

Empirical Research Paper

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

Anne Strand Alfredsen Larsen ^{a,c,*}, Anniken Th Karlsen ^b, Bjørn Andersen ^c^a Aalesund Hospital, Møre and Romsdal Hospital Trust, Norway^b Department of ICT and Natural Sciences, Faculty of Information Technology and Electrical Engineering, Norwegian University of Science and Technology, Norway^c Department of Mechanical and Industrial Engineering, Faculty of Engineering, Norwegian University of Science and Technology, Norway

ARTICLE INFO

Keywords:

Front-end
Hospital projects
Strategic project success
Decision-making
Challenges
Improvement

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

* Corresponding author. Aalesund Hospital, Møre and Romsdal Hospital Trust, Norway.

E-mail addresses: anne.strand.alfredsen.larsen@helse-mr.no, annestra@stud.ntnu.no (A.S. Alfredsen Larsen).

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

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 lifespan (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 (Larsen, 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 (Larsen, 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; Särkilähti, 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; Särkilähti, 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
	of alternatives supplied?	C	N/A	C	P	P
	Criteria for evaluation of alternatives and consecutive choice?	C	N/A	C	P	N/A
	Resource allocation and plan for concept phase following guidelines?	C	C-	C	C	N/A
	Activities and milestones? Timeline? Project management plan?	C	C-	C	C	N/A
	Expected main conclusions/deliveries in concept phase described?	C	P	C	C-	N/A
	Organisation, responsibilities between project organisations and parent organisation described?	C	P	C	C	C
RELEVANCE, POSSIBILITY, SUSTAINABILITY	Are these themes covered? How?	C	C	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-option 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
PROGRAMME TO SOLUTION	Assessments and ranking- how and which criteria are used?	C	C	C	C	C
	Detailing reports present	C	P	C	C	C
PROGRAMMING AND DETAILING	General themes elaborated for each solution? Any special analyses?	C	C	P	C	P
	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
FINANCIAL CONSIDERATIONS	Logistics, personnel, goods- principles for handling?	C	C	C	C	C
	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

