).

The SOEs interpret the concept term more narrowly compared with the SPM. SOEs often look at variations of the same concept and not at unique conceptual solutions. For example, for hospital projects, all assessed concepts tend to involve new buildings, comprising variations of alternative dimensions or localization, or both. The SOEs rather focus on whether their preferred solution is well documented, and thus the conceptual choice, as defined in the SPM, is made in advance.

The narrow interpretation of the concept may be due to limited mandates of the SOEs. However, it is unfortunate that terminology related to major projects is inconsistent, and it should be clarified. Thus, discussions on what constitutes a concept would be valuable, especially for hospital projects, as also stated by Larsen et al. (2020). Broader analyses and a wider exploration of the opportunity space in order to find unique solutions might be suggested, although it is known from experience with the SPM that interpreting the meaning of the concept term is demanding and has been discussed for years. However, this could serve as a beneficial starting point for improvement, although, balancing concept

elaboration and political decision making is a well-known challenge, and is yet to be solved (Klakegg et al. 2016).

Potential variations in the content of QA due to scope flexibility might challenge the governance arrangements' legitimacy and accountability when the analytical basis is affected by increasing unpredictability and reduced transparency. Furthermore, flexibility is considered crucial (Müller et al. 2014; Volden and Andersen 2018), thus indicating that finding a proper balance between demands and possible adaptations is important.

Moreover, a wider use of the business case along the project life cycle in the SOEs than for projects under the SPM was discovered. This situation has recently changed in the SPM, and the business case, (i.e., the project benefits) will also be emphasized in this arrangement after the concept phase. Thus, use of the business case has served as a learning point between the different arrangements.

4.3. Actors, Roles and Political Aspect

The different actors and roles vary between the SPM and the SOEs' arrangements, as illustrated in Figure 5 (the left pane shows the SPM; the right pane shows a simplified version of the SOEs, as there are variations between the different SOEs).

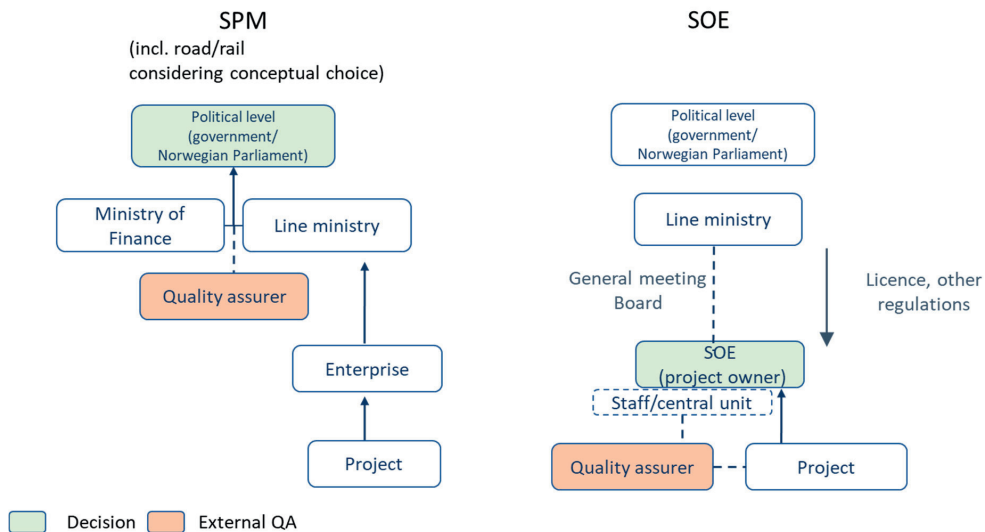


Figure 5. Organization of actors in the SPM and SOE arrangements.

The line ministries own the projects for the respective SOEs, as opposed to projects under the SPM, where project ownership should be considered as part of a hierarchy comprising the government, the line ministry and the agency (as discussed in Volden and Andersen (2018)). In the SPM, the process towards starting the projects is initiated by the line ministry, generally in consultation with the subordinate agency. The MoF contracts the external quality assessors who, after completion of their assessments, provide a general recommendation to the MoF and the respective line ministry. Decisions on project concept and funding are further made at the political level, namely by the government and parliament. The funding is made to the actual agency through the line ministry.

