

Value adding collaboration means in construction contracts

Based on document study investigating ongoing and finished case projects

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Preface

This master thesis was completed in spring 2021 at the University of Agder in Grimstad. It was written at the Department of Industrial Economy and Technology management at UiA school of Business and Law, as a part of the 2-year master's degree programme in industrial and technology management, with a specialization in contract and public innovation.

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I am especially grateful to my brother who spent hours reading through this master thesis, immersing himself in a topic that is far from his field of study. Without his help, this thesis would never have been finished on time.

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Abstract

Public projects are becoming complex as the development of public infrastructures call for highly specialized competence and technological solutions. Public interest as well as stakeholders' values are increasingly becoming more important as public project focuses shifts from maximizing profits to optimizing utilization of resources, also termed as value creation. Project owners as well as suppliers are preferring for contract forms that secure them against negative uncertainties and risks. Relational contracting is often regarded as means to integrate project owner and contractors' interest. However due to the existing established traditional contract standards which is supported by the framework of the existing national law for contract standards, implementation of relational based contracts is still in pre-mature phase.

The overall purpose of this thesis is to increase understanding on collaboration value creating means in the acquaintance, development, and construction of public infrastructure. The focus is to evaluate the different relational arrangement needed to ensure that public projects are planned, designed, and produced within the desired framework of cost and time. The thesis examines Collaboration means relatively to value creation in the perspective of the project owner, contractor and end-user

Ideas and end-user need are transformed into the project owner's requirement in the front-end phase of the project. These early phases of the project life cycle are discussed and analysed in the thesis from the flowing perspectives 1) development of ideas, 2) relation between owners and contractor when developing functional and technical specifications and 3) joint management of risk and opportunity.

The empirical data in the thesis is extracted from a document study investigating collaboration means on several mega public project across the country. An analytical model is developed to analysed and give criteria the practical relational elements that could be included in the contract hard document. Experiences and subjective findings are further analysed in relation to the existing theories in the literature. Relational approaches consist of both contractual and non-contractual collaboration means. The project owner has to consider always the right balance on the number of contractual and none-contractual elements that can be incorporated in their contracts.

Collaboration means, can be implemented in the pre-planning, planning, execution, or post-project phases. The most productive collaboration means are the ones introduced in the front-end phase. The importance of the front-end phase is particularly analysed and discussed in the thesis. Evidence in the empirical data suggest that contracts with collaboration framework generate capacity to adapt non-contractual collaboration means.

Sammendrag

Bygge- og anleggsnæringen er en av Norges største næringer. Spekteret av prosjekter varierer både når det gjelder størrelse og kompleksitet. Næringen har historisk også vært preget av lave marginer. Økt spesialisering og kompleksitet, har medført fragmentering og motstridende perspektiver og interesser i prosjektene. Resultatet har ofte blitt et økt konfliktnivå og manglende verdiskaping for aktørene som har vært involvert i prosjektene. Behovet for å øke verdiskapingen i bransjen er stort.

Det er også en oppfatning at det er behov for å videreutvikle forståelsen av hva verdiskapende samhandling er samt å avklare hva som skal til for å utløse mer av potensialet i samhandlingen og gi konkurransekraft.

Tradisjonelle kontrakter form kan føre til rigid håndtering av endringer og lite involvering av leverandøren. Etter hvert har mer relasjonelle kontrakter dukket opp som et tiltak mot konflikter som kan skyldes tradisjonelle kontraktens utgangspunkt, nemlig at byggherren bestemmer omfang og overvåker leveranser. De relasjonelle kontraktene har til hensikt å øke verdi av prosjektene ved å redusere konfliktnivået og forbedre prosjektresultatene.

Det overordnede formålet med denne oppgaven er til å øke forståelsen for verdiskapende relasjonelle virksomheter i de offentlige prosjekter med hensyn til offentlige prosjekter. Fokuset er til å evaluere de forskjellige relasjonelle forhold i kontraktsstrategien som kunne inkluderes i kontrakten harde og formelle dokumentene. Oppgaven undersøker relasjonselementer i kontraktsstrategien i henhold til verdiskapingsperspektiver til byggherren, entreprenøren, og brukerne.

Oppgaven ser nærmere byggeprosessen fra ide til forvaltning av infrastrukturen gjennom flere casestudier i et dokument studie. Hensikten er til å diskutere de praktiske tre faser i programarbeidet i henhold til byggherrens ønsker og krav, entreprenøren og aktøren rolle in utviklingsfasen 1) utviklingsarbeid 2) forholdet mellom byggherren og entreprenøren i forbindelse med utvikling av funksjonelle og tekniske prosjektbeskrivelse og 3) organisering av ledelse av bygningen når det gjelder å skape brukerverdier.

Empiriske data analyseres gjennom analytiske modell som tar hensyn til å finne den rette balansen mellom formelle uformelle relasjonellelementer. Dette er særlig viktig ved utvikling av kontraktstrategien. Relasjonellelementer kan ikke måles objektivt, og det kan være utfordrende til å inkludere i den harde, formelle kontrakts dokumentet. derfor er det viktig til å ta sikt på utvikling gunstig samspillnivå tidlig i prosjekt med hensyn til å identifisere, evaluere, og følge opp effektive og bærekraftige funksjonelle og tekniske bygningskrav til brukerverdier.

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Terminology

Brief is a description of what is included in a project, expresses its goals, the client's values, vision as well as quantities, functionalities, and quality of premises for the activities that the project is intended to support (Blyth and Worthington, 2001).

Epistemology: the philosophical study of the nature, origin, and limits of human knowledge ((Johannessen, Christoffersen & Tufte, 2019, p. 54).

Contractual relational elements are relational elements included in the actual hard document of the contract.

Non-contractual collaboration means are relational elements observed and experienced and recorded in all or some of the phases of the project life cycle, but not included in the actual hard document of the contract.

Stakeholders are individuals or organizations that are actively involved in the construction project and those whose interests may be positively or negatively affected of the effects of the project (Olander, 2007).

Project owner is individual who initiate, plan and carries out building or construction project. Owners also interprets and translates the needs, expectations, and desires of the end-user into requirements and conditions for contractability of projects.

Public project owner is also having the same responsibility as project owner, but they initiate public projects financed by taxpayers.

Concurrent Design means that a large number of sequential design activities are coordinated and performed at the same time by interdisciplinary teams. Concurrent design in a construction setting is largely a question of interaction between owners, design specialties and contractors by using integrated project groups.

Construction industry is understood as the input- and output of deliveries from and between private and public industries, such as building, manufacturing, consulting, including design, construction and installation, as well as public administration, education, transport, communication etc., with an important impact on the national economy as well as on the labour market (Bröchner and Kadefors, 2010).

Backstops: measures that provides dependable support or protection against failure or loss

1. INTRODUCTION

1.1. Background and objective

According to the last report of the Norwegian auditor general on public infrastructure projects 2019, the appropriation of funds to public infrastructure has tripled in the last decade. This has led to the initiations of mega and complex projects that call for innovative and co-creation approaches to procure suppliers, to obtain the needed innovative solutions and take advantage the vast knowledge and experience of the contractors and suppliers to make the project timely and cost effective. Furthermore, there is increasing trend that construction projects are become more technical in relation to automation and technology (e.g., smart buildings), which means that projects increased in complexity and require more collaboration to solve interdependencies (Kalsaas et al. 2020). The traditional contracts standards for procurement and construction contracts as they exist today do not support objective collaboration means as they are design as legislative contracts in a transactional framework (Codex 2020). The tactical legislative framework in standard contracts addresses foreseeable contingencies and prevents a flexible and quick respond to the unforeseen events (Lahdenperä 1012). To navigate through these challenges, the actors in the construction industry has opted for relational solutions like early contractor involvement (ECI), open book, alliance contract, and others that are based on mutual trust and commitment (Kalsaas et al. 2020). Practically some of these elements could be included in the formal contracts.

A typical construction contract form encompasses both the questions of *what to build* related to the demand side, and *how to build*, related to the supply side. To be more precise, the construction industry is managed by actors belonging to either private or public companies and organization with different structure and economical capabilities (Klakegg 2017 p, 423). The construction industry has important impact on the Norwegian economy as well as the labour market (Bråthen, 2015). However, the construction industry does not create value in the same way as the manufacturing and process industries. While construction industry is organized in projects and the terms and conditions of their contracts changes or end with the project lifespan, the manufacturing and the process industries are mainly organized around their production process (Chronéer and Laurell Stenlund, 2006). Constructions projects is all about value creation (Klakegg 2017 p, 419). and construction projects have certain peculiarities of construction, like one-of-a-kind products, temporary organization, and site production preventing the attainment of flows as efficient as in manufacturing (Koskela, 2000). Hence value creation in the construction industry depends on the success of the collaboration endeavours between the actors at the commencement of the contractual agreement.

owners in the construction industry favor contract forms that includes broader services packages i.e., maintenance (Koppinen & Lahdenperä, 2005). Studies aimed at fostering innovation in construction also stress the need for closer integration and improve collaboration (Pertti Lahdenperä 2012). Scholars also indicated that earlier contractor involvement ECI, and best value procurement BVP could be mechanism to develop a shared value creation model in the front-end phase of projects and reduce the conflict level between the owner and the contractor (Högnason, Wondimu, Lædre 2019). However, the public procurement rules of fairness set certain limitation on the implementation of innovative procurement methods (Krüger, 2004). On the other hand, due to knowledge gap and cultural difference on the use of modern innovative procurement methods, the contractors and clients in the construction market are struggling to exploit fully these new method to their advantage. Relation contracts that are based on multi-party contract form has been offered as a solution to these challenges as clients perceives this kind of contract as a strategic collaboration means to improve their performance of their core operations (Pertti Lahdenperä 2012). Furthermore, the wording and the boundaries in the legislative contract standards create more tension than cooperation (M.B. Jelodar *et al* 2016), and hence the need to validate and investigate this theory. Thus, the research question for the thesis addresses; ***what are the value adding collaborative means in construction contracts?***

1.2. Structure of the report

In *Chapter 2. Theory*, a literature review of theory relevant for this thesis is provide, contextualized, and decontextualized in relation to the objective of the thesis.

In *Chapter 3. methodology*, the chosen method for analysing, evaluating the empirical data is described.

In *Chapter 4. Results*, presentation of the empirical data from the document study including case projects technical and contractual framework information.

In *Chapter 5. Model development*, the empirical is analysed using the analytical model developed in this chapter.

In *chapter 6. Experiences and Findings*, the empirical data is objectively and subjectively presented and analysed. Taking into consideration full potentials.

Chapter 12. Discussion, the finding in this study is discussed, including theoretical reflection and comments regarding previous experiences from similar case studies.

Chapter 13. Conclusion

Chapter 14. Further work

Chapter 15. References

2. THEORETICAL FRAMEWORK

How can value creating collaboration means in construction in Norwegian context be analysed? A theoretical framework for analysing value creating collaboration means in contracts that considers non-contractual elements that can be integrated into the formal contract hard document, and the effect for public owners, construction professionals and end user's valuation is presented here. First the value concept is presented in terms of value creating processes and by defining projects value, and values. In order to create a comprehensive context in understanding the essence of collaboration means in the construction industry, the thesis will look into theoretical aspects in the literature on value creation, procurement processes, contract type and framework for relational contracts.

2.1. Value creating processes

2.1.1. value chains

When studying organization's abilities to create value and by that achieve a competitive advantage, the method of analysing the generic value chain developed by (Porter 1994) has been a common analytical tool. The value chain divides the processes into different kinds of activities, the primary activities, i.e., logistics, operations, marketing and sales and services and into the supporting activities, i.e., infrastructure, human resource management as well as research and development (R&D). The organisation of strategies for primary and secondary activities, creates a value to the organization and its stakeholders. According to (Porter 1994) the generic value chain also answers the question of how the company is going to achieve its mission and goal. customers, suppliers, potential entrants, and substitute products are the forces to consider in pursue of organizational goals (porter 2008)

A difficulty in using the generic value chain, when describing the primary and supporting activities within construction industry, is that construction industry and its stakeholders belong to different owners and that construction companies in common have a project organisation (Winch, 2002; Gray and Hughes, 2001; Bröchner and Kadefors, 2010; Segerstedt and Olofsson, 2010). Projects in the construction industry are usually carried out by many companies that are specialize in branches of design, and different fields of construction, all having their own business model. In order to align commercial interests and goals, one needs to have a shared business model in an inter-organizational continuum (Kalsaas et al. 2020). Construction industry is a combination of both production process and assembly process, and these peculiarities create different value creation means (Kalsaas et al. 2017 p, 23).

2.1.2. Value creation in the construction industry

According to (Barrett and Sutrisna 2009) the chronological nature of the construction project consists of four stages: pre-design, design, construction and occupation. In the pre-design phase, the question of what to build is central. In the design phase the architect is the central actor designing the building according to the client's requirements. The design documents are incoming inputs to builders and contractors realising the building.

According to Gray and Hughes (2001) design activities combine the demand side with the supply side. During design, clients' requirements and end-users' needs are communicated into visible requirements and transformed into functional and technical solutions (Gray and Hughes, 2001). (Saxon 2005) argues that the design of the building should include technical and functional solutions supporting the activities performed in the building when creating an added value in the building processes. According to (Ballard & Koskela, 2013) the phenomena of design consist of analysing, synthesis and evaluation and employs rhetoric like logos (rational argumentation), ethos (moral argumentation) and pathos (influencing the feelings of the audience) as inspirational source. Value creation in the design process is characterized by iterations and strong reciprocal interdependencies where the design is gradually matured through learning (Kalsaas & Moum, 2016). This is an apparent part of the learning process where the actors need abilities such as concrete experience, reflective observation, abstract conceptualization, and active experimentation to mature the design, since learning is a major process of adaptation (Kolb, 1984, p. 30, 32).

Design is a task that require simultaneous learning of the nature of the problem and the range of possible solution (Kalsaas & Moum 2016). Designers work in different ways but a common element in the design stage is to implement the design brief and prepare additional data. The design brief includes documents describing the project’s very outline, strategic, structural, mechanical and electrical proposals, an outline specification (a written account of proposed materials, forms of construction and performance standards for the building envelope and its key spaces) together with a preliminary cost plan as the phenomena of architectural design are like «baking bread» and «playing jazz». To conceptualize this metaphor, the «baking bread» represents the linear, predictable, explicit and measurable activities of the architectural process based on repetition and routines. While the part of «playing jazz» is the improvised, intuitive, and tacit process that leads to a unique performance, based on feelings, talents, practice and experiences (Kalsaas & Moum 2016). It is the design stage that most can be done to optimize value creation in the construction industry through supplier and stakeholder’s involvement, and integrated project delivery methods.