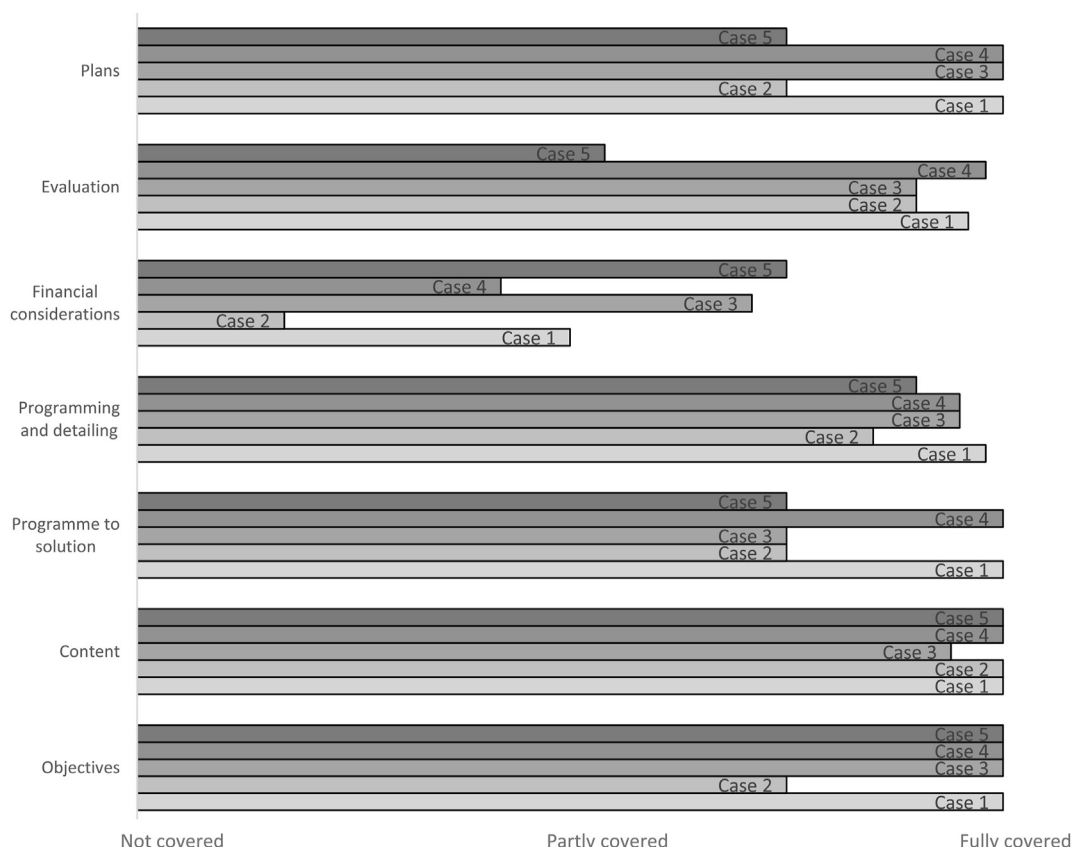


Fig. 2. Coverage concept phases.

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 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](#); [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 strategical (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.

Acknowledgements

This research is partly funded by the Research Council of Norway through the Public sector PhD-scheme, grant no. 272377.