The SOEs' initiate their own projects and necessary elaborations, and contract the external quality assessors. For the SOE projects, the quality assessors provide their recommendations to the SOE, which mainly serves as the decision maker for the project's continuance. The line ministries may be involved in the processes either as shareholder or as licensing authority, lender or governor. However, in these projects, state ownership does not imply governing/controlling the individual projects. Investment decisions are generally not

decided at the political level by the government or parliament. Line ministries' corporate governance is mainly practiced through the appointment of a board. However, the QA might be of relevance for the authorities when they are acting as a licensing authority, lender or governor, particularly in the case of major projects' licensing concerning the national electricity grid or transmission grid (Statnett). In these projects, the purpose of the external QA is to demonstrate the project's benefit–cost efficiency. By contrast, Avinor is dependent on licenses for new development projects, but there is no similar relation to external QA, and according to the respondents, the Ministry for Transport only to a minor extent practices political control when acting as a licensing authority. In the case of Bane Nor, Nye Veier and the regional health authorities, reports from their respective QAs serve as the decision basis for funding and development of railroads, roads and hospitals, respectively, but the respondents indicated that there no political judgements were involved in these projects. The external QA rather becomes a way of making the different SOEs financially accountable for the projects.

4.3.1. Political Distancing

The SOEs' arrangements contribute to a political distancing compared with the SPM. The line ministries' degree of involvement differs, thus affecting how political control is exerted. The political distance may make it easier for the projects to perform rational assessments regarding investment needs, life cycle costs, and profits in a long-term perspective. However, several respondents also held that the political distance made it more difficult for the projects to include sufficient political and societal considerations. The SOEs' arrangements are primarily tools for supporting the boards and management in making the right decisions, and are not made for the purpose of serving the State's and wider society's interests. As formulated by one of the quality assurers:

“Our job in these arrangements is to provide safety for the board and management to make the right decisions, not to be the State or society's agents”

This contrasts the general purpose of governance arrangements as a way to provide central political power to the decisions on major public projects and to further anchor the projects at the central level (Christensen 2011).

Deviating from the general purpose might compromise legitimacy and accountability by undermining central control and further compromise strategic project success by losing sight of the bigger societal picture. As an example, one of the State's objectives with Avinor is to manage Norway's network of airports. Avinor is required to operate in profit, and thus the enterprise should focus on clients and business that provide revenue for the company, namely passengers, goods transport and duty-free sales. Society at large is increasingly concerned with environmental and sustainability issues, but the focus in Avinor is on developing air services that will lead to an increase in passenger and freight traffic. There are, surprisingly to some, no political assessments connected to these questions or to suitable arenas for holistic discussions in parliament, government and the line ministries. Several respondents highlighted the political distance in these processes, where discussions regarding environmental policies and alcohol policies should be carried out on a national level. The exception is larger projects that need additional governmental grants and are mentioned in the National Transport Plan. These projects will be subject to the SPM.

Except for the regional health authorities, there is no tradition of political governing of single projects in Norway. As several of the respondents said:

“Since the governmental level does not have a clearly defined role in these governance regimes, governmental interventions may lead to decisions that are even more “political” or random”.

However, for the development of health services, for which considerable changes to existing services have been suggested, such as the closing down of hospitals, decisions should be made by the Ministry of Health and Care Services, following health legislation.

Due to political complexities associated with these situations, it is regarded as a challenge for the health authorities to let go of their governing rights, thus illustrating how uncertainty and the level of conflict may influence the delegation of authority (Huber and Shipan 2013).

To summarize, this study shows that in the case of airports, the SOE (Avinor) seems to escape politics altogether. In the case of hospitals, it seems to be “pretended” that there is an arm’s length to politics, but the government has found other (less predictable?) ways to exercise power, while in the case of the electricity grid, highways and railroads, political control over the choice of concept is ensured (at least in principle) in the same way as for ordinary public projects. This contrasts with the criticism of the SPM regarding too much political involvement, where seemingly some of the SOEs have gone too far in the opposite direction.

Conferring to critique against NPM from a political science and organizational theory point of view (e.g., Christensen 2011) and possible unfortunate outcomes resulting from decentralization of decision making (Simon 1944), the government should ensure that political control is not undermined. This is especially important for SOEs with sectoral policy objectives, in order to keep the societal perspective and thus strengthen the possibilities for strategically successful projects—that is, doing the right project (e.g., Williams and Samset 2010). As mentioned earlier (cf. “Political distancing”), there exist cases of investment decisions taken by an SOE that clearly affect the broader policy pursued by society and the use of its resources with very little political involvement.