2.1.2.1. Value creation and quality measures for clients.

Projects in the construction industry often suffer from cost and time overruns (Högnason te al. 2019). in practice, owners participating in complex projects are struggling with the implementation of joint processes, practices, motivation and knowledge to truly exploit the potential opportunities in value adding relational arrangements (Hietajärvi et al. 2016). As a result of this, project owners are become more end-user oriented (T. Blomquist et al. 2007). Common among design terms today is to use an expression of the end-users’ desired properties of utility, durability and aesthetics in the final building (Courtney, 2008).

Another perspective on the building’s quality is an economic, social and environmental perspective on the value of the product quality. For the owners, private as well as public, the global expressed need for sustainable development highlights that construction have responsibility over societies’ needs for a sustainable built environment in accordance with the Brundtland Commission report (United Nations, 1983). The fundamental aspect of this responsibility is the requirement of developing and executing projects without compromising the life and prosperity of future generations (Aarseth et al. 2016). Value management literature emphasizes the benefits of building performance to clients and end-users, where benefits are quantified in business terms: relationships among costs, time, and quality where quality includes esteem, exchange, and use value (Kelly et al., 2003).

Winch (2002, p. 57) suggests that the project owners could apply the concept of product integrity when defining the intention of the product, see Figure 1.

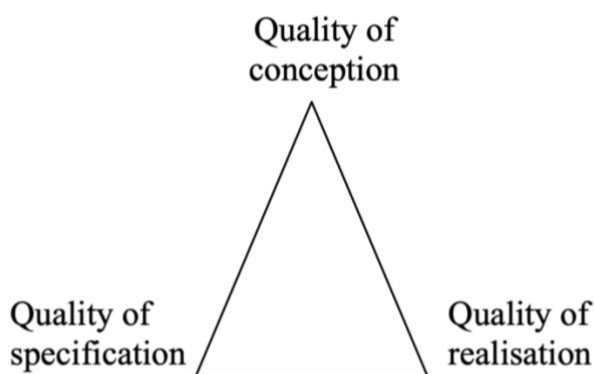


Figure 1. concept of quality measurement (Winch 2002, p. 57)

The three dimensions of the integrity of the constructed product are defined in terms of quality, because what is central to the creation of new value is the quality of the asset resulting from the process according to Winch. The dimensions of integrity are described by Winch as follows:

- The symbolic aspects are captured by the quality of *conception*, in terms of elegance of form, spatial articulation, contribution to the urbanization, and the like, measured through the professional peer review process.
- The functional aspects are captured by the quality of *specification*, in terms of the fit and finish desired, and the fitness for purpose of the completed infrastructure measured through performance in use.
- The program and budget are assessed by the quality of *realization*, in terms of the objectives set for program and budget, and the service delivery experience for the client measured through process benchmarks for comparator artifacts.

The trade-offs within and between the three criteria take many forms and have to be made according to Winch (2002, p. 58).

The public owner, when investing in a public infrastructure, may have an interest in developing the county, municipality and the region by creating an economic value in terms of increased population and new taxpayers but also in terms of creating social value to citizens (Macmillan, 2006).

Buildings like sports venues or museum create a social value for their users, that is, e.g., for the football team and the audience. When the sport arena is also useable for other events than sports, for example a conference, the building is used for multiple activities with possibilities to give back both an economic and a social value to its stakeholders. Icon buildings symbolize urban revival and also create a brand mark for the city or country (Jencks, 2005). According to (Bröchner 2009, p. 21) monumental buildings, landmarks or icon buildings like Munch Museum in Oslo city, signal innate qualities of cities, devised to attract temporary visitors or more permanent settling of firms and individuals. The example that everybody mentions is the case of the Sidney Opera. The Sidney Opera has created both a symbolic value to the city and its citizens and an economic value to its occupying organizations (CRC Construction Innovation, 2007). Environmental questions have also become important for construction owners to manage, e.g., the utilization of resources and energy consumption (Preiser and Vischer, 2005).

2.1.2.2. Quality measure in relation to contractor

The relation between the client's quality intention regarding the product and the construction project's quality intention regarding the process integrity is described in Figure 2.



Figure 2. represent project four aspect of quality (Olsson 2017, p. 386)

A successful construction project delivers a product demanded by the owner. For contractors the benefits of a construction project are described in the success of performing the project on time, building it to costs in the budget and in accordance with the client's requirements, already procured with the owner (Winch, 2002, p. 186).

The construction project thus creates economic benefits directly for the actors putting resources in the building processes. This perspective is based on the input-throughput-output perspective of economic growth theories meaning that an input of different resources is used and developed in a context (throughput)

that affects the use of resources, leading to an output in terms of economic profit (Coase, 1937/1998). (Bon 2001) argues that the building process should be described as an economic process with an input-output perspective.

The time factor defined by the program and the schedule of the construction project are crucial for the success of the construction project. Business activities as well as public activities need to be performed, where a construction project overrunning its times, schedule may have a negative influence on the business activities as well as on public activities (Murdock and Hughes, 2008). As time is increasingly seen as an important and limited organizational resource that must be used efficiently, tension and pressure may evolve among the actors involved to perform the project (N. Arvidsson 2009). The time factor is thus also related to the cost factor. Overrunning material and construction budgets will have a negative influence on the construction project. Experiences from complex project have shown that project exceed the budget (Short *et al.*, 2007). These complex projects are known to be expensive to build, and increased costs will consequently give the owner problems (Kalsaas, Hannås, Frislie, & Skaar, 2018). The construction project's parameters: time and costs, are thus important criteria to consider when defining the benefits of developing and initiating a project. The customer in a construction project is synonymous with the client or owner. In the meantime, when the owner is not the same person using the building, the construction project should also consider the client's or owner's customer or the end-user. A construction project may be successful in costs and time as well as in delivering according to the owner's specification, but at the same time fail in quality due to end-users' evaluation of the building, i.e., a failure in identifying the customer's customers' needs.

2.1.2.3. Value creation in terms of quality measure for end users

Value is accordingly what one gives in relation to what one gets, and it is personal and not an objective fact (Saxon, 2005). End-users' evaluation of a building is in general based on functional and technical solutions of the final building (Preiser and Vischer, 2005). Public owners in the construction industry are not often the end-users. Public projects in the development portfolio with high socio-economic profitability are prioritized over those with low socio-economic profitability. This philosophy provides a strictly rational reasoned order in regard to how to prioritize public projects (Nyeveier 2021). In order to identify end-user value, it is important to understand the outcome the end-user is expecting (Bustinduy, J. 1995). Translating the unmet needs of an end-user to value added insights allows for creative solutions (T. Blomquist, T.L. Wilson 2007). Sustaining innovative concepts that reflect end customer needs requires an approach to test concepts quickly and easily, gain buy-in from stakeholders in a timely manner, and support during implementation (Weele 2019, p, 133). Managing the end-to-end process of innovation is a key element in ensuring the right customer or end-user insights are captured, explored, developed, and executed. The critical success factor is the feedback cycle to ensure it has met the perceived value to the end-user but also provided value to the organization (return on investment). This leads to the need to take a closer look at concept regarding perception of value to the customer or end-user (Daniel SchallmoTania Salarvand 2018).

According to ISO 9000 quality is defined as the inherent characteristics of a product or service created to satisfy customer needs, expectations, and requirements. In order to evaluate quality delivered to the end users, there must be a quality relationship between the supplier and the end user, attributed with trust, ethical conduct, behaviour, satisfaction, and commitment (M.B. Jelodar *et al* 2016). These relationships can be indirect in the case of delivering public owned project as the client is more like project owners' representatives taking care the interest of the end users by guaranteeing the quality of the delivered goods and services in accordance with the end users' expectations and specifications if any (Weele, 2019, p. 113). The centrifugal force behind initiating construction project is creating value for end user either at individual level or societal level (Klakegg 2017 p, 419). This ideological framework can be transformed into developing strategic project procedural planning as shown in figure 3



Figure 3. Present project procedural delivery steps (DBIA 2015)

2.2. Public procurement

Public procurement law prescribes in a formal way, how to go about public contracts i.e., how to deal with suppliers and how to award public contracts (Norwegian auditor general 2019). On top of the legislations that regulates the public procurement act, the Norwegian public owners are also obliged to follow international agreements throughout national public procurement regulations (Lædre, 2006). Public owners in European nations are within the jurisdiction of the four European procurement directives which directs that procurement should be awarded on the principles of non-discrimination, equal treatment, transparency and proportionality (Weele 2019 p, 126). In the Norwegian contract context, the public procurement regulation covers all public procurements in Norway, which includes the state, county, and municipality, including statutory bodies. A statutory body is everybody that is there for the purpose of the public and is not of an industrial business character. The regulation also covers private projects with more than 50 % subsidiaries from the public (Lovdata, 2017). However, the European procurement procedure standards give the European project owner several procedural arrangements among them; open procedure, restricted procedure, negotiated, and design procedure (Weele 2019 p, 130). On the other hand, public owners in the construction industry feel a full implementation of the procurement act could become a practical barrier to early contractor involvement and best value procurement as discussed in the following sub-chapters (Högnason *et al* 2019). Following the selection of proper procurement procedure public owners are required to prepare detailed specification of the scope of the project together with the suppliers, and the suppliers that were solicited are normatively invited to submit their detailed bids (Weele 2019, p 132).

2.2.1. Front-end phase

The front-end of project is the initial part of the project illustrated in the figures below. From the period when the idea of the project is conceived until the project financing is made. project front-end has been advocated as a phase in time where risks ought to be weighed against the value they may entail (Hellstrom *et al* 2016). The front-end consists of the concept definition, concept development, and the concept evaluation phase (Samset *et al* 2003)

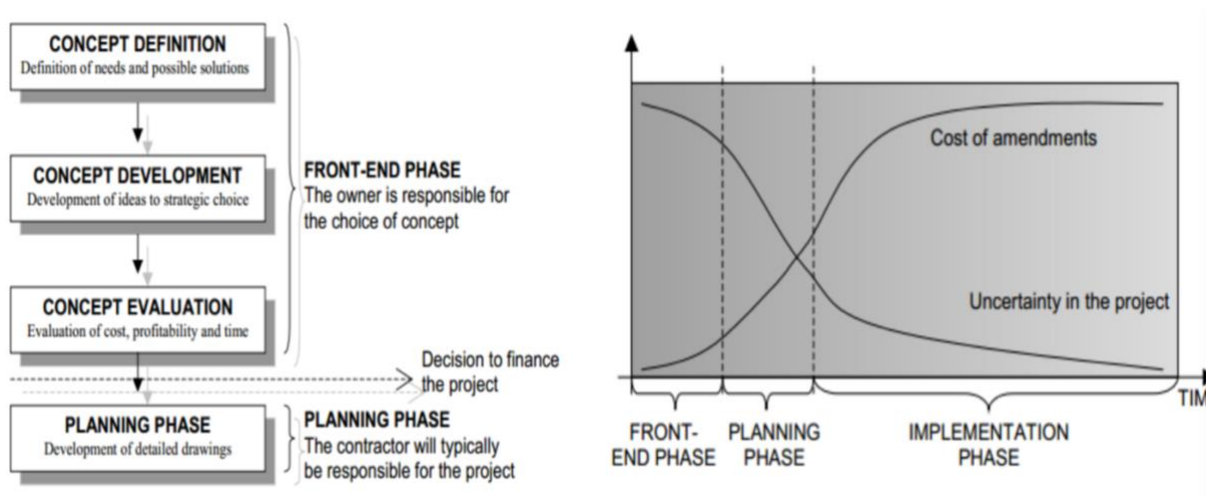


Figure 4. The front-end phases (Samset *et al.*,2003). Figure 5.. Anticipated correlation between cost of changes and uncertainty (Samset *et al.*, 2003)

2.2.2. Competitive Dialogue

Competitive dialogue is a special procedure that gives the public owner the authority to restrict the procurement procedure to pre-selection of qualified contractors based on previous interaction where the parties are consulted for the solution that best fit the functions specification that has been submitted by the public owners (Weele 2019, p, 132). Competitive dialogue (CD) is a relatively new procurement procedure introduced in 2004 by the European Parliament for particularly complex contracts. It is a procedure that can be used to engage suppliers in the early phase of a project to support innovation (Wondimu, P.A., Lohne, J. and Lædre, O., 2018). Public contract is considered as particularly complex when the contracting authority is unable to define in an objective manner the technical specifications to satisfy its needs or to specify in advance the legal and/or financial makeup of the project (Rolstadås *et al* 2019, p 347-348). The key distinctive element of the Competitive Dialogue procurement procedure is the possibility to open a dialogue between the public owners or the contracting authority and several economic operators with the aim of developing an optimal solution that matches the needs of the project owners before deciding which would be the final awardee of the contract (Giulia Buccino, Elisabetta Iossa, Biancamaria Raganelli and Mate Vincze 2019).



Figure 6. Phases in competitive dialogue (CD) (Wondimu *et al* 2018)

2.2.3. Public-private Partnership

Public private partnership is a cooperation between public owners and private contractors (Child *et al* 2019). Public-private partnership induces very strong incentives to invest in cost reductions, which is desirable if the investments are quality-enhancing but may well be undesirable if the investments have a negative side-effect on quality (Hoppe *et al.*, 2013). A key characteristic of public-private partnerships is that the two tasks of building a facility and subsequently operating it are bundled and delegated to a single private contractor, while under traditional procurement, separate contractors are in charge of these two tasks. One of the differences between traditional procurement method and PPP is that the private parties share the financing responsibilities with the public project owners. PPP often includes either maintenance, operation or both (Child *et al* 2019).

2.2.4. Best Value Procurement (BVP).

Best value procurement (BVP) is another method that can be used for early contractor involvement. On principle BVP engages with contractor as an expert with sufficient room to evaluate the price and duration of a project based on the client`s desired outcome of the project but not on the detailed specification (Högnason, *et al.* 2019). It would be useful if a fundamental framework of dimensions describing expected project team behaviours could be developed that provide an improved way of helping project owners understand what this procurement form may be suitably deployed over another (Walker and Lloyd-walker 2012), taking into consideration the existing contract standards and the role of the stakeholders. Stakeholders` role in project procurement are becoming more critical as sustainability become more and more important in project delivery (T. Blomquist *et al.* 2007). BVP calls for practical modification to the existing standards so that public project owner can adhere to the existing public procurement principles of competition, equal treatment, and non-discrimination (Högnason, *et al* 2019). In practical terms, companies participating in complex projects are struggling with the implementation of joint processes, practice, motivation, and knowledge to truly exploit the potential opportunities related to these new innovative delivery methods (Hietajärvi *et al.* 2017).

BVP is typically conducted in four phases: 1) Preparation (or Pre-qualification as it is called) 2) Selection, 3) Clarification, and 4) Execution (Högnason, et al 2019).



Figure 7..The four phases of BVP ((Högnason, et al 2019).