References

- Andersen, B., Bråthen, S., Fagerhaug, T., Nafstad, O., Næss, P., Olsson, N., 2007. Effektivvurdering av store statlige investeringsprosjekter (Impact Assessment of Major Public Investment Projects), Concept Rapport: 19. Concept: Trondheim.
- Aubry, M., Lavoie-Tremblay, M., 2018. Rethinking organizational design for managing multiple projects. *Int. J. Proj. Manag.* 36, 12–26. <https://doi.org/10.1016/j.ijproman.2017.05.012>.
- Aubry, M., Richer, M.-C., Lavoie-Tremblay, M., 2014. Governance performance in complex environment: the case of a major transformation in a university hospital. *Int. J. Proj. Manag.* 32 (8), 1333–1345. <https://doi.org/10.1016/j.ijproman.2013.07.008>.
- Baccarini, D., 1999. The logical framework method for defining project success. *Proj. Manag. J.* 30 (4), 25–32. [10.1177/2F875697289903000405](https://doi.org/10.1177/2F875697289903000405).
- Bayer, S., Köberle-Gaiser, M., Barlow, J., 2007. Planning for adaptability in healthcare infrastructure. In: *The 2007 International Conference of the System Dynamics Society*. System Dynamics Society, Boston, Massachusetts, USA.
- Bowen, G.A., 2009. Document analysis as a qualitative research method. *Qual. Res. J.* 9 (2), 27–40. <https://doi.org/10.3316/QRJ0902027>.
- Bygballer, L.E., 2010. Samarbeid og læring i byggenæringen. En casestudie av nye St. Olavs Hospital i Trondheim (Collaboration and Learning in the Construction Industry. A Case-Study of the New St.Olavs Hospital in Trondheim), No. 2/2010. Norwegian Business School.
- Carden, L., Egan, T., 2008. Does our literature support sectors newer to project management? The search for quality publications relevant to nontraditional industries. *Proj. Manag. J.* 39 (3), 6–27. <https://doi.org/10.1002/pmj.20068>.
- Consulting Engineers' Association (RIF), 2015. Norges tilstand 2015 (State of the nation). Consulting Engineers' Association.
- Deming, W.E., 1994. *The New Economics: for Industry, Government, Education*, second ed. Massachusetts Institute of Technology, Center for Advanced Educational Services, Cambridge, Mass.
- Denis, J.-L., Dompierre, G., Langley, A., Rouleau, L., 2011. Escalating indecision: between reification and strategic ambiguity. *Organ. Sci.* 22 (1), 225–244. <https://doi.org/10.1287/orsc.1090.0501>.
- Denzin, N.K., Lincoln, Y.S., 2018. *The SAGE Handbook of Qualitative Research*, fifth ed. SAGE Publications, London.
- Dvir, D., Shenhar, A.J., 2011. What great projects have in common. *MIT Sloan Manag. Rev.* 52 (3), 18–22.
- Edkins, A., Geraldi, J., Morris, P., Smith, A., 2013. Exploring the front-end of project management. *Eng. Proj. Organ. J.* 3 (2), 71–85. <https://doi.org/10.1080/21573727.2013.775942>.
- Eeckloo, K., Delesie, L., Vleugels, A., 2007. Where is the pilot? The changing shapes of governance in the European hospital sector. *J. Roy. Soc. Promot. Health* 127 (2), 78–86. [10.1177/2F1466424007075457](https://doi.org/10.1177/2F1466424007075457).
- Eisenhardt, K.M., 1989. Building theories from case study research. *Acad. Manag. Rev.* 14 (4), 532–550. <https://doi.org/10.1080/10.5465/amr.1989.4308385>.
- Eizakshiri, F., Chan, P., Emsley, M., 2011. Delays, what delays? A critical review of the literature on delays in construction. In: *27th Annual Association of Researchers in Construction Management*. ARCOM, Bristol, UK, 2011.
- Elf, M., Malmqvist, I., 2009. An audit of the content and quality in briefs for Swedish healthcare spaces. *J. Facil. Manag.* 7 (3), 198–211. <https://doi.org/10.1108/14725960910971478>.
- Elf, M., Engström, M.S., Wijk, H., 2012. An assessment of briefs used for designing healthcare environments: a survey in Sweden. *Construct. Manag. Econ.* 30 (10), 835–844. <https://doi.org/10.1080/01446193.2012.702917>.
- Elf, M., Fröst, P., Lindahl, G., Wijk, H., 2015. Shared decision making in designing new healthcare environments—time to begin improving quality. *BMC Health Serv. Res.* 15 (1), 114. <https://doi.org/10.1186/s12913-015-0782-7>.
- Ernst, Young, 2016. Eierskap og forvaltning av sykehusbygg. Oppsummering av analyser og dokumentasjon vedrørende sykehusbygg (Ownership and Property Management of Hospital Buildings. A Summary of Analyses and Documentation Concerning Hospital Buildings) 25, 2016.
- Ettelt, S., McKee, M., Nolte, E., Mays, N., Thomson, S., 2009. Planning health care capacity: whose responsibility? In: Rechel, B., et al. (Eds.), *Investing in Hospitals of the Future*. World Health Organization, Copenhagen, Denmark, pp. 47–66.
- Faniran, O.O., Love, P.E.D., Smith, J., 2000. Effective front-end project management – a key element in achieving project success in developing countries. In: *Proceedings of the 2nd International Conference of the CIB Task Group 29 (TG29): Challenges Facing the Construction Industry in Developing Countries*. International Council for Research and Innovation in Building and Construction (CIB), Gaborone.
- Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qual. Inq.* 12 (2), 219–245. [10.1177/2F1077800405284363](https://doi.org/10.1177/2F1077800405284363).
- Flyvbjerg, B., 2013. Quality control and due diligence in project management: getting decisions right by taking the outside view. *Int. J. Proj. Manag.* 31 (5), 760–774. <https://doi.org/10.1016/j.ijproman.2012.10.007>.