4.3.2. Administering the QA Scheme

As opposed to the SPM, the SOEs themselves are responsible for both producing the decision basis and for contracting its external QA. Responsibility for handling elaborations in an early phase varies among the SOEs, as does the establishment of a dedicated project organization. There are variations regarding how responsibility for contracting external QA is designated: in some cases, the project itself is responsible, but for most cases the responsibility lies with a more centralized unit at the SOE level. For example, Nye Veier has moved the responsibility for contracting from the project manager to project management office level. For hospital projects, the relevant regional health authority serves as project owner, while the Norwegian Hospital Construction Agency is responsible for contracting the QA. This might become a challenge, since the agency is used as project managers or advisors in hospital projects exceeding USD 60 million, and thus risks contracting QA of its own work.

It could be argued that line ministries or other authorities should be involved in administering the QA in cases where they are target groups for the QA report. However, some respondents held that this would compromise the SOEs’ independence.

The Railway Directorate and the Norwegian Water Resources and Energy Directorate use the QA reports for assessments regarding investments and development of railroads and the electricity grid, respectively, but do not have a role in contracting the QA.

Some variations are also seen regarding how the contracting is carried out. With the exception of Statnett, all SOEs have long-term framework agreements with between three and six companies or constellations of companies. Most SOEs contract the companies through competitive bidding, as opposed to the SPM, whereby quality assurers are contracted by aiming to attain a certain percentage distribution of the assignments seen over time.

All SOEs are concerned with using limited time and resources on the QA process, thereby limiting the scope of the QA assignments, aiming to gain early access to the quality assurers’ recommendations. The importance of keeping the assessed projects up to speed is emphasized, since project delays are regarded as a considerable disadvantage for financial and other reasons. For example, hospital projects have a high degree of user involvement, making it important for them to keep to the project timeline. One of the quality assurers, however, pointed out that:

“If the SOEs aim at using limited time on quality assurance, it is important that the elaborations and reports presented by the SOEs are of good quality initially”

4.3.3. The Quality Assurers’ Role

Both commissioning practice and performance of the QA process make the distance between the quality assurer and the SOE/project less than in the SPM, as illustrated in Figure 5. In the SPM, quality assessments happen at specific points and by truly external consultants without much dialogue between the parties, while the SOEs mainly perform parallel assessments. The closeness between the SOEs’ projects and the external quality assurers may make the exchange of professional advice easier, but at the same time challenge the impartiality, especially since the QA process is parallel. The parallel process may affect the quality assurers’ role, making it more advisory, and the quality assurers risk assessing their own advice since they receive continuous versions of the decision documents. For some SOEs, this is deliberate and explained by the arrangements’ immaturity and the wish for consecutive assessments of practice. In some cases, the process also seems necessary, due to high degrees of insufficiency in the assessed reports; hence, the quality assurers need to tell the projects what to do. This practice was in many ways considered valuable and meaningful by the respondents from the SOEs, and the closeness created between the quality assurers and the projects makes it more likely for the quality assurers’ advice and recommendations to be accepted. As a respondent from one of the SOEs said:

“Looking strictly at the QA, the quality may become better if the quality assurers were allowed to sit for themselves in peace and quiet, working on the quality assurance report for half a year, but it is not worth it”

Working together and drawing on the different actors’ experience and competence potentially creates a sound culture for decision making as part of project governance, which in turn might be beneficial for the project performance (Turner 2020b). Knowledge sharing may improve the internal quality of work and it can also facilitate the learning and knowledge exchange process between different entities (Hussein 2020; Nesheim and Hunskaar 2015).

The expected contents of the QAs appear as more flexible in the SOEs’ arrangements, and the specifications regarding what to include are experienced as more guiding than absolute, as opposed to the SPM’s specifications. This makes it possible for the SOEs to assess the scope of the QA for each project, which then becomes subject to competitive bidding. In the SPM, the specifications are set in framework agreements, and have recently been defined in a directive. Some of the respondents described the flexibility as a positive feature of the SOEs’ arrangements, while others expressed their concern about possible large variations in the QAs’ contents and quality resulting from the flexibility.

4.3.4. Researchers’ Assessments

Three main observations are made concerning actors and roles in the SOEs, which differ from the SPM:

- Decisions on SOEs’ projects are made by the projects themselves and not at the political level by the government or parliament;
- Administration of the QA arrangements is carried out closer to the project, making QA less independent;
- The quality assurers are forced to be more flexible, mainly due to the projects’ desire to avoid pauses.

Transferring responsibilities for decisions regarding societal needs from the political level to SOEs with limited sectoral objectives should be carried out consciously. It may be questioned that SOEs are responsible for their own QA arrangements and the further use of the QA reports for decision making by the authorities. For the SOEs, the reports are mainly aimed at the different enterprises and might not cover the authorities’ need for information.