A core principle of BVP is the use of past performance information to predict the performance of the contractor in the current project (Högnason, et al 2019). This could undermine the full potential use of the new and upcoming construction contractors in the industry. On the other hand, BVP designates the control of the execution of the project to the contract while the risk of the project is not transferred from the owner to the contractor (Högnason, et al 2019). This particular specification may increase uncertainty from the owner perspective and may defy the clauses of the Norwegian contract standards that demand that owner and contractor role, and responsibilities should be specified prior to the signation of the contracts (NS 8407). Furthermore, Case studies on BVP has shown success of the BVP was diminished by the lack of specific contract standard provisions as the legislation on public procurement represented challenge and the ban on close negotiation was extremely demanding (Högnason, et al 2019). In fact, maintaining a balance between early collaboration and competitive or economic tension tends to be a challenge in most cases due to the generally mutually exclusive nature of the two (Pertti Lahdenperä 2012).

2.2.5. Early Contractor Involvement (ECI)

ECI is another project delivery method that is solely meant to create more in the construction industry. Measuring project success in the construction industry is a complex task and traditionally been associated with criteria like time, cost, and quality in the project society. Understanding the owner's and user's strategic objectives and translate them into functional building seem to be essential factor in understanding the true value of a project (Haddadi et al 2016). There three dimensions to distinguish among projects: uncertainty, complexity, and pace (Aaron J. Shenhar, Dov Dvir 2004).

- **Uncertainty.** Different projects present, at the outset, different levels of uncertainty, and project execution can be seen as a process that is aimed at uncertainty reduction. Uncertainty determines, among other things, the length and timing of front-end activities, how well and how fast one can define and finalize construction requirements and design, the degree of detail and extent of planning accuracy, and the level of contingency resources (time buffer and budget reserve). Uncertainties could be external or internal, depending on the environment, stakeholders, contract type and on the specific task
- **Complexity.** Project complexity depends on product scope, number and variety of elements, and the interconnection among them. But it also depends on the complexity of the organization and the connections among its parties. Complexity will determine the organization and the process, as well as the formality with which the project will be managed
- **Pace.** The third dimension for distinction among projects involves according to (Aaron J. Shenhar, Dov Dvir 2004), the urgency and criticality of time goals. The same goal with different time constraints may require different project structures and different level om owner, contractor involvement

The main ambition of ECI is to develop viable solution for project dimension (Uncertainty, complexity, and pace) with the help of the constructor knowledge and experience in the pre-construction phases of projects. Of particular interest is the improvement in value for money and project delivery time in comparison to traditional project delivery methods (Paulos Abebe Wondimu, Ali Hosseini, Jardar Lohne and Ola Lædre 2016). This will allow parties to engage in healthy relationship, increase understanding and decrease opportunistic behaviors which will result to potential adversarial relationship (Kalsaas, Hannås, Frislíe, & Skaar, 2018). ECI are guided by various qualitative selection criteria than price in order to create the right psychological environment for cooperation (Pertti Lahdenperä 2012). In order to respond to these criteria different owners have developed different ECI models, based on their necessities and circumstances. Some owners have developed relationship base ECI models, while other owners developed contract bounded ICE collaboration means which start as engagement in the early phase of the project and evolves to conventional type of contract in the project execution phase (Wondimu *et al* 2016). However public project owners face a major challenge if they want to implement ECI since the contractor selection methods involved bypassing the preestablished contract standards (Lahdenperä, 2013). Another challenge is trust, as there are contradicting views that trust cannot be orchestrated, and it needs time and effort to be developed (M.B. Jelodar *et al* 2016)

ECI practices are implemented in different manners. In the US contracts that involves ECI approaches compels the owner to hold two contacts, one with the designer and the other with contractors while in the UK the owner holds single contract with contractor. This kind of approach is well conversant with contractor involvement in the design phase of a project, implemented by a design-build (DB) contract instead of design-bid-build (DBB), more elaboration on this is coming in the next sub-chapter. Furthermore, the aim of ECI in design is to integrate construction knowledge into the design process. This would give the possibility of improving information flow, designing, material supply and construction schedule performance (Wondimu *et al* 2016).

Figure 8 illustrates the three contract forms and how the five models of ECI can be mapped onto three of the identified four project life cycles phases.

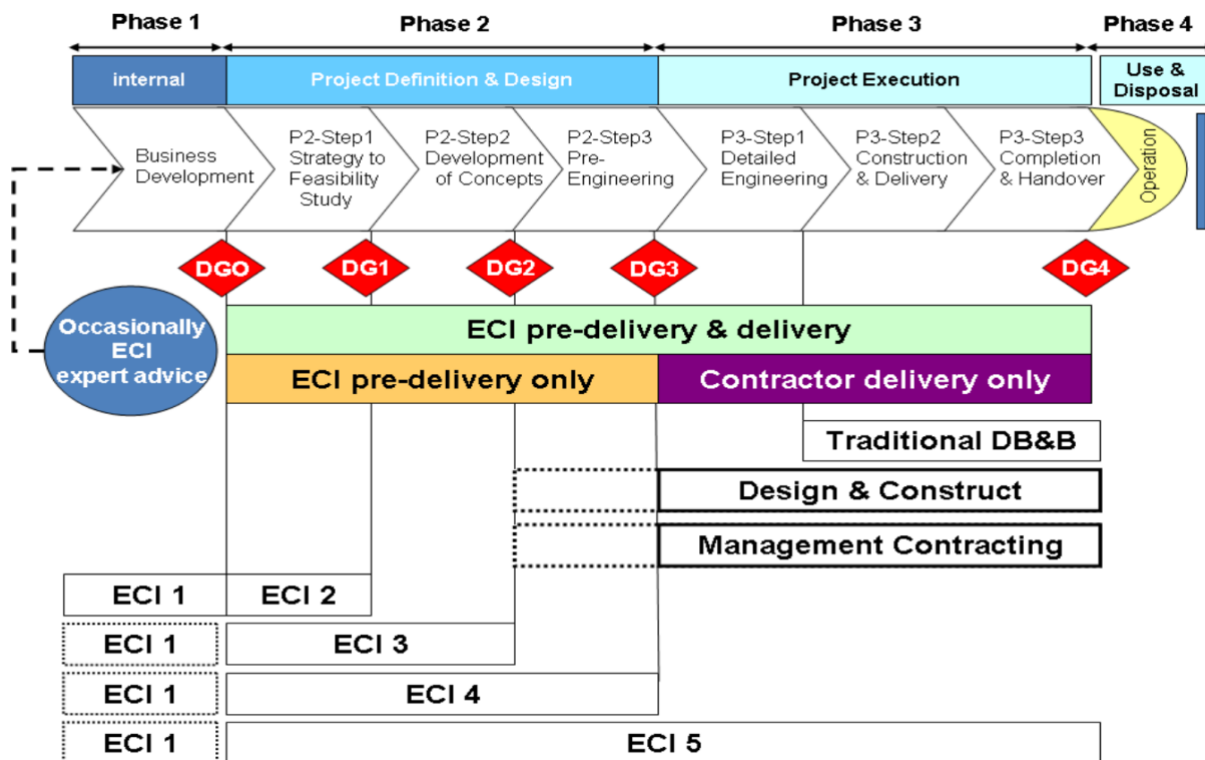


Figure 8. Project Life Cycle Phases and ICE integration (Walker and Lloyd-walker 2012).

DG denotes to decision gates: DG0=formally recognized idea, DG1=acceptable initiative to investigate, DG2=choice of concept, DG3=go/no go, DG4=accept outputs for the operation phase: (Wondimu et al 2016)

Phase 1 represents a strategic idea for a project's changed direction that germinates from an embryonic business development proposal to become an identified potential entity.

Phase 2 involves project definition and design.

Phase 3 project execution phase

(Walker and Lloyd-walker 2012) analyses the project lifecycle illustrated above from a human metaphor perspective raising interesting issues. The various ECI interventions can be seen as project embryo nurturing and sustenance measures where the project is actively shaped and influenced through access to valuable external resources at the stages, so that the best possible outcome at birth is encouraged. The decision gates represent Darwinian test points so that only the fittest project (fitting strategic intent and evolving business/external environment) is allowed to develop. ECI can play a part at the Phase 2 only or at both Phase 2 and 3 or the project owners may choose to not access any ECI, and simply perform all tasks in Phase 1 and 2 internally, or with outsourced design development consultants and then contracting the project execution to a contractor using D&B or CM or DB&B.

2.3. Delivery system

2.3.1. DB&B, DB, DBM

Fragmentation of the construction process and the resulting adversarial relationships between the parties involved have been a constant topic of critical writings for decades and the stumbling block to change is the traditional project delivery methods that is much rooted in the construction industry (Kalsaas et al 2017, p 28-29). Commonly available project delivery methods in the construction industry are design-bid-build (DBB), construction management (CM), design-build (DB) and design-build-maintain (DBM) (Koppinen & Lahdenperä 2005). The traditional project delivery DB&B with unit price contracting, open bidding and owner quality control facilitate checks and balances (Rålstadås, Johansen, Olsson and Langlo, p 359). However, studies and trends in the construction industry shows that contracts that allow more integrated services lead to better value for money (Kalsaas et al., 2018). In application Each delivery method provides a distinct best application outside of which its advantages cannot be realized in full.

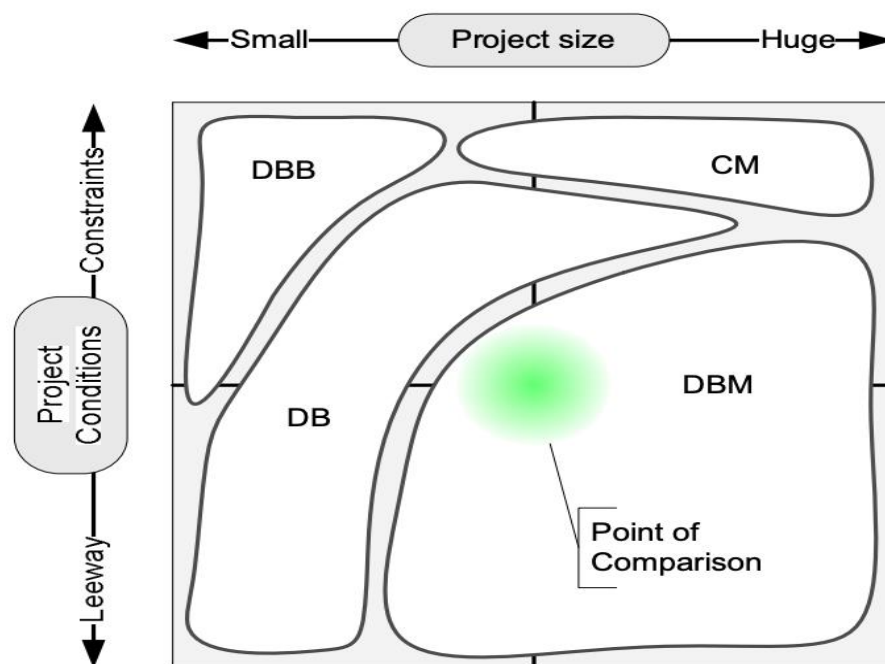


Figure 9. Optimal application areas of various delivery methods (Koppinen & Lahdenperä 2005).

2.3.1.1. Comparing and defining DB\$B, DB, DBM

Delivery method.	Application and Attributes
<p>DBB: stand for Design-Bid-Build. DBB is the traditional method of project Delivery where the project delivery method employs sequential process where one task follows completion of another with no overlap (Kubba 2012)</p>	<p>The owner has individual contracts separate contracts with the architecture, contractor, and subcontractor (Koolwijk et al. 2020). With D-B-B, the contractor does not enter the process until after the design is complete (Khan 2015)</p>
<p>DB: Design-Build project delivery system is one where the client makes contract with a single entity to perform both design and construction under a single DB contract (Ratnasabapathy 2020). Norwegian construction (industry) can be seen in the transition from DBB to DB regarding the construction of infrastructure projects (Kalsaas et al. 2020).</p>	<p>DB offers the client with single point of responsibility for both design and construction services. The DB form appears to be replacing DBB as the preferred project delivery model (Kalsaas et al. 2020)</p>
<p>DBM: Design-Build-Maintain (include version DBMF; Design-Build-Maintain-Finance, and DBMFO; Design-Build-Maintain-Finance-Operate). These delivery methods are upgraded version of DB, where more collaboration means like maintenance, operation, or financing services during and after project delivery are incorporated to DB. This has improved the life-cycle economy of public roads (Koppinen & Lahdenperä 2005)</p>	<p>The applications have ranged from fully client-financed roads to pure toll roads. With the former, the enlarged responsibility of the private sector covers lesser duration in maintenance, whereas in the case of toll roads the owners or contractor collect revenue in the form of user fees over a contracted period (Koppinen & Lahdenperä 2005).</p>
<p>CM. Construction-Management is a delivery method that entails a commitment by the Contractor for construction performance to deliver the project within a defined schedule and price, either a fixed lump sum, target price or a guaranteed maximum price. The CM provides construction input to the owner during the design phases and becomes the general contractor during the construction phase (DBIA 2015). Not common in Norway and Nordic countries but used widely in the US</p>	<p>Experiences of CM indicate some benefits particularly for the contractors as they have to assume lesser responsibilities, although, at the same time, the fact that buying small work packages does not allow the industry to develop drew criticism (Koppinen & Lahdenperä 2005).</p>

Table 1. Definition and technical aspect of deferent project delivery methods

According to (Koppinen & Lahdenperä 2004) in modern contract assessment, DB has gained ground on DB&B due to uncertainty related to DB&B which often leads to high transaction costs of negotiating changed terms and conditions and it leads to the need for a contingency sum to allow for unforeseen cost and time delays., while DB is paving the way for DBM applications as the challenge in DB contracts is to avoid bids being inflated to buffer against uncertainty and complexity (Wondimu *et al* 2016). The literature indicates that DBM applications enhances equal sharing of risks, opportunity and responsibilities between the client and contractor. In addition, contracts that are based on DBM are considered effective in procuring roads, as it shortens delivery time and improves the cost. Each phase of a project such as procurement, design, construction and maintenance involve certain costs and delivery durations. However, costs vary from different project delivery methods. Figure 6 from (Koppinen & Lahdenperä 2005) shows the costs of DBB, CM (M&C), DB and DBM projects at different discount rates. The figure shows that DBM is the contract type that yields the largest cost savings at different interest rates. A variant DMB is the design-

construct-operate-maintain contract, and it is similar to Build Own Operate which is often initiated through public private partnership (Ratnasabapathy 2020)