- Flyvbjerg, B., 2014. What you should know about megaprojects and why: an overview. *Proj. Manag. J.* 45 (2), 6–19. [10.1002/2Fpmj.21409](https://doi.org/10.1002/2Fpmj.21409).
- Flyvbjerg, B., 2009. Optimism and misrepresentation in early project development. In: Williams, T.M., Samset, K., Sunnevåg, K. (Eds.), *Making Essential Choices with Scant Information: Front-End Decision Making in Major Projects*, pp. 147–168.
- Flyvbjerg, B., 2011. Case study. In: Denzin, N.K., Lincoln, Y.S. (Eds.), *The Sage Handbook of Qualitative Research*. SAGE, Thousand Oaks, CA, pp. 301–316.
- Fréchette, J., Lavoie-Tremblay, M., Aubry, M., Kilpatrick, K., Bitzas, V., 2020. Major hospital transformations: an integrative review and implications for nursing. *J. Nurs. Educ. Pract.* 10 (7), 46–52. <https://doi.org/10.5430/jnep.v10n7p46>.
- Frey, B.B., 2018. Document analysis. In: *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. SAGE Publications, Inc., Thousand Oaks, CA.
- Given, L.M., 2008. Constructivism. In: *The SAGE Encyclopedia of Qualitative Research Methods*. SAGE Publications, Thousand Oaks, CA.
- Glouberman, S., Mintzberg, H., 2001. Managing the care of health and the cure of disease. Part I: differentiation. *Health Care Manag. Rev.* 26, 56–69.
- Gomm, R., Hammersley, M., Foster, P., 2000. Case study and generalization. In: Gomm, R., Hammersley, M., Foster, P. (Eds.), *Case study method: Key issues, key texts*. SAGE Publications, London.
- Haanæs, S., Holte, E., Larsen, S.V., 2004. Beslutningsunderlag og beslutninger i store statlige investeringsprosjekt (Basis for Decisions and Decisions in Major Public Investment Projects); Concept Report 3. Concept: Trondheim.
- Haji-Kazemi, S., Andersen, B., Krane, H.P., 2012. Identification of Early Warning Signs in Front-End Stage of Projects, an Aid to Effective Decision Making 26th IPMA World Congress. Crete, Greece. <https://doi.org/10.1016/j.sbspro.2013.03.011>.
- Kahneman, D., Lovallo, D., 1993. Timid choices and bold forecasts: a cognitive perspective on risk taking. *Manag. Sci.* 39 (1), 17–31. <https://doi.org/10.1287/mnsc.39.1.17>.
- Kelly, J., Hunter, K., Shen, G., Yu, A., 2005. Briefing from a facilities management perspective. *Facilities* 23 (7/8), 356–367. <https://doi.org/10.1108/02632770510600308>.
- Klakegg, O.J., 2006. Målformulering i store statlige investeringsprosjekt (Alignment of Objectives in Major Public Investment Projects); Concept Report: 6. Concept: Trondheim.
- Klakegg, O.J., 2010. Governance of major public projects. In: *Department of Civil and Transport Engineering, NTNU, Trondheim*.
- Klakegg, O.J., Haavaldsen, T., 2011. Governance of major public investment projects: in pursuit of relevance and sustainability. *Int. J. Manag. Proj. Bus.* 4 (1), 157–167. <https://doi.org/10.1108/17538371111096953>.
- Klakegg, O.J., Williams, T., Walker, D., Andersen, B., Magnussen, O.M., 2010. Early Warning Signs in Complex Projects. United States of America: Project Management Institute, Pennsylvania.
- Klakegg, O.J., Williams, T., Shiferaw, A.T., 2016. Taming the trolls: major public projects in the making. *Int. J. Proj. Manag.* 34, 282–296. <https://doi.org/10.1016/j.ijproman.2015.03.008>.
- Larssen, A.K., 2011. Bygg og eiendoms betydning for effektiv sykehusdrift (Buildings' impact on Hospital Effectiveness). In: *Department of Civil and Transport Engineering, NTNU, Trondheim*.
- Lee, B., 2012. Using documents in organizational research. In: Symon, G., Cassell, C. (Eds.), *Qualitative Organizational Research. Core Methods and Current Challenges*. SAGE Publications, London.
- Lincoln, Y.S., Lynham, S.A., Guba, E.G., 2018. Paradigmatic controversies, contradictions, and emerging confluences, revisited. In: Denzin, N.K., Lincoln, Y.S. (Eds.), *The SAGE Handbook of Qualitative Research*. SAGE Publications, London.
- Linton, M.-J., Coast, J., Williams, I., Copping, J., Owen-Smith, A., 2019. Developing a framework of quality indicators for healthcare business cases: a qualitative document analysis consolidating insight from expert guidance and current practice. *BMC Health Serv. Res.* 19 (1), 433. <https://doi.org/10.1186/s12913-019-4269-9>.
- Marshall, M.N., 1996. Sampling for qualitative research. *Fam. Pract.* 13 (6), 522–525. <https://doi.org/10.1093/fampra/13.6.522>.
- Miller, R., Hobbs, B., 2005. Governance regimes for large complex projects. *Proj. Manag. J.* 36 (3), 42–50. <https://doi.org/10.1177/875697280503600305>.
- Mintzberg, H., Glouberman, S., 2001. Managing the care of health and the cure of disease-Part II: integration. *Health Care Manag. Rev.* 26 (1), 70–84.
- Morris, P.W.G., 2009. Implementing strategy through project management: the importance of managing the project front-end. In: Williams, T.M., Samset, K., Sunnevåg, K. (Eds.), *Making Essential Choices with Scant Information: Front-End Decision Making in Major Projects*, pp. 39–64.
- Næss, P., Brekke, K.A., Olsson, N., Klakegg, O.J., 2004. Bedre utforming av store statlige investeringsprosjekter. Vurdering av behov, mål og effekt i tidligfasen (Improved design of Public Investment Projects. Up-Front Appraisal of Needs, Objectives and Effects); Concept Report: 9. Concept: Trondheim.