Therefore, the authorities should thoroughly consider whether the reports' contents are sufficient for their needs, and whether a sufficient societal perspective is present.

Choosing the right concept is vital for strategic project success, hence SOEs' elaboration of concepts should take a holistic societal perspective by sufficiently exploring the opportunity space (Klakegg and Haavaldsen 2011; Samset and Christensen 2017). The choice of concept, especially in the case of hospitals and airports, should take a more holistic societal perspective and the Government should be given a formal role in approving the projects. This corresponds to the general critique against NPM regarding the decentralization of power in matters important to the society (e.g., Christensen 2009, 2011). However, for Bane NOR and Nye Veier, conceptual decisions are made at the central level, delegating authority to the SOE afterwards. This might be beneficial considering the level of uncertainty and potentially high levels of conflict that can occur in the earliest project phases (Huber and Shipan 2013). Premature concept decisions compromise exploration of the opportunity space, and may lead to early lock-in (Flyvbjerg 2014). Therefore, the SOEs have much to learn from the SPM, in which wide assessment criteria are used, aiming for a comprehensive assessment of the project's societal usefulness. For SOEs, the assessments of projects are generally rather narrow, in which commercial considerations or achievements of limited sectoral objectives seem more pronounced than making broad societal assessments. On the basis of this study, it is suggested to perform broader benefit–cost analyses for the largest SOE projects.

Even if the closeness between the SOE and the quality assurers due to the parallel QA process is seen as beneficial, there is a risk of compromising the impartiality that should be prominent in such processes. It could be argued that the quality assurers should be given a formal opportunity to state when the decision basis is insufficient, similar to formal arrangements within the SPM.

4.4. Scope and Use of Resources in Quality Assurance

The respondents from the SOEs held that their arrangements were more efficient than the SPM, the scope was generally less ambitious, and the QA process was often parallel and generally more flexible. This, in turn, led to more efficient implementation of the investment projects. The MoF has made an effort to make the SPM more efficient and has managed to shorten the time spent on the assessments over the years. The average cost has been reduced for QA2, while for QA1 the average cost has increased, most likely due to a few projects' need for extensive elaborations. QA costs and time used per QA review are illustrated in Table 5.

Table 5. QA costs and time used in the studied different arrangements.

Case	Average Cost per QA Review	Time Used per QA Review
	September 2015–September 2019:	September 2015–September 2019:
State Project Model	QA1: USD 330,000 QA2: USD 202,000	QA1: 8 months QA2: 5 months
Avinor	QA1: USD 57,500 QA2: USD 57,500	2–3 months
Bane NOR	QA2: USD 57,500	8 weeks (sometimes more)
Nye Veier	QA2: USD 57,000–69,000	6 weeks (sometimes more)
Statnett	Between USD 115,000–172,000	3–4 months in total (split process; quality assurers may use 6 weeks on each part)
Regional health authorities	QA concept phase USD 18,400	2 weeks when using parallel arrangements, 6 weeks when using point evaluation

Several of the respondents from the MoF and quality assurers affiliated with the SPM held that there was potential for improving the SPM's efficiency. However, it remains

unclear as to what extent it can be improved and what the actual degree of improvement has been in recent years. Some minimum requirements limit the ability to shorten time and/or reduce costs. This depends on the quality of the final reports and complexity of the project. The MoF holds that efforts to improve the QA2 are limited, while there is potential for improvement of the QA1. However, as several quality assurers claimed:

“The choice of concept is the most important decision, and attempts to shorten the process by a few weeks in order to save time and money clearly is the wrong focus”

The respondents put forward some suggestions for how to improve the arrangements' time and cost efficiency, such as providing target figures or demands for time and cost, thus signaling the importance of these issues for the State. This would further force quality assurers to take on a risk-based approach by focusing on the weakest links in the decision basis and not treating every issue equally thorough. Further, the respondents stressed the importance of a qualitatively sufficient and complete decision basis to shorten the time spent on QA. They also mentioned the possibility for performing a “light” version of the QA, whereby the quality assurers could assess the available documentation and not perform their own independent analyses, given that project owners are experienced and projects are less complex. Looking at this from another perspective, one of the quality assurers said that:

“Pretending that everything is equally important may constitute a risk for covering the important issues among the less important ones”

When assessments are finished, it is common for quality assurers to write an extensive report, involving a considerable number of working hours. Some respondents pointed to the possibility of simplifying the report, more in line with the standards of some of the other QA arrangements. Furthermore, the respondents point to the number of actors attending the QA constellations as a factor that might drive up the costs, due to the need for coordination and involvement. The State's constellations are quite large, comprising typically three or four companies.