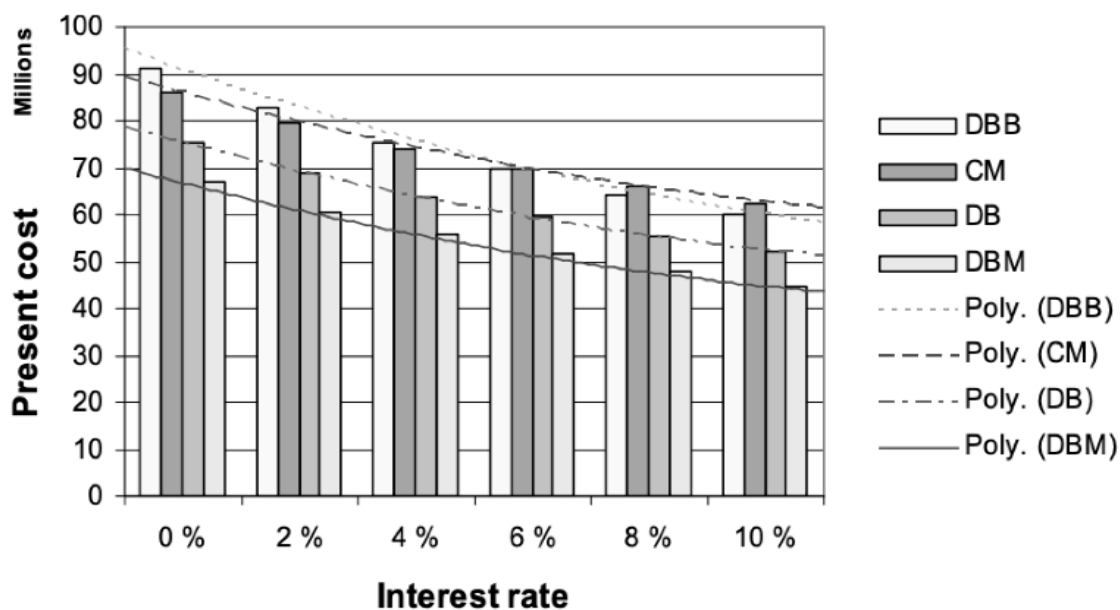


Figure 10. Costs of a variety of contracts at different discount rates (Koppinen et al 2005)

Not only does the cost behaviour of different project delivery system vary, their ability to generate value for the owner and the other parties also varies. The value criteria generally used were grouped in the study into the value factors of Fig. 11: cost certainty, time certainty, short cycle times, good quality (aesthetics, travelling comfort, minor need of maintenance), safe and environment-friendly implementation, flexibility (ease by which client can effect changes), smooth delivery (effective communication, no disputes or claims), public inconvenience (road availability, minimum user disturbances) (Koppinen & Lahdenperä 2005). The figure shows that DBM contracts score better in all aspects except for flexibility.

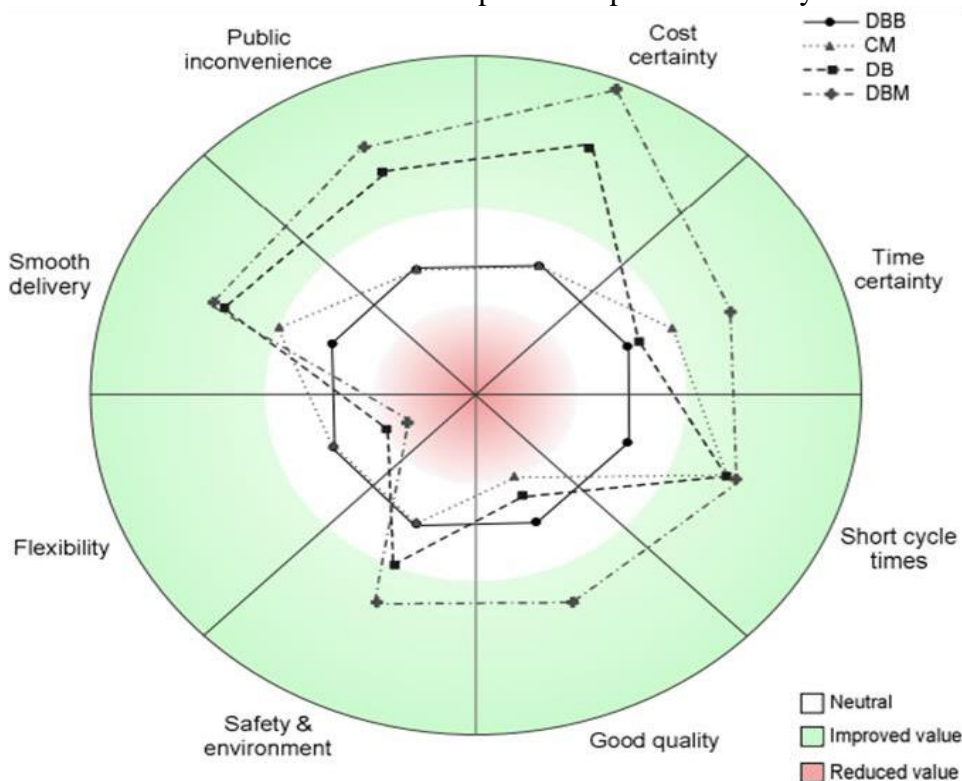


Figure 11. Value generation capacity of different contract types (Koppinen et al. 2005).

2.4. Contract format

2.4.1. Traditional contracts

There are three contract management stages: the pre- contractual stage, the contract negotiations stage, and the post-contractual stage, and the nature of these stages is shaped by the perspectives of the contracts (Weele 2019, p. 100-107). The four most common contracts used by the public road sector in Norway today are function contract, unit price contract, fixed price, and billable work. (Rolstadås et al 2019 p, 350-351). The difference in these contract lies on the amount of risk the project owner and the contractor will share or transfer to the other partner. In the figure below, one can see that at the far right the billable work, and that in these types of contracts, the risk is almost fully on the project owner. In the middle, the risk is to a certain degree divided between the two parties with a unit price contract. Whilst in the far right the project finds the function contract, where the contractor takes more of a risk.

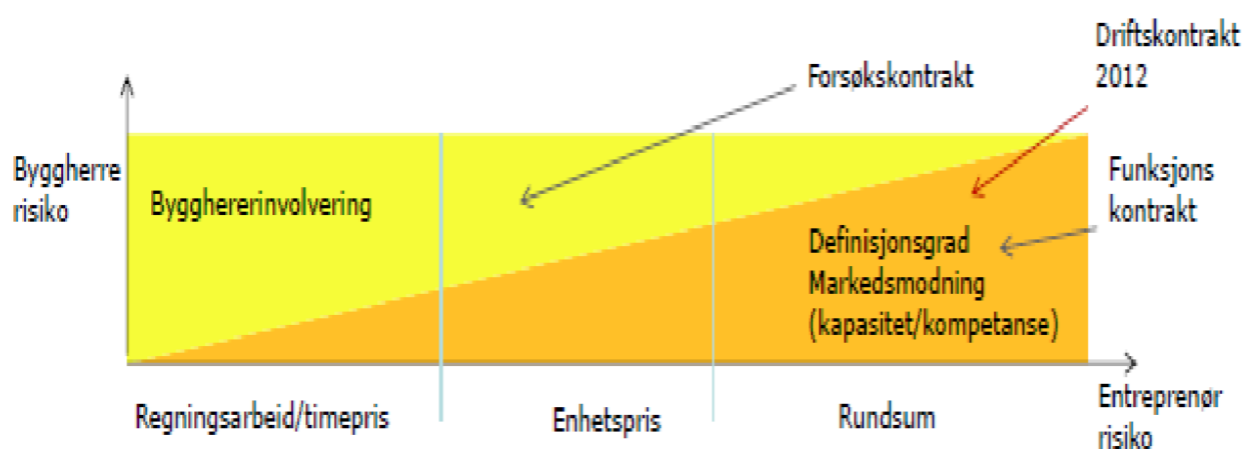


Figure 12. Risk balance in traditional contracts (Byggherreseksjonen, 2012)

2.4.1.1. Function contract

A function contract is a type of contract where the public owners have a contract with a contractor where the parameters of the contract contain functional requirements, and not a measurable entity. It is up to the contractor to choose when, where and how they will keep the functionality of the project for example a stretch of road (Rolstadås et al 2019 p, 358).

2.4.1.2. Unit price contract

In this contract type, the contractor offers his lowest price. The project owner has no means of controlling whether the contractor has understood the conditions and parameters of the project, whether they have chosen the best technical solutions or if they have sufficient experience from previous similar projects. Price is the main focus in this contract type, but due to the risk associated with low price, the owner may include competence requirement in the contract. (Rolstadås et al 2019 p, 359).

2.4.1.3. Fixed priced contract

This type of contract provides a price, which normally is not subject to any adjustment unless certain provisions are included in the agreement. These can be provisions such as contract change, economic pricing, or defective pricing. These contracts are negotiated, usually where reasonably definite specifications are available, and costs can be estimated with reasonable accuracy. A fixed price contract places minimum administrative burden on the contracting parties but subjects the contractor to the maximum risk arising from full responsibility for all cost escalations (Rolstadås et al 2019 p, 358).

2.4.1.4. Billable work

This is a very simple way of getting work done. The contractor completes the work and then bills the project owner for the hours used. Often, they have negotiated a fixed price per hour (Rolstadås et al 2019 p, 360).

2.4.2. The structure of traditional law contract

Traditionally contract standards were formulated to assign responsibilities, accountabilities and liabilities to parties involved in different projects, and the dominant perception is that relationships should be determined by legal boundaries (M.B. Jelodar *et al* 2016). Project's complexities differ and they need to be managed in a manner dependent on their context, whereas more turbulent environment, projects require an alliance approach (Blomquist *et al* 2007). The wording in the law contract standards diminishes healthy collaboration and cooperation as the rigid and control mechanism of the standard leads to unfair transfer of risk to the contractor which make projects unnecessarily expensive for the owner. the construction industry is still struggling with the idea of seizing potential opportunities in projects to overcome poor performance (Hietajärvi *et al* 2017). There are severe legal barriers that exclude the public owners from introducing contractors at the initiation of projects (Wondimu *et al* 2016). In the construction industry project managers rather focus on preventing threats as the negative impact of cost overruns grows faster than does the positive impact of additional profits (Hietajärvi *et al* 2017). The structure of the traditional contract standard is compounded by the fear of the negative risk. This characteristic of the standards jeopardises owner, contractor relationship as each will be contesting to transfer project risk to the other party. Consider that the common wisdom in construction has been that "the party that can best manage the risk should bear the risk." As a result, traditional construction contracts shift risk among the various participants, and sometimes, despite the common wisdom, the party who bears the risk is the one with the least bargaining power rather than the one best able to manage the risk (Thomsen *et al.* 2009).

According to projects managed by Norwegian Public Roads Administration (NPRA) details of project design are postponed until after contract signing, which eventually leads to partnering with the contractors in front-end phase of projects. This approach gives both the owner and the contractor to work and find an optimal solution for the project. On the other hand, the standards compel the owners either to hand over control of the entirety of the project or withheld (NS8407, NS8405). Another option in the standard is outsourcing the design to consultant firms. This may create complexity of information flow which may lead to disorientation on the ground hence discontinuity of project. This may also require the project owner to manage two contracts simultaneously, one to the design consultant firm and the other to the contractor.

The standards confine the owners and contractors into a remote and distant relationship with non-aspect of relational orientation between the parties. The standards divide the parties' obligations into separate operations, with each organization working to accomplish their responsibilities and individual objectives. The transaction between the parties is discrete and self-contained between the parties with only inter-action being at the interface of the project. The standard is designed to protect the parties from each other's opportunistic behaviour by deploy contract measures that is enforceable by the courts. Although the parties can accommodate known or anticipated risk in the transaction, deviations that have repercussions, are required to be formally notified in writing in accordance with the provisions of the contract standards (read, cf. Section 9 NS 8407). In the event of extreme conditions that are outside the control of the parties or serious contract breach, the standards allow the parties to suspend their operation. The parties can either resolve their disputes by using liquidated damage clause that provides for a mutual assessment of the probable damages that a delay or breach could have caused. Another option is the use of the court's apparatus, but the process of obtaining satisfaction through the courts could be time consuming and costly (Auditor general 2019). These predefined transactional contract framework and old school communication methods with no joint integrated upfront to handle risk related scenario create intrigues between the parties and hampers the conducive relational success factor for the project (byggejuss 2013).

Project networks should emphasize the dynamism of the project, interactions, interrelations, and continuous risk by updating and scanning an environment in the risk management approach (Hietajärvi *et al* 2017). In addition, relational approaches may include non-contractual alignment of goals and agreements outside the contractual setting as well as the more contractual structure of relational contracting (M.B. Jelodar *et al* 2016), a mechanism that can hardly be incorporated in the standards. On the other hand, law contract standards in general do not reflect much the impact and complexity of stakeholders in the entirety of the project lifecycle, as projects often include external factors such as customers, suppliers or partners, and these contextual forces may lead to tension between internal and external demands (N. Arvidsson 2009)

2.4.3. Relational multi-party contracting

Relational contract form are alternatives to the traditionally grounded transactional contracting perspective of contracts as being the formal, express agreement that attempts to predict in detail what uncertainties will arise. Moreover, the Standard forms of contract are not usually good hosts for good working relationships since their initial goals are to place the blame where there is liability. As a solution contracts with greater capacity for collaboration means were structured and popularised to stimulate better quality relationships; thus, they are known as relational contracting methods (M.B. Jelodar *et al.* 2016). The difference between transactional and relational contracts is trust. Relational contracts put more emphasis on trust rather than monitoring mechanisms (Kalsaas 2020). There are two main relationship theories in contract management: transaction cost economics and agency problem. These theories are based on the concepts of bounded rationality and opportunistic behaviour (Turner & Keegan, 2001). Bounded rationality explains the different contractual perspectives due to incomplete information and self-interest (Weele, 2019, p. 100). Meanwhile, opportunistic behaviour is economic self-interest at the loss of the other supply chain members. Transaction cost economics assumes incomplete contracting and management of transactions to avoid disputes (Turner & Keegan, 2001). The agency problem aims to align incentives in such a way that companies behave rationally and avoid opportunistic behaviour (Turner & Keegan, 2001). The agency problem is based on the existence of conflicts of interest between buyers and suppliers due to conflicting goals and asymmetric information (Weele, 2019, p. 101). Conflicts of interest can appear when the buyer wants to pay as little as possible while the supplier wants to charge as much as possible (Weele, 2019, p. 102). Conflicts of interest are solved by negotiation. These aspects of contract management should be kept in mind when selecting collaboration-based contract model.