- Norwegian Hospital Construction Agency, 2015. Evaluering av KS-ordningene for utviklingsplan og konseptfase (Evaluation of External Quality Assurance Practices for Strategic Plans and Concept Phases). Norwegian Hospital Construction Agency, pp. 90–126. SB-sak 22/2015 (Minutes from board meeting).
- Norwegian Ministry of Health and Care Services, 2015. Meld. St. 11 Nasjonal Helse- Og Sykehusplan (2016-2019) (National Plan for Health and Hospitals (2016-2019)). Norwegian Ministry of Health and Care Services.
- OECD Health expenditure and financing. 2019. (Accessed 15 January 2020).
- Office of the Auditor General of Norway, 2011. Riksrevisjonens undersøkelse av eiendomsforvaltningen i helseforetakene (The Office of the Auditor General's investigation of property management in Norwegian Health Authorities). Office of the Auditor General of Norway.
- Olsson, N.O.E., Hansen, G.K., 2010. Identification of critical factors affecting flexibility in hospital construction projects. *HERD- Health Environments Research&Design Journal* 3 (2), 30–47. [10.1177/2193758671000300204](https://doi.org/10.1177/2193758671000300204).
- Pauget, B., Wald, A., 2013. Relational competence in complex temporary organizations: the case of a French hospital construction project network. *Int. J. Proj. Manag.* 31 (2), 200–211. <https://doi.org/10.1016/j.ijproman.2012.07.001>.
- Pinto, J.K., Kharbanda, O.P., 1996. How to fail in project management (without really trying). *Bus. Horiz.* 39 (4), 45–53. [https://doi.org/10.1016/s0007-6813\(96\)90051-8](https://doi.org/10.1016/s0007-6813(96)90051-8).
- Ryd, N., Fristedt, S., 2007. Transforming strategic briefing into project briefs. *Facilities* 25 (5/6), 185–202. <https://doi.org/10.1108/02632770710742165>.
- Samset, K., 2007. Hvilke muligheter har vi til å forutsi i en tidlig fase? (Which opportunities for prediction are present in an early phase?). In: Sunnevåg, K. (Ed.), *Beslutninger på svakt informasjonsgrunnlag; tilnærminger og utfordringer i prosjekters tidlige fase (Decisions Based on Scant Information; Challenges and Tools during the Front-End Phases of Projects)*; Concept Report 17. Concept, Trondheim.
- Samset, K., 2008. Prosjekt i tidligfasen. Valg av konsept (The early project phase. Choice of concept), 1 Ed. Trondheim: Tapir Akademisk Forlag. 344.
- Samset, K., 2009. Projects, their quality at entry and challenges in the front-end phase. In: Williams, T.M., Samset, K., Sunnevåg, K.J. (Eds.), *Making Essential Choices with Scant Information. Front-End Decision Making in Major Projects*. Palgrave Macmillan, London, pp. 18–35.
- Samset, K., 2010. Early Project Appraisal. Making the Initial Choices. Palgrave Macmillan, Hampshire, England.
- Samset, K., 2014. Evaluering av prosjekter. Vurdering av Suksess (Evaluation of Projects. Assessment of Success). Fagbokforlaget, Bergen.
- Samset, K., 2017. Systems engineering in front-end governance of major public investment projects. *Systems* 5 (1), 13. <https://doi.org/10.3390/systems5010013>.
- Samset, K., Christensen, T., 2017. Ex ante project evaluation and the complexity of early decision-making. *Publ. Organ. Rev.* 17 (1), 1–17. <https://doi.org/10.1007/s11115-015-0326-y>.
- Samset, K., Drowdeswell, B., 2009. Concept planning: getting capital investment right. In: Rechel, B., et al. (Eds.), *Investing in Hospitals of the Future*. World Health Organization, Copenhagen, Denmark, pp. 67–83.
- Samset, K., Strand, A., Hendricks, V.F., 2009. Sykehus, fregatter og skipstunnel: Logisk minimalisme, rasjonalitet- og de avgjørende valg (Major projects: Logical minimalism, rationality and grand choices); Concept report: 21. Concept, Trondheim. Concept-programmet.
- Samset, K., Volden, G.H., 2016a. Front-end definition of projects: ten paradoxes and some reflections regarding project management and project governance. *Int. J. Proj. Manag.* 34, 294–313. <https://doi.org/10.1016/j.ijproman.2015.01.014>.