4.4.1. Are Some Arrangements Too Scarce?

Considering costs and time spent, the thoroughness of the SPM makes it a candidate for improvement. Using this as a backdrop, one could ask whether the SOEs' arrangements are too scarce or too narrow. The SOEs find their arrangements sufficiently thorough, and point to the external QA as part of an extensive QA system, which also includes internal assessments. Most enterprises/agencies have their own arrangements, but it could be argued that enterprises that have their own boards and that are financially responsible for a project portfolio may have stronger incentives for such arrangements. However, it should be emphasized that the case SOEs are still state-owned companies managing the State's assets, and thus the societal perspective should be given prominence by securing political control through a suitable level of state governance. Irrespective of the State's more or less direct involvement in the external assessments, it is important to ensure the necessary premises for the quality assurers to do a good job. One of the respondents exemplified this by saying:

“... a superficial QA report could become an alibi that would lead the decision-makers to make their decisions on false premises”

The quality assurers mentioned difficulties in providing good advice or recommendations when there was limited room for making their own analyses, which is common practice for project assessment under the SPM. The majority of arrangements do open for control calculations and provide grounds for extended analyses when needed. However, in practice it may be difficult to manage this within the scope of the current arrangements.

Some respondents held that QA is more important when projects are immature, and that given that the SOEs' arrangements are young and still under development, the QA should be seen as a valuable asset. The quality assurers shared the opinion that some of

the SOEs lacked project maturity compared with the agencies under the SPM, which may emphasize the need for QA of projects in these enterprises.

Another factor influencing the QA is the SOE projects' need for progress in order to be included in the state budget for the current year. This affects time spent on the QA and serves as the main reason for choosing the parallel approach to QA. However, as pointed out by several of the quality assurers, the need for progression may compromise the quality of the assessments, making it too narrow and making it hard to judge whether the decision basis is insufficient and whether to recommend further assessments.

4.4.2. Researchers' Assessments

Our findings show that the SPM is more extensive than the case SOEs' arrangements. The SOEs largely manage to control the time and resources spent on the QA process because they administer the arrangements themselves. The pronounced need to keep to the project cost and timeline makes parallel QA practice widespread among the SOEs.

Finding the appropriate level of external QA is challenging, as seen from the studied arrangements. The project model, corporate governance and other incentives will affect the scope and use of resources in the external QA, leading to variations among arrangements and chosen actions. However, when searching for an optimal balance there should be potential learning points between the SPM and the SOEs' arrangements. Depending on the projects' complexity and scope, the SPM could benefit from becoming more flexible, thus improving its efficiency and making it simpler. Attempting to achieve an optimal balance, experiences and knowledge should be shared among the different arrangements. This enables development of ideas and could help in implementing practices and procedures (Wang and Noe 2010). To facilitate such knowledge sharing processes, the establishment of suitable arenas for this purpose would be beneficial (Söderlund 2002), which also corresponds to one of several identified factors shown to influence knowledge sharing behavior (Wang and Noe 2010).

However, it is unclear whether the potential for improvement is due to the QA arrangement itself or how it is practiced. Moreover, is it unclear to what extent the SPM may be improved. The quality of the assessments should not be compromised by improving efficiency. Still, the quality assurers' influence on the arrangements could be questioned and whether they possess the right incentives to suggest a simplified QA process whenever possible.

For the less comprehensive SOE arrangements, the quality assurers should be allowed sufficient time and perhaps a more prominent role to facilitate their work. The considerable focus on maintaining scheduled time and costs should not compromise the quality of the QA. While this is not an explicit issue for all SOE arrangements, it is generally an important point to avoid superficial QA processes leading to unfortunate decisions. The quality assurers should be able to perform their own analyses when needed, namely when the decision basis is insufficient due to, for example, inadequate analysis or lack of transparency.

Additionally, the overall decision basis should be assessed as a whole, by asking whether it is sufficient for making decisions. To avoid a situation where the quality assurers assess their own recommendations, the original document should remain unchanged, and a change record should be made in addition. Limited data make it difficult for any conclusions to be drawn as to which arrangements are sufficient and which are not, based on the differences found between the SOE arrangements regarding the impact of time and cost pressure. However, it should still be recommended that the different SOEs evaluate whether the perceived time and cost pressure has unfortunate effects on the QA processes, as superficial QAs may not serve their purpose.