Construction is known to be as one of the most unfavourable industries in embracing new innovations. This is explained mainly by the project-based nature of operations and temporary couplings as the most frequent type of partnerships in construction (Farid Sartipi 2019). Collaborative construction project arrangements have been identified as alternative solution to tackle the frustration felt toward the opportunistic behaviours inherent in traditional contracting arrangement. Project partnering, project alliancing and integrated project delivery has been suggested as the promising approaches for tackling the challenge of adopting and implementing joint risk and opportunity management processes in inter-organizational contexts (Pertti Lahdenperä 2012). Other collaborative characteristics of these approaches include inclusive decision making, open book accounting, risk-reward sharing, open communication, and joint team building activities (Jelle Koolwijk, Clarine Van Oel, Gaviria Moreno 2020). Trust is expected to emerge and grow, when a party is known to reliably make good faith efforts, to behave in accordance with prior commitments and does not take excessive advantage of an exchange partner (Weele 2019, p 371). The framework in Fig 13. shows trust as the ultimate relationship enforcement factor. The figure amplifies behavioural pattern influencing relationships is meant to evoke mutual trust which drives social principles and acceptance of certain practices as a general strategy, to achieve implementable collaboration means (M.B. Jelodar *et al* 2016).

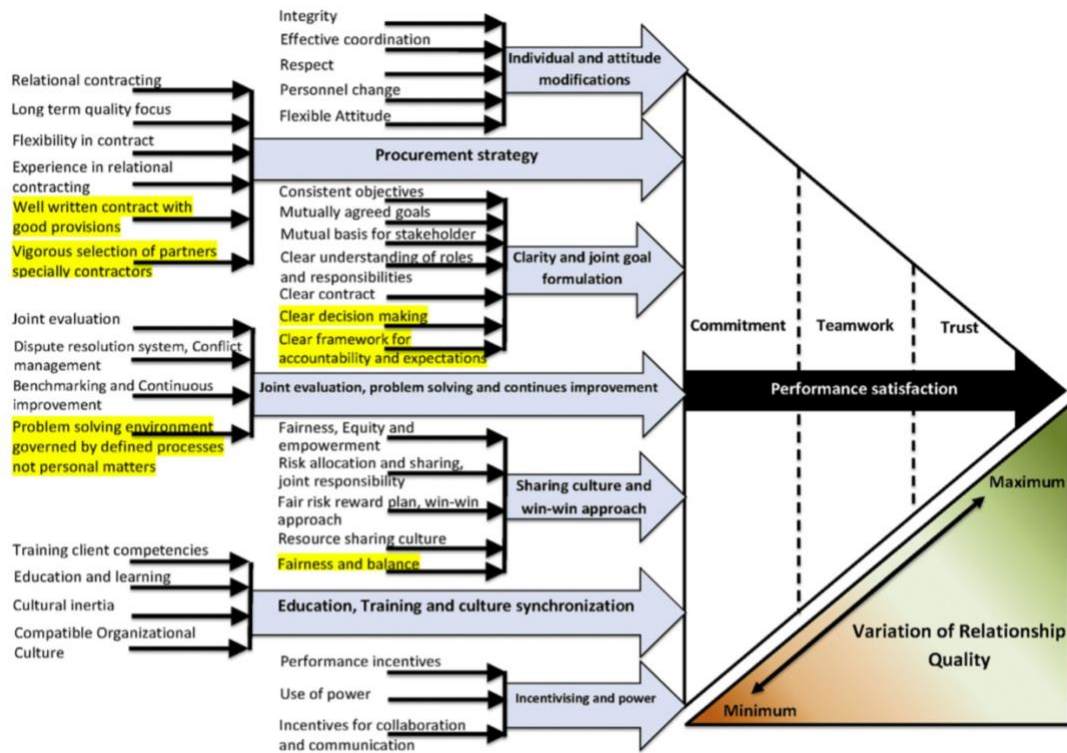


Figure 13.. Conceptual framework of relational contract form (M.B. Jelodar et al 2016)

Project partnering (PP) is a single project application of management approach used by two or more organizations to achieve specific business objectives and it is based on mutual objectives, an agreed method of problem resolution and an active search for continuous improvements. Project alliancing (PA) is quite different from PP. it focuses on delivering major capital assets where the owner and non- owner participants work together as an integrated, collaborative team in good faith, acting with integrity and making unanimous, best-for- project decisions, managing all risks of project delivery jointly, and sharing the outcome of the project. On the other hand, Integrated project delivery (IPD) method is distinguished by a contractual agreement among the owner, designer, and builder, where risk and reward are shared, and stakeholder success is dependent on project success (Pertti Lahdenperä 2012). IPD is inspired by Lean principles of time, cost quality and customer involvement (Ole Jonny Klakegg 2017 p, 447). In an IPD, collaboration occurs early, whereby the contractors are present from the onset (Kalsaas 2020).

Difference between PP, PA, and IPD	
Project partnering (PP)	Project partnering is (a single project application of) a management approach used by two or more organizations to achieve specific business objectives and based on mutual objectives, an agreed method of problem resolution and an active search for continuous improvements, and While trust and commitment is at the core of PP philosophy, tools like partnering charter and the decision ladder are considered important elements in pp(Lahdenpera 2012).
Project Alliancing (PA)	Project alliancing is a method of delivering major capital assets where the owner and non- owner participants work together as an integrated, collaborative team in good faith, acting with integrity and making unanimous, best-for- project decisions, managing all risks of project delivery

	jointly, and sharing the outcome of the project (Lahdenpera 2012). PA enables a shared uncertainty management approach by supporting a no-blame culture that leads to increased innovation capacity and improved capability to manage opportunities (Hietajärvi et al. 2017).
Integrated Project Delivery (IPD)	Integrated project delivery is a project delivery method distinguished by a contractual agreement between a minimum of the owner, design professional and contractor, where risk and reward are shared, and stakeholder success is dependent on project success (Lahdenpera 2012). Organizationally, all IPD projects share at least one thing in common: construction managers and at least some key trade contractors are involved in the project with the owner and designers from the early stages of design (Thomsen et al. 2009).

Table 2. Presents key Differences between PP, PA, and IPD

The Norwegian law contract standards require contracts partners to be legally binding, while relational and collaborative contract form is based on a relationship of trust between parties, and in which responsibilities and benefit are a portioned fairly and transparently (Pertti Lahdenperä 2012). Another important distinguishing feature in relational contracts is the extent to which consensus amongst the project owner and contractor drives a sink-or-swim together mentality which results in a no litigation contract clause in alliances. Lesser forms of relational collaboration include various forms of partnering where the level of mutual commitment may be enshrined in a partnering charter but does not extend to a sink-or-swim together linkage of all parties sharing pain or gain (Walker and Lloyd-walker 2012). Furthermore, the contracts used in PA, or PP, or even IPD consist of incentive and behavioural parts. The incentive part act as the motivator for opportunity management, and the behavioural set up a working environment that supports and creates possibilities for managing opportunities by integrating different parties (Hietajärvi et al 2017). The traditional plan driven contract focuses more on time-framework and cost, while the value contract framework as indicated in figure 15, the focus is the scope which eventual benefits the end-user or the customer.

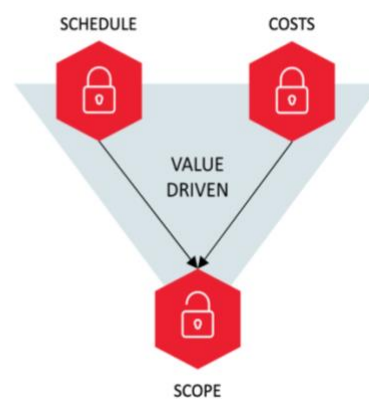
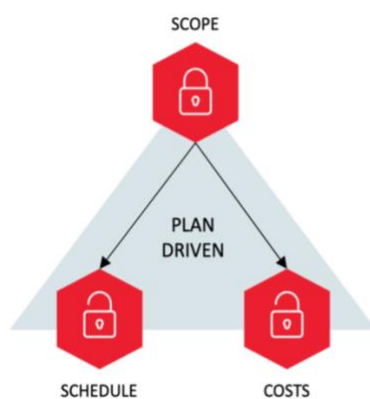


Figure 14. Preplanning phase (Atanasijevic et al 2019) Figure 15. Planning phase (Atanasijevic et al 2019)

2.4.4. Elasticity limits in relational contracts

Project tend to be managed in a manner dependent on their context and uncertainty plays a role in the way in which projects are conducted (Blomquist et al 2007). project management is not universal and adapting project management styles is critical to project success (Shenhar et al 2004). The construction industry is

widely affected by variation and fluctuating and conflicting production (Kalsaas 2017, p, 35). The development in partnering contract form is generally considered to be based on practices from Japan which are founded on lean management concepts (Pertti Lahdenperä 2012). There are no currently Norwegian contract standards that support partnering or alliance contract form. This has compelled the actors in the construction industry engaging in unregulated partnering contract form which may not favor contractors in legal litigations in some extent (Codex Advokat 2019).

In relational contract form stakeholder value creation dominates over resource-based value creation (Hietajärvi *et al* 2017). Although contractor unique resource, competence to deploy those resource and capabilities that derived from bundled resources makes them attractive for clients, it may not make attractive candidates for relational contracts as such contract require contractors that value and focuses on the diverse stakeholders' perspective that call for multi engagement, balance, weigh, and responsive (Weele, 2018, p. 364). Figure 13 illustrates how different relational contracts weight different key integration features: the further from the targeted core component of cooperative culture (in the middle) a relational contract lies, the more it exploits the key integration features in question in extending the foundation of the collaborative relationship (i.e., the demarcated area).

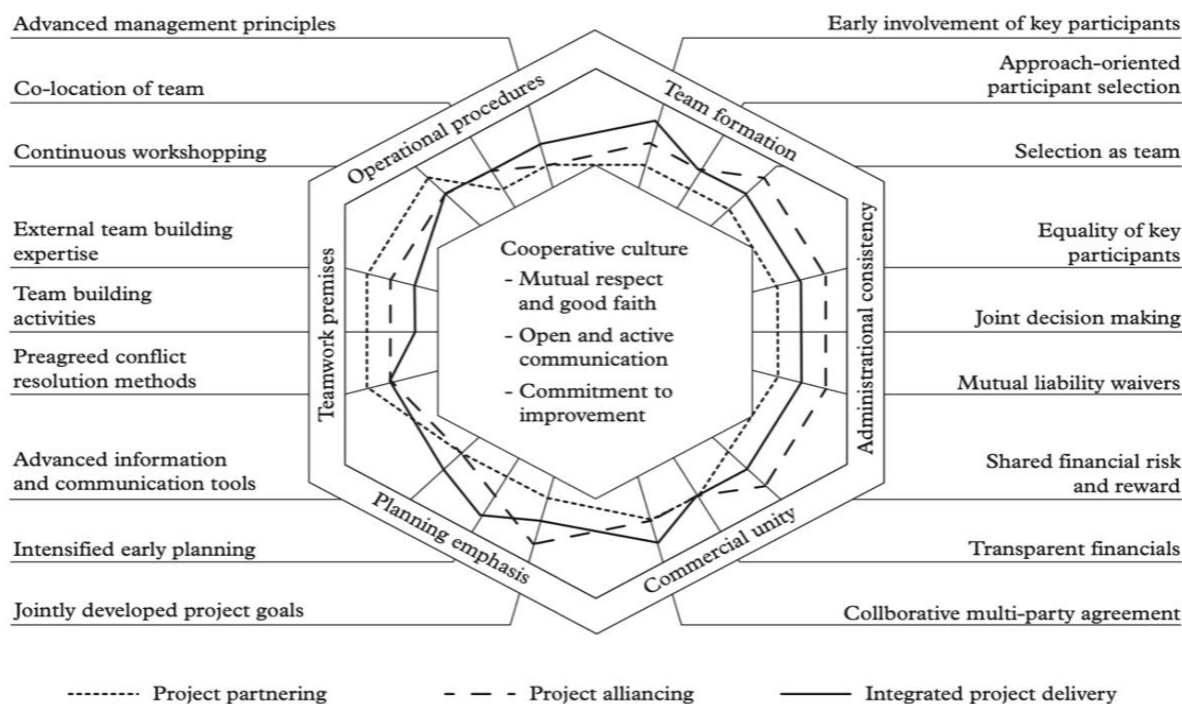


Figure 16. Different relational arrangement pitted against each other (Pertti Lahdenperä 2012).

2.4.5. Lean Inspired Construction Contracts

Lean construction is inspired by the success of lean as a management philosophy in manufacturing particularly Toyota Corporation. The philosophy was based on about creating flow in production by eliminating waste and producing only what the customer wants. Waste is effort or resource utilization that does not create value, while setbacks and problems are seen as opportunities for development and improvement (Moding & Åhlstrom 2019 p, 69-74). Lean construction is specifically formulated to arrive at all project and program goals without conceding that trade-off of time, cost, quality, participant satisfaction, or safety are inevitable (Thomsen et al. 2009). Lean project delivery method has different definition for project phases, the relationship between phases and the participants in each phase. The figure below shows a series of phases in overlapping triangles. The phases as shown in the figure is Project definition, Lean design, Lean supply, Lean

assembly, and Use (Ballard & Howell 2003). The management of production throughout the project is indicated by the horizontal bars labelled Production Control and Work Structuring. The systematic use of feedback loops between supplier and customer processes is symbolized by the inclusion of Post Occupancy Evaluations between projects

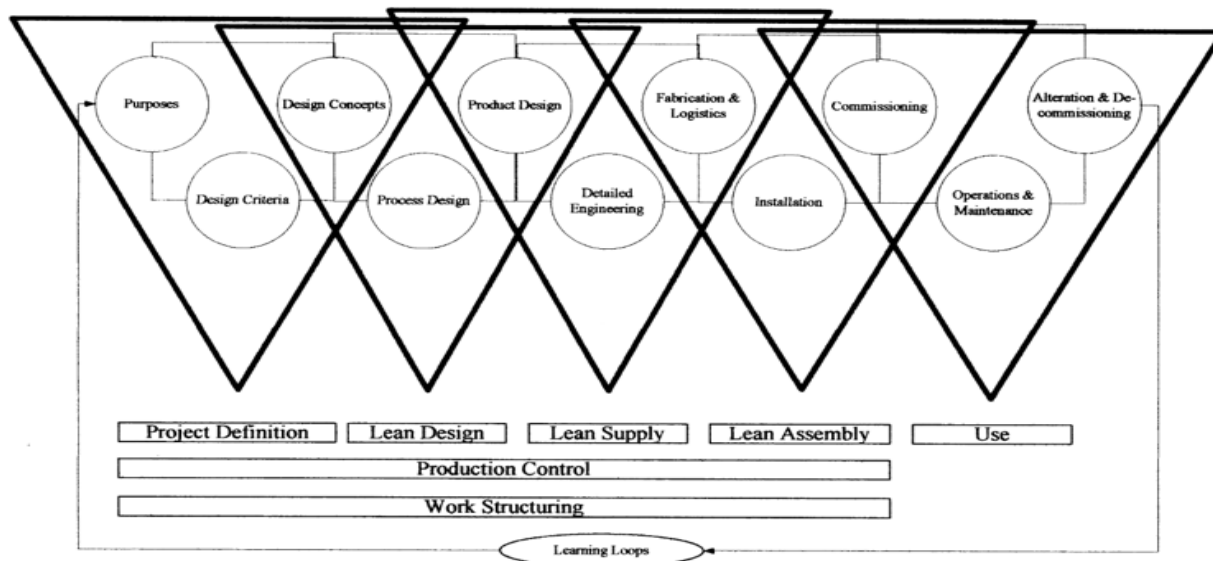


Figure 17. Represent project phases in relation to Lean construction (Ballard & Howell 2003).