- Samset, K.F., Volden, G.H., 2016b. Front-end Definition of Major Public Projects. Theoretical Insights and Conflicting Practices. A Selection of Findings from Studies Conducted by the Concept Research Program. Norwegian University of Science and Technology, Trondheim: Ex ante Academic Publisher.
- Samset, K., Welde, M., 2019. Mandater for konseptvalgutredninger. En gjennomgang av praksis (Mandates for the Concept Appraisal Study. A Review of practice.); Concept Report: 58. Concept: Trondheim.
- Samset, K., Andersen, B., Austeng, K., 2013. Mulighetsrommet. En studie om konseptutredninger og konseptvalg (The Opportunity Space. A Study of Conceptual Appraisals and the Choice of Conceptual Solutions); Concept Report: 34. Concept, Trondheim.
- Samset, K., Andersen, B., Austeng, K., 2014. To what extent do projects explore the opportunity space? A study of conceptual solutions. *Int. J. Manag. Proj. Bus.* 7 (3), 473–492. <https://doi.org/10.1108/IJMPB-08-2013-0038>.
- Särkilähti, A., 2017. Change management during hospital construction projects- a multiple case study. In: *Industrial Engineering and Management*, Aalto University School of Science: Finland.
- Saunders, M., Lewis, P., Thornhill, A., 2009. *Research Methods for Business Students*. Pearson Education Limited, Essex, England.
- Schwandt, T.A., Lincoln, Y.S., Guba, E.G., 2007. Judging interpretations: but is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *N. Dir. Eval.* 114, 11–252. <https://doi.org/10.1002/ev.223>.
- Serrador, P., Turner, J.R., 2015. What is Enough Planning? Results from a global quantitative study. *IEEE Trans. Eng. Manag.* 62 (4), 462–474. <https://doi.org/10.1109/TEM.2015.2448059>.
- Simons, H., 2015. Interpret in context: generalizing from the single case in evaluation. *Evaluation* 2 (2), 173–188. <https://doi.org/10.1177/1356389015577512>.
- Smith, J., Wyatt, R., Jackson, N., 2003. A method for strategic client briefing. *Facilities* 21 (10), 203–211. <https://doi.org/10.1108/02632770310493571>.
- Smith, P.C., Anell, A., Busse, R., Crivelli, L., Healy, J., Lindahl, A.K., Westert, G., Kene, T., 2012. Leadership and governance in seven developed health systems. *Health Pol.* 106 (1), 37–49. <https://doi.org/10.1016/j.healthpol.2011.12.009>.
- Snowden, D.J., Boone, M.E., 2007. A leader's framework for decision making. *Harv. Bus. Rev.* 85 (11), 68–76, 149.
- Stake, Robert E., 1978. The Case Study Method in Social Inquiry. *Educational researcher* 7 (2), 5–8.
- The Bank of Norway (Norges Bank). (Accessed 12 December 2018).
- The Norwegian Directorate of Health, 2011. Tidligfaseplanlegging i Sykehusprosjekter (Front-End Planning of Hospital Projects). The Norwegian Directorate of Health.
- van Wee, B., Priemus, H., 2017. Megaproject decision making and management. Ethical and Political issues. In: Flyvbjerg, B. (Ed.), *The Oxford Handbook of Megaproject Management*. The Oxford University Press, Madison Avenue, New York, NY 10016, United States of America.
- Volden, G.H., 2019. Assessing public projects' value for money: an empirical study of the usefulness of cost-benefit analyses in decision-making. *Int. J. Proj. Manag.* 37, 549–564. <https://doi.org/10.1016/j.ijproman.2019.02.007>.
- Volden, G.H., Samset, K., 2013. Etterevaluering av statlige investeringsprosjekter. Konklusjoner, erfaringer og råd basert på pilotevaluering av fire prosjekter (Evaluating Public Investment Projects. Lessons and Advice from a Meta-Evaluation of Four Projects); Concept Report: 30. Concept, Trondheim.
- Williams, T., Samset, K., 2010. Issues in front-end decision making on projects. *Proj. Manag. J.* 41 (2), 38–49. DOI: 10.1002/2Fpmj.20160.
- Williams, T., Vo, H., Samset, K., Edkins, A., 2019. The front-end of projects: a systematic literature review and structuring. *Prod. Plann. Contr.* 30 (14), 1137–1169. <https://doi.org/10.1080/09537287.2019.1594429>.
- Wisth, E., Hjelmbrekke, H., 2018. Følgeforskning. Forprosjekt: Politiets Nasjonale Beredskapssenter (Trailing Reserach. Pre-project: the Norwegian National Police Response-Centre); Concept Working Paper. Concept, Trondheim.
- Yin, R.K., 2014. *Case Study Research: Design and Methods*, 5 ed. SAGE Publications, Los Angeles, CA.