5. Concluding Remarks

This study set out to explore the governance arrangements of major public projects in SOEs in Norway, and in particular, how the recommended external QA part of these

arrangements is organized and performed. The SOE arrangements are compared with the more established SPM governing the State's ordinary public projects, in order to establish a point of departure for mutual learning and improvement between the different arrangements.

From our comparison of the SOEs' QA arrangements with the SPM, it may be concluded that the SOEs' arrangements are more efficient, considering scope and use of time and resources. The SPM has been criticized for its comprehensiveness, and actions have been taken to improve it. Some learning points may be taken from the SOEs' arrangements in this manner.

Organizing state ownership in its own enterprises might be considered beneficial in several respects. However, the State should be aware of which decisions are "outsourced" due to such organizing and should ensure that a broad societal perspective is kept when decisions are made. Due to the SOEs' sectorial perspectives/objectives, this might become a challenge. Making the SOEs responsible for their own QA arrangements further contributes to distancing of decisions on potentially important societal matters from the political and democratic level. Centralizing responsibility for the QA might compensate for the decentralization of responsibility as described in the SOEs' arrangements. Furthermore, such centralization may strengthen the societal aspects that should be prominent in decision making concerning public projects, in order to achieve strategic success.

Strategical success is also sought through decisions on the conceptual solution, when it is essential to keep a holistic societal perspective. The discussion on what constitutes a concept should be emphasized in the SOEs, and in this regard experiences of the SPM over the past two decades would be useful, aiming for a harmonization of the terminology and the use of broad assessment criteria.

Further, the quality assurers' role in the SOE arrangements and their closeness to the SOEs' projects should be emphasized, which may compromise the necessary impartiality that should be present in such processes. Even if the SOEs see the parallel QA arrangements and close relation as an advantage, it is considered reasonable to point this out as a potential risk factor.

Compared with the SPM, which has been a research topic for two decades, the SOEs' arrangements are relatively immature, and therefore the need for more research is pressing. Continuing research on the different arrangements' development, especially connected to relative effects on cost control, achievement of tactical and strategical objectives, and other success criteria would presumably be beneficial for further improvements and learning, also seen in an international context. This may guide us towards finding the right level of external QA, and how to balance this against internal QA arrangements. Gaining further knowledge of the schemes would also be beneficial for assessing which topics to emphasize in the QA reports, how to organize the arrangements, and how the quality assurers' role should be balanced in favor of acting as an advisor. Further knowledge on these topics might contribute to more predictability, which in turn would improve the decision-making environment, and which could, according to [Turner \(2020a, 2020b\)](#), lead to better project performance.

Research Implications

This study advances our general understanding of SOEs and the governance of major public projects undertaken in such enterprises, both of which are research topics in need of further knowledge. This study points to the SOEs' challenging role in balancing independence and efficiency with the need to keep a holistic, societal perspective and make societal decisions at the right political level. It provides an illustration of challenges following public reforms, such as NPM, underlining former criticism regarding delegation of decision making and thus political distancing of societal matters.

This study also adds to the general understanding of governance of major public projects' front-end phase by establishing more knowledge of such projects undertaken in a context distant from central politics. The SOEs still administer considerable public

resources and interests, and should make serious efforts to “do the right project”, to achieve strategical project success. Making the SOEs responsible for both QA of the projects and the subsequent decision-making process requires clearly stated mandates from the central political level, in order to enable a holistic societal perspective to be retained. Our comparison of the SOEs’ governance models with the more established SPM that follows theoretical recommendations from project management literature, and that is used for governing public projects undertaken in a political context in which decisions are centralized in order to maintain societal interests, contributes to creating a point of departure for improvement and mutual learning among the different arrangements. Through this comparison, and as a practical contribution, this study has made it possible to offer some recommendations to the SOEs and their line ministries regarding topics that might compromise project performance if not dealt with properly:

- External QA should focus on concept elaboration and, in order to take on a holistic societal perspective, it should be performed early enough (in the projects’ front-end phase).
- Care should be taken regarding which decisions are political in nature, and it should be ensured that decisions are anchored in the right (governmental) level.
- Sufficient resources for external QA should be provided.
- Capability/awareness of the need to balance external quality assurers’ impartiality with the required and desired process efficiency is important when using parallel QA arrangements.
- Arenas should be established to promote mutual learning between the different arrangements through sharing knowledge and exchanging experiences and advice.

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PAPER IV

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