Project Definition

The project definition phase includes owner, contractor, end-user and stakeholder purposes and values, design concepts, and design criteria. Here competitive dialogue, ECI, and BVP can be implemented and play impotent role.

Lean Design

The gate between Project Definition and Lean Design is alignment of values, concepts and criteria definition. If the ongoing search for value reveal opportunities that are consistent with the end-user and stakeholder constraints e.g., resource constrain, or time constrain the parties can collectively address in good time. This lean design approach allows the parties identify earlier in the front-end phase of the project challenges related to interdependencies, iteration and lead time.

Lean supply

In this phase the project detailed engineering, fabrication, and delivery is addressed in order to reduce the lead time for information and material which determine the pace and timing of the project.

Lean Assembly

Lean assembly begins with the delivery of materials and the relevant information for their installation. Assembly completes when the client has beneficial use of the facility, which typically occurs after commissioning and start-up.

From the figure above, lean construction is based around maximizing value for the customer and minimizing waste. Tools like Last Planner, Visualization, and Daily Huddle Meetings encourages trust, commitment, and informal collaborations. Collaboration, trust, promised based management and continuous learning are behaviours required of each individual on a Lean project (Thomsen et al. 2009).

2.4.5.1. Lean triangle

All project delivery systems have three basic domains within which they operate: the project organization, the project's "operating system," and the commercial terms binding the project participants (Thomsen et al. 2009). There are no Lean construction contracts, but Lean construction strategies that improve cooperation and collaboration in the construction industry. Based on the three basic domains for which project operates, the Lean Construction Institute has developed recommendations for project optimality, which is especially well suited for uncertain and complex projects but is also effective for less challenging projects. The lean triangle consists of operating system (strategy and technology), commercial (contracts), and organization (integrated) (Bygballe & Sward 2017 p, 403).



Figure 18. Lean triangle exhibiting the relation between commercial, organization, and operation system (Ballard 2012)

1. Commercial notion represents the terms that align the financial interests of the participating supplier with the interests of the owner. Lean inspired projects take a variety of approaches to change the commercial framework of risk allocation and compensation in order to better align the parties' commercial interests with a collaborative approach and overall success on the project (Thomsen et al 2009).
2. The organization side stands for an integrated organization in which downstream players participate in upstream processes, and vice-versa. Bringing the key constructors together with the owner and the designers from the early stages of the project allow the major players to develop a much higher level of common understanding of the project.
3. An operating system structured to pursue the lean ideal, to follow the relevant principles in that pursuit, and to use the best available methods and tools, both managerial and technological. To apply those principles, Lean Construction or Lean Project Delivery offers a number of innovations on the project operating systems that reduce waste, shorten schedules, increase productivity and quality, and also can improve safety and project relationships (Thomsen et al 2009).

The technology in the middle of the triangle present technological solutions like BIM which greases the process by ensuring an effective flow of information and communication so that the three side of the triangle can interact and optimize value creation (Klakegg 2017 p, 422). Building technology can assist the effort for an integrated team, as people across disciplines to converge around digital conglomeration of models to figure out how things work together, address clashes and see how the various parts of the project are shaping up (Thomsen et al. 2009).

3. METHODS

3.1. Limitations

The research question states what are the value adding collaboration means that can be included in the formal contract strategy? The initial design of the thesis was to conduct survey that consist of questionnaire, short sett interviews, and possible site visitation with physical observation and analyzation, but due to covid-19 and health precautions measures, an alternative research method mainly based on document study is applied. The case projects in the document study have been investigated by scholars consisting of university professor and lecturers including the project supervisor for this master thesis and PhD students. Some of the case projects are still active while other have been accomplished. For this reason, field work and survey has been omitted from the master thesis. On the other hand, the choice of the research question was favoured to indulge a wider perspective of collaboration means in contract strategy, to generate strong and reliable evidence and to create a more convincing theory.

3.2. Research design

It is important to note that a research design has to represent a logical set of statement which can be tested through certain logical test such as construct validity, internal validity, external validity, and reliability (Yin, R. 2018 p. 42). The purpose of the thesis is exploring and explain value creating collaboration means in the construction industry in Norwegian context, and the research question starts with what. According to Yin (1994, p.6) research design concerns first the selection of a research method related to the type of the research question. “What questions’ are suggested to be suitable for survey and archive analyses, and ‘how questions’ for case studies and history studies (Yin, 1994). However, case study methodology also allows a research design of what and how questions by combining qualitative and quantitative data analyses (Yin, 1994).

The document study underpinning the analyses presented in this thesis is based on the complex methodology where different forms of data are collected and analysed in several steps. The document study methodology was chosen based on its possibilities to include different types of case and data analysis within one study.

The expectation of the accomplished study in this thesis is to contribute to understanding of new methods and tools in briefing with a value-focused collaboration means for owners and contractors, stakeholders including designers within the construction industry. The literature suggests that a supplier should aim to generate ever-increased customer value (K. Artto et al 2008). Theories regarding improved value processes in the construction industry are found and developed within Lean production and the framework of Lean constructions principles (Kalsaas 2017 p, 37-50). Theories that are not founded on an empery can be termed as just mare speculation while empirical research that is not anchored on theoretical framework can easily turn to be an isolated description of a simple phenomenon which has limited value and does not give any particular new insight that leads to understanding of a problem (Johannessen, Christoffersen & Tufte, 2019, p. 35-40). On the other hand, data analyzation approach itself is an iterative process where before actual data are transmitted for use, several rounds of abstract conceptualization and reflection take place (Kalsaas, 2012). Instruments of value creation in the construction sector is thus relevant to be investigated to make inroads on the nature and scope of value adding relational-based contract forms.

3.2.1. Quantitative and qualitative

Both quantitative and qualitative methods are employed in this thesis. The total data collection was based on document studies founded on survey, field work, and semi structured interviews with key stakeholders in the Norwegian construction sector including the public project owners are deeply involved. The review of the contemporary literature was undertaken using the search engines like research gate, Oria, science direct and Google. Oria is a Norwegian University library resource that includes academic journal papers, conference papers, reports, dissertations, etc. The search words used included collaboration instrument in construction,

Value creation, ECI, public procurement, National standards, public procurement relational contracts and the combination of these.

3.2.2. Validity and reliability

The purpose of this thesis was to explore Collaboration means and their impact on stakeholders, project team and end-user. Being reliable means that the data are covering the parts of a problem that the thesis want to solve and given the same condition other researchers could come to similar conclusion by applying the same method and data. On the other hand, validity claims are based on experiencing solutions of actual problems that really work (Levi et al. 1997, p. 97). Securing high data validity is an important part of ensuring that your project is using correct sources for data collection. A method can exhibit low reliable but have high validity. High validity is important to show that the findings in the project are trustworthy and verifiable. A method of securing high validity is to ensure that construct validity is verifiable. Construct validity refers to which degree a test measures what it claims, or purports, to be measuring (Brown, 1996). The compilations and analyses of the data were validated in different steps. The findings and empirical data in the document studies that is based on this thesis is generated from several project case studies that mainly involve public project owners. Triangulation by cross-referencing the data in the document studies with theories in the literatures is initiated in the thesis. Furthermore, to ensure that the data analysis in the document study are relevant to the research question, the finding from the document study were compared with previous and similar studies and existing theories that are pinpointing the essence of value promoting instruments in constructions contracts specifically in the front-end phase of projects.

3.2.3. Choice of data analyzation approach

The empirical data in the document study is attained by scholars with engineering background using design science research approaches. (Koskela et al. 2019) associate the emphasis on improvement with the tradition of design science research (DSR) in which the artefact should be the solution to a problem. (Koskela et al. 2019) relates DSR to the idea of using induction from empirical experimentation as the primary form of reasoning, which is centered around the complementarity of theoretical knowledge and empirical observation as a source of engineering/design knowledge, requiring iteration between induction and deduction. This perspective may have implication that the method of design analysis does not grantee that any solution will be found.

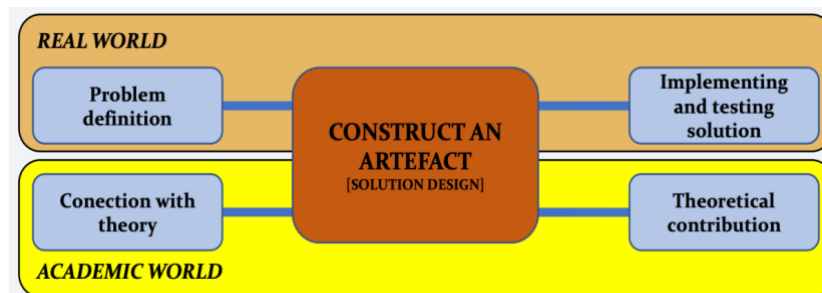


Figure 19. overview Design Science Research methods (Lukka 2003)

The theoretical research studies that is grounded on this thesis is practically based on the principles of epistemology of the known subject and followed more like an interdisciplinary perspective, where the qualitative techniques in the thesis try to answers the interpretive models of the underlying concepts of value creating collaborations in an integrated form and stakeholder chain network, ,founded on a cross functional team development, where different actors in the construction industry interact and coordinate to achieve business model, and where the supplier and the buyer share the gain and risk of their business transactions. The thesis conceptualizes the data in the document and categorizes into contractual (hard) and non-contractual (soft). (Johannessen, Christoffersen & Tufte, 2019, p. 37) defines hard data as measurable, factual and indisputable data while soft data are observation and quantified data, in other words it is based on argumentative concepts founded on opinions, interpretations and contradictions. The hard data that the document study scrutinized, mainly focuses on the measurable technical interaction between the project

owner and contractors referred in the document as contractual relational elements. These data include formal joint collaboration activities that can be included in the contract hard documents. The activities can be joint project budgeting arrangements, development of software driven integrated platform. On the other hand, the soft data in the form of none-contractual collaboration means is analyzed by reflecting and cross checking the existing theories in the literatures and models in the field of construction and project procurement processes that appreciate none-contractual relational interaction between project owners, contractors, and stakeholders. The data analyzation itself required frequent shuttle to the problem by trying once more to solve and conceptualize the problem in a different way.

4. Empirical data

4.1. Description

The empirical data presented here are results for ten case projects in the document study. There are ongoing research on some of these case projects, but the result presented here are complete. As noted earlier the purpose of these case projects is to investigate features of collaboration means and project alliancing in public projects, something they call in the document study collaboration contract strategy and specialized relational interactions. All the cases considered by this thesis were identified as complex, since the owners could not determine which of several possible solutions would be best suited to satisfy their needs and specification. The notion used to segregate the different collaboration means in the research is contractual (formal) and non-contractual (informal) collaboration means. The contractual collaboration means are collaboration elements that are articulated in contract actual documents, while the non-contractual collaboration means are elements that the parties adapted in the project delivery processes but are not documented in the contract documents. This is either due to contract legislations limits or the nature of the collaboration means which are often based on trust and commitment which is hard to measure and objectively to formalize. However, the project case study only focused on collaboration means which could technically be included into the formal contract hard document.

Table 3 presents the ten case projects mentioned above, the project owners and total number of collaboration element identified in the research.

Case Projects	Public Project Owner	Total number of collaboration elements identified
E6 Helgeland North	Staten Vegvesen	24 relational promoting elements
E6 Helgeland South	Staten Vegvesen	23 relational promoting elements
Rv3/Rv 25	Staten Vegvesen	24 relational promoting elements
E16 Fagernes - Øylo	Staten Vegvesen	22 relational promoting elements
Ulsberg-Vindåslien	Staten Vegvesen	45 relational promoting elements
E39 Mandal East-Mandal town	Nye veier	29 relational promoting elements
E6 Kvithammar-Åsen	Nye veier	31 relational promoting elements
E6 Kvål-Melhus	Nye veier	43 relational promoting elements
Helse Sør-Øst/Sykehuset i Vestfold HF	Helse Sør-Øst	31 relational promoting elements
Horten Vgs	Vestfold & Telemark Fylkeskommune	6 relational promoting elements

Table 3. listing of case project and total number of relational elements

4.2. Correlation of the formal and informal collaboration means

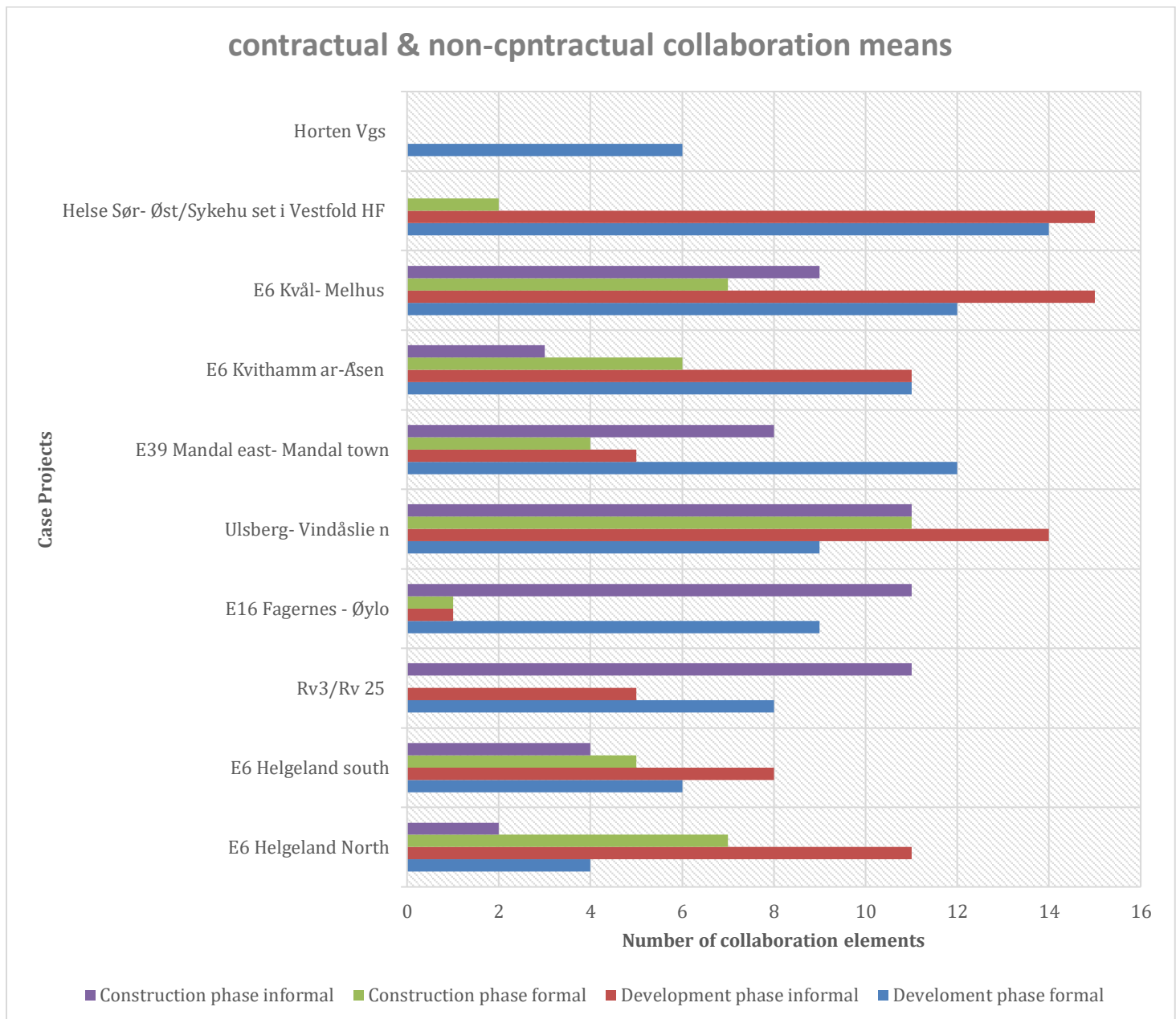


Figure 20. Graphical presentation of the formal, informal relational promoting elements identified the case projects

The graphical presentation of the collaboration means identified in the case projects in the document study convincingly indicates that non-contractual collaboration means are more consistently adapted by the parties particularly in the project development phase (Front-end phase).

4.3. Individual case project technical descriptions

4.3.0. E6 Helgeland North

The technical and the contract framework for the case projects are presented here. A more elaborated version of the tables is also attached to the thesis.

	Type of project (transport project or construction project)	Transport project	
	Contractor (and other suppliers by multi-party contract)	Hæhre	
	Project Name	E6 Helgeland North	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	road development contract (VUK)	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	"B3 Requirements for offers and special competition rules (9 pages), C2 Special contract provisions (41 pages) "	Construction/Execution phase
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	"- K1 Technical solutions and implementation of the contract = NOK 80 million - K2 Traffic flow = NOK 40 million - K3 Environmental considerations = NOK 30 million - K4 Construction time = NOK 6 million S = T - K1 - K2-K3-K4 "	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	One Step	"Operation contractor is involved in planning and construction "
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Most of Function Descriptions, but also some detailed description	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		turnkey contract with operational responsibility
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)		Fix-sum
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Losers Fee	Loser Fee
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	No
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General	NS 8402	"NS8407 + med operating agreement for 15 years "

	<p>contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>		
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Table 4. Practical and technical description of case project E6 Helgeland North

E6 Helgeland North	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	4 elements	11 elements
In Construction phase	7 elements	2 elements

Table 5. Number of identified collaboration relational elements in E6 Helgeland North

4.3.1. E6 Helgeland South

Background information	Type of project (transport project or construction project)	Transport project	
	Contractor (and other suppliers by multi-party contract)	Skanska (with Hæhre as sub-contractor)	
	Project Name	E6 Helgeland South	
	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	road development contract (VUK)	
Contracting	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition initiated 08042016 - 409 pages is the offer with prices - 38 pages the competitive basis it selves.	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	<input type="checkbox"/> K1 - Organization and management of contract = 110 mill <input type="checkbox"/> K2 - Sensitive areas = 30 mill <input type="checkbox"/> K3 - Technical solutions = 50 mill <input type="checkbox"/> K4 - Traffic flow = 40 mi	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	

	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	One Step	"Operation contractor is involved in planning and construction "
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	Most of Function Descriptions, but also some detailed description	Functional description and description of financing model
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		turnkey contract with operational responsibility
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)		Fix-sum
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Losers Fee	carries out as a target price contract with an incentive. Furthermore, agreement must be achieved on agreed target price with associated conditions within six months. after contract signing. In addition, a separate contact supplement is being developed in collaboration that regulates the relationship.
			If no agreement is reached on the agreed target price, the contact's provision on areas of sensitive clause applies.
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	No
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time		"NS8407 + med operating agreement for 15 years "

N/B K1, K2.... Stands for contract 1, 2, ...

Table 6. Practical and technical description of case Project E6 Helgeland South

E6 Helgeland South	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	6 elements	8 elements
In Construction phase	5 elements	4 elements

Table 7. Number of identified collaboration relational elements in E6 Helgeland South

4.3.2. Rv. 3/rv. 25 Løten-Elverum

	Type of project (transport project or construction project)	Transport Project	
	Contractor (and other suppliers by multi-party contract)	Skanska	
	Project Name	Rv. 3/rv. 25 Løten-Elverum	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Competitive negotiation and PPP	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis 433 pages	
Contracting	Supplier-Prequalification (Yes/No)	Plan	Build
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Yes	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Award criterion 1: Price 80% Award criterion 2: Plan for implementation and organization of the project 6% Award criterion 3: Quality 8% Award criterion 4: Health, environment, and safety 6%	Hybrid – driven by dialog about task understanding
		and then negotiation 3 envelope in three rounds	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	PPP contract - development, (incl. Re-regulation) construction, operation and financing model	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	PPP contract	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	PPP	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Fix-sum	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	1) Payment for Availability (BT) 2) Payment for Operating Standard (BD) 3) Payment for Security (BS) 4) Early Payment of parts of the Construction Cost (TBB) (milestones)	

		handover veg 50 of cost% Failure on one of these 4 leads to a reduction of payment - i.e., there is a penalty in the agreements / negative incentive	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time	Based on NS8407 and experiences from previously completed PPP project	

The abbreviations are in Norwegian ex: BT; Betaling for Tilgjengelighet,....

Table 8. Practical and technical description of case Project Rv. 3/rv. 25 Løten-Elverum

Rv. 3/rv. 25 Løten-Elverum	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	8 elements	5 elements
In Construction phase	0 elements	11 elements

Table 9. Number of identified collaboration relational elements in Rv. 3/rv. 25 Løten-Elverum

4.3.3. E16 Fagernes-Øylo

	Type of project (transport project or construction project)	Transport Project	
	Contractor (and other suppliers by multi-party contract)	Br Dokken	
	Project Name	E16 Fagernes-Øylo	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Turnkey contract with relational arrangement	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis 105 pages plus presentation	Plan
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Award criterion: consideration: Total amount in Offer 50%: K1 - Assignment organization 20%; K2 - Assignment completion 30%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	2 steps	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Functional Requirements	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with relational arrangement	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Billable work with target price	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Calculation of remuneration. The contractor receives the fixed sum Profit and Indirect costs. In addition, the contractor is reimbursed the actual documented Construction Costs NOK for NOK up to the Final Target Price. If the Construction Cost is lower than the Final Target Price, the contractor will receive a percentage of this saving as a bonus /	

		incentive ("Bonus"). The percentage depends on the offered percentage for profit and indirect costs	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Remuneration: Hourly rates and purchase of services, with a surcharge of 10%	Target price agreement. % Rate profit and indirect costs Percentage of savings to contractor 0 - 5%: 0%; 6 - 14%: 30%; 15 - 20%: 60%; 21- 30%: 80%
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well	NS 8407	

Table 10. Practical and technical description of case E16 Fagernes-Øylo

E16 Fagernes-Øylo	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	9 elements	1 element
In Construction phase	1 element	11 elements

Table 11. Number of identified collaboration relational elements in E16 Fagernes-Øylo

4.3.4. E6 Ulsberg-Vindåsliene

	Type of project (transport project or construction project)	Transport Project	
	Contractor (and other suppliers by multi-party contract)	FCC & Rambøll	
	Project Name	E6 Ulsberg-Vindåsliene	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	integrated relational arrangement with target price	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	5 documents - 1.Task description, 2. Special contact regulations, 2.2 Special contact regulations - remuneration, 1.1 description of Scope of work, 1.2 Requirements for implementation and technical description	
Contracting	Supplier-Prequalification (Yes/No)	Plan	Build
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	BVP method	BVP 5 criteria that are evaluated with different% weight Award criteria: The criteria include: Quality criteria - Name: K1 Performance justification / Weighting: 25% Quality criteria - Name: K2 Risk assessment / Weighting: 15%

			Quality criteria - Name: K3 Competence and experience / Weighting: 30% Price - Weighting: 30%
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))		BVP
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)		Two steps - development phase with target price
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))		Own part of contract
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		Turnkey contract
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Target price	Billable work with target price
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)		The target price arrangement, give ground for bonus sharing
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Se over	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time	NS 8402 with budget but it says that the entire implementation is carried out in accordance with NS8407	

Table 12. Practical and technical description of case project E6 Ulsberg-Vindåsliene

E6 Ulsberg-Vindåsliene	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	9 elements	14 elements
In Construction phase	11 elements	11 elements

Table 13.. Number of identified collaboration relational elements in E6 Ulsberg-Vindåsliene

4.3.5. Mandal East-Mandal city

 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	Hæhre	
 	Project Name	Mandal East-Mandal city	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated relational arrangement with target price	Turnkey contract with fixed price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis which in total consisted of 8 chapters	
Contracting	Supplier-Prequalification (Yes/No)	BVP method	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Award criteria Weighting Total Offer amount 15% K1 - Performance justification 30% K2 - Risk assessment 25% K3 - Competence and experience for key personnel 30%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition)	BVP	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with	Two steps - target price	

	letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)		
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	Functional descriptions	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with collaboration means (development phase as part of the planning phase)	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Billable work that goes over to Target price	Target price with bonus incentive
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)		The target price arrangement, give ground for bonus sharing
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Se over	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based		NS 8407
	on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time		

Table 14. Practical and technical description of case project Mandal east-Mandal city

Mandal East-Mandal city	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	12 elements	4 elements
In Construction phase	5 elements	8 elements

Table 15. Number of identified collaboration relational elements in Mandal East-Mandal city

4.3.6. E6 Kvithammar-Åsen

	Type of project (transport project or construction project)	Transport Project	
	Contractor (and other suppliers by multi-party contract)	Hæhre	
	Project Name	E6 Kvithammar-Åsen	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated relational arrangement with target price	Turnkey contract with fixed price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Contract Chapter D1.1 Description of scope of work - E6 Kvithammar-Åsen Contract Chapter D1.2 Requirements for implementation and technical description	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Integrated collaboration phase with re-regulation, lasts until design completion	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	N/A	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	N/A (BVP)	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Two-step contracting, with an option for a turnkey contract	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code	Functional descriptions	
	1 Standard description for road contracts or NS3420 Description system building and construction)		
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Total consultancy contract	NS8407 Turnkey contract (with an option on IPL with its own contract provisions)
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	N/B	Fix-price
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	No, not beyond the option of implementation (either as a turnkey contract or IPL)	No
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No, not beyond the client's budget price (goal-oriented design).	No, not beyond the client's budget price.
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible	No	NS 8407

for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time

Table 16. Practical and technical description of case project E6 Kvithammar-Åsen

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E6 Kvithammar-Åsen	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	11 elements	11 elements
In Construction phase	6 elements	3 elements

Table 17. Number of identified collaboration relational elements in E6 Kvithammar-Åsen

4.3.6. E6 Kvål-Melhus

 	Type of project (transport project or construction project)	Transport project	
 	Contractor (and other suppliers by multi-party contract)	Peab	
 	Project Name	E6 Kvål-Melhus	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated project delivery I - with target price	Integrated project delivery II - with target price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Contract for integrated project delivery, A0 Content descriptive part, A1 Description of scope of work, A2 Description of IPL, A3 Requirements for implementation and technical description, C1 Milestones, E4 Performance justification, F4 Agreement for implementation of phase 1. 108 pages	
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous (Doffin): Performance justification / Weighting: 25% Risk assessment / Weighting: 20% competence and experience / Weighting: 30%	Build

		Price - Weighting: 25%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competition with negotiation (and BVP)	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Two-step contracting / Integrated project delivery (IPL)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Functional descriptions	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		IPL (turnkey contract)
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Full cost in Phase 1, based on hourly rates	Billable work with surcharges for risk and profit. Target price.
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Incentive for more work in step 2	KPIs related to bonus payment: Unforeseen closure of E6, Completion, Number of absence claims, Number of incidents related to the environment
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)		Range with 0% (more than 5% budget overrun), 25% (between 2.5 and 5%) and 50% (less than 2.5%)
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time	redeveloped IPL contract. The owner has an option on NS8407 with a fixed price.	

Table 18. Practical and technical description of case project E6 Kvithammar-Åsen

E6 Kvål-Melhus	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	12 elements	15 elements
In Construction phase	7 elements	9 elements

Table 19. Number of identified collaboration relational elements in E6 Kvithammar-Åsen

4.3.8. Helse Sør-Øst/Sykehuset i Vestfold HF

	Type of project (transport project or construction project)	Construction Project	
	Contractor (and other suppliers by multi-party contract)	Skanska	
	Project Name	Helse Sør-Øst/Sykehuset i Vestfold HF	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated project delivery IPL	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	In-house developed IPD contract. American pattern	
Contracting	Project Phases covered by the contract (Regulation plan, Procurement, Execution contract in figure from "Degree of freedom" or Pre-planning / sketch, planning / engineering and Execution / execution).	Plan	Build
	Supplier-Prequalification (Yes/No)	Preliminary project was available, but not binding	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	No	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for	Offer competition with negotiation	
	tender competition / competition with negotiation or tender competition)		
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Yes)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	?	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with option IPD	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Target price	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Bonus linked to target prize	KPIs related to bonus payment: Unforeseen closure of E6, Completion, Number of absence claims, Number of incidents related to the environment
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Bonus linked to target prize	Range with 0% (more than 5% budget overrun), 25% (between 2.5 and 5%) and 50% (less than 2.5%)

	<p>Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	<p>In-house developed IPD contract. American pattern</p>
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Table 20. Practical and technical description of case project Helse Sør-Øst/Sykehuset i Vestfold HF

Helse Sør-Øst/Sykehuset i Vestfold HF	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	14 elements	15 elements
In Construction phase	2 elements	0 element

Table 21. Number of identified collaboration relational elements in Helse Sør-Øst/Sykehuset i Vestfold HF

4.3.9. Horten Vgs

	Type of project (transport project or construction project)	Construction Project	
	Contractor (and other suppliers by multi-party contract)	Veidekke	
	Project Name	Horten Vgs	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Competitive Dialogue	Turnkey contract NS8407
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Plan	Build
Contracting	Project Phases covered by the contract (Regulation plan, Procurement, Execution contract in figure from "Degree of freedom" or Pre-planning / sketch, planning / engineering and Execution / execution).	Preliminary project was available, but not binding	
	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for	Competitive Dialogue	
	tender competition / competition with negotiation or tender competition)		
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Yes)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	Yes, award criteria	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Competitive Dialogue	Turnkey contract NS8407
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Fixed sum	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	No	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based	NS8407	

	<p>on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	
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Table 22. Practical and technical description of case project Horten Vgs

Horten Vgs	Number relational element included in the contract hard document	Number of relational elements and observed and recorded but not in the contract
In Development phase	6 elements	0 elements
In Construction phase	0 elements	0 element

Table 23. Number of identified collaboration relational elements Horten Vgs

5. Model development

5.1. Analytical model

The analytical model takes into consideration, conditions in the contract strategy that could have been included in the formal contract documents, economic incentives and instruments that support relational approaches, joint organization of design and production, and integrated operating systems. The inspiration behind the model is the concepts presented in the Lean construction triangle framework. The triangle was developed as collaboration means that can improve relations between project owners, service providers and contractors at planning, contract level, operational level, and organizational level.

As background information, different relational attributes in the literature are contextualized in relation to procurement, contract development, project operation, and organization commitment. The table below show different collaboration attributes that are key for development of relational contract format.

Relationship attributes	
Flexible Attitude, Flexibility in contract Procurement strategy, (competitive tendering), Clear contracts Long term quality focus Trust, inter-organizational trust, Trust built on personal relationships, Trust and opportunism, Mutual trust, Self-interest and distrust, Distrust, Previous interactions and Trust building of partners, Trust building and Maintenance Commitment, Understanding each other's commitment, Long-term commitment, Uneven commitment	Procurement process Success factor: Trust
Senior management commitment, The commitment of top management, Top management support, leadership Collaborative team culture, Formulized team building, Teamwork, scope for teambuilding Communication, Open communication, Transparency and effective communication, Communication via the feedback link Cooperation, Cooperation and communication Consistent objectives, acting consistent with objectives, mutually agreed goals, Joint goal formulation, Common objectives, mutual basis for stakeholder interests' Joint evaluation Problem solving, Dispute resolution system, Conflict management	Contract side (Formal & Informal) Success Factor: Commitment
Continuous improvement & benchmarking process	Operating System Success Factor: Strategy & Action

Incentives, Performance incentives linked with common goals, Incentives, and shared culture Power, Fairness, Equity, and empowerment Risk allocation and sharing, Unfair risk and reward plan, Joint responsibilities Resource sharing, Shared culture Win-win approach, Win-lose attitude	
Cultural issues, Compatible Organizational culture, cultural inertia Education and learning, Training, Client competencies and learning Experience in relational contracting Effective coordination Clear understanding of roles and responsibilities Respect Personnel change Integrity	Intra &inter organization relationship Success Factor: Teamwork

Table 24. Key relational attributes in project phase context highlighting success factors

Based on the relational attributes noted in the table 24, an analytical model is developed. The conceptual framework of the analytical model considers key elements that promoted collaboration means in the decision of contracts and project phases handling. In the model practical relational approaches in conjunction with the projects` life cycle characteristics are measured and compared with the existing theoretical relational approaches identified in the literature. The practical relationship in the document study is mainly based on the actions taken by the public project owners to improves trust, commitment, operational strategy, and organization collaboration in delivering public projects.

The model takes into consideration three stages with different level of relational arrangement. At the lowest level of the model is characterized as transactional traditional law contract with little or non-relational elements, where the owners and contractor`s relationship is organized vertically and separated from each other by contractual walls. In the second stage, relational collaboration means are not developed as contract charter, but are considered significant for project success. At maturity level, trust is higher, and the parties are relying upon each other to honour commitments, including the assumption underlying the commitments that the committer has the capability to perform and complete work as promised. At this level the contract framework is expected to be fully operating on relational collaboration framework, where majority of non-contractual elements are integrated into the contract charter, and the level of acceptance for non-contractual elements is relatively higher. A significant factor noted in the case projects technical presentation is the numbers of non-contractual collaboration means are higher among case projects where there already exists relatively agreed relational contract forms.

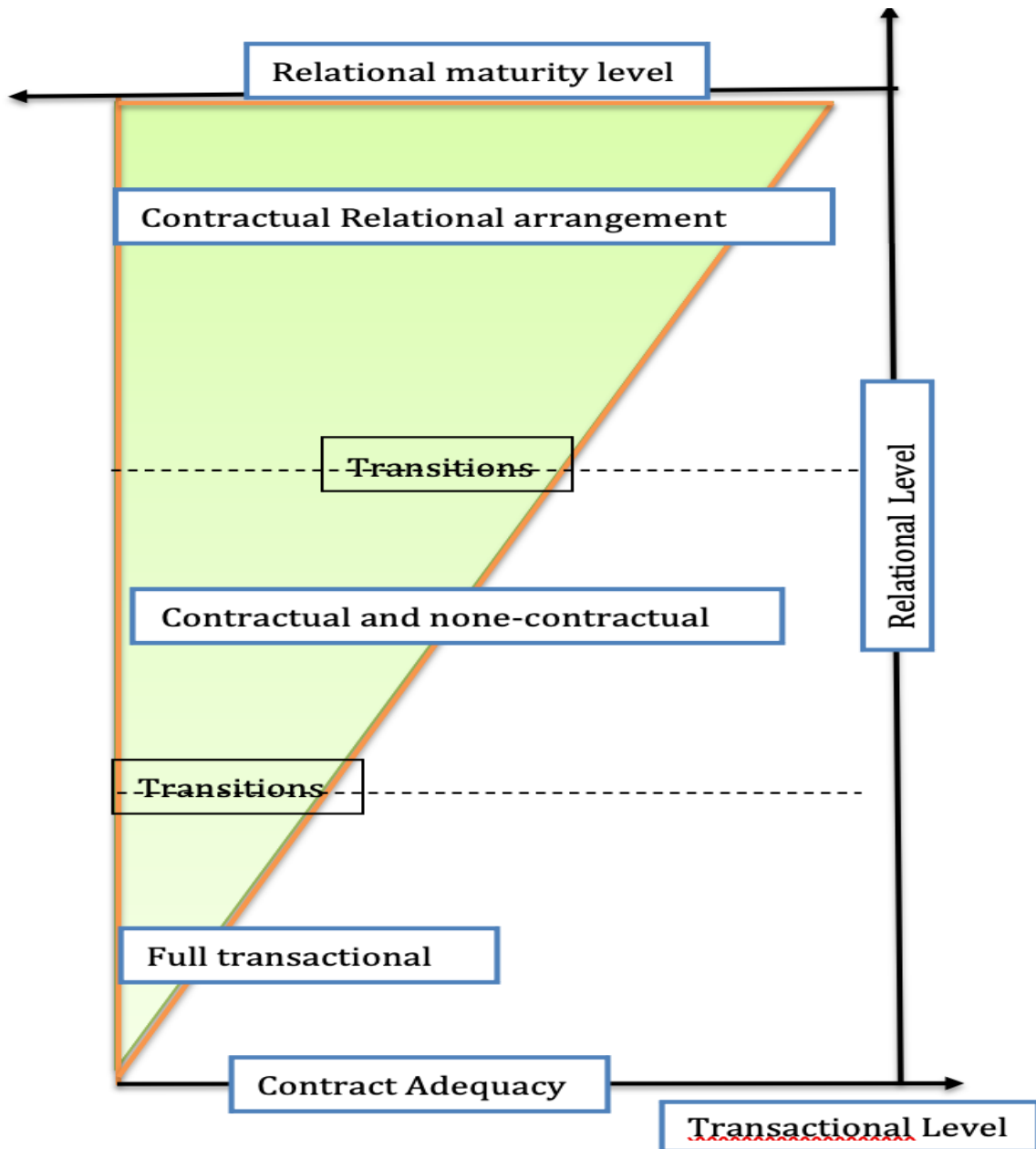


Figure 21.. Represent the perceived evolution of relational arrangements

Other factors that need to be considered are all relational collaboration means cannot be documented, but they evolve as the trust at professional and personal level grows.

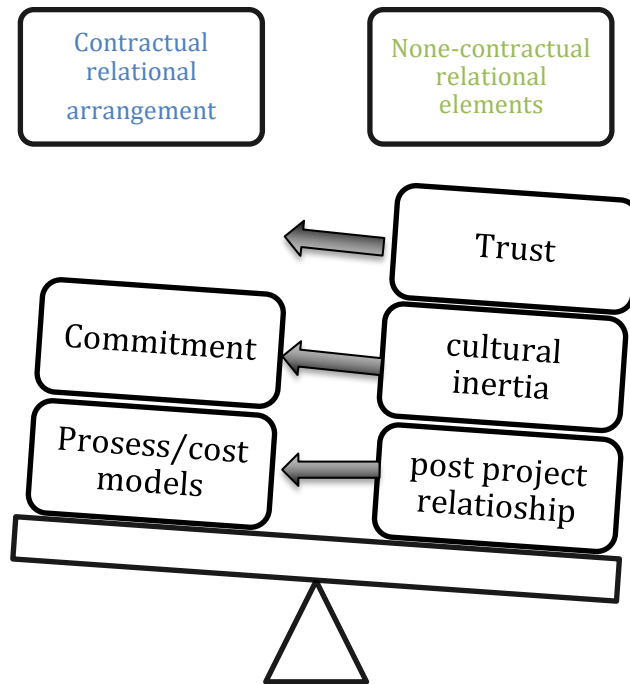


Figure 22. Show the balancing of formal and informal relational elements

For projects to approach optimality, three elements are required; aligned commercial, integrated organization and operating system. these elements are instrumental for relational development in the different phases of project. The analytical model puts these relational collaboration means into spectrum in context and support of the existing theoretical relational collaboration means identified in the literature. These elements are further analysed where criteria one is given any identified relational collaboration element in the case projects.

Identified relational collaboration means in the case projects procuring process.	Theoretical collaboration means in the literature that support the case projects perspectives
Award criteria (Only lowest price or most economically advantageous (if so, which criteria to weighting)	open procedure, restricted procedure, negotiated, and design procedure (Weele 2019 p, 130), gives the PO (Project Owners) room to identify economically advantageous contracts.
Form of contract (direct purchase), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition) - Use of BVP, competitive dialogue, competition with negotiation tender competition 1 - i.e., you do something beyond the usual tender competition.	BVP calls for transfer of the control over the execution of the project to a larger extent to the contractor (Högnason <i>et al</i> 2019). To understand the BVP method, it is necessary to have insight in how the phases of the method work. Under BVP procedures, the risks of the project are not transferred from the client to the contractor, but rather the management and control of these risks. Competitive Dialogue on the other hand provide the possibility to open a dialogue between the public owners and the contractor which has the purpose of building trust and developing an optimal solution that matches the needs of the project owners before deciding which would be the final awardee of the contract (Wondimu <i>et al</i> 2016).

	<p>There are several contractor assessment methods from the owner’s perspective, and it include spreadsheets, qualitative assessments, vendor rating, supplier audit, and cost modelling. These methods can be both subjective and objective (Kalsaas et al 2020)</p>
<p>Early contractor involvement / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)</p>	<p>ECI helps parties to engage in healthy relationship, increase understanding and decrease opportunistic behaviors which will result to potential adversarial relationship (Kalsaas, Hannås, Frislie, & Skaar, 2018). Contractor expertise and experiences plays important part in front-end phase of the project. Apart from relational improvement there is improvement in value for money and project delivery time in comparison to traditional project delivery methods (Wondimu et al 2016). ECI can start in the internal or business development phase and can last until the project completion and handover phase (Walker and Lloyd-walker 2012)</p>
<p>Form of contract (PPP, turnkey contract with operational responsibility, execution contract - including general contract, main contract and subcontracts) collaboration in the operational phase (alternative text: Form of contract with collaboration in operational phase)</p>	<p>Under PPP framework the two tasks of building and subsequently operating it are bundled and delegated to a single private contractor. PPP induces very strong incentives to invest in cost reductions which will impact quality (Child <i>et al</i> 2019).</p>
<p>Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts Option for collaboration-based contracts. 6) IPD contract, with both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP in a public-private partnership (PPP), where the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	<p>The Norwegian contracts are organized as what the project in Norway call “Utførelsesentreprise” execution enterprise, and “totalentreprise” total enterprise, which is similar to a turnkey contract. As NPRA describes the “entreprise”, they oversee the organizing of the work between the project owner, construction company and the project planner (Vegvesen 2021). These contract forms were formulated to assign responsibilities, accountabilities and liabilities to parties involved in different projects, and the dominant perception is that relationships should be determined by legal boundaries. These standards operate under four contracts framework namely, function contract, unit price contract fixed price, and billable work. nonetheless arrangements such as partnering recognize that difference and even divergent goals of the parties that need to be met and aligned in order to achieve desired strategic outcomes that benefits all parties involved in the contracts (Rolstadås et al 2019 p, 262-2639)</p>

Table 25. Present practical collaboration means in the procurement process tressed back in the literature

Identified relational collaboration means that could be included in the formal contract	Theoretical collaboration means in the literature that support the case projects perspectives
Multi-party contracts	Collaborative construction project arrangements have been identified as alternative solution to tackle the frustration felt toward the opportunism inherent in traditional contracting. Multi party contract form such as Project partnering, project alliancing and integrated project delivery promote relational approaches that reduces uncertainty and tension between the owners and the contractor (Pertti Lahdenperä 2012).
Warranty liability to Contractor	collaborative approaches that include inclusive decision making, open book accounting, risk-reward sharing, open communication, and joint team building activities (Koolwijk, et al.2020). Can ease legislation compounded tension between the parties and particularly the owner confidence in the contractor.
Maintenance responsibility to the Contractor	DBB&M contract have integrated maintenance clause that include operations support, outsourcing and other types of services that relate to operating or developing the existing installed base (Kalsaas et al. 2020).
Operational responsibility for the Contractor	Operational responsibility relational elements in the form of business relationships fosters trust and understanding between the parties (Pertti Lahdenperä 2012).
Guides for upstream and downstream contractual relationships	The literature describes project as omniverse with down and upstream networks and contractual relationship that emphasize the dynamism of the project, interactions, interrelations, and continuous risk assessment by updating and scanning the continuous changing environment of the project (Blomquist et 2007).
Project goals beyond Time-cost quality	The success of project depends on the combination of effectiveness and efficiency. Efficiency and effectiveness are not the same thing. Efficiency is defined as the ability to accomplish something with the least amount of wasted time, money, and effort or competency in performance. Effectiveness is defined as the degree to which something is successful in producing a desired result Blomquist et 2007). Project should be value-based that essentially hinges upon a quantification and explication of the proposed value (Aarseth et 2007).
Letter of intent (i.e., use of temporary agreement that regulates conditions for a phase / open book intention) 1 step vs. 2 steps	project management is not universal and adapting project management styles is critical to project success. In relational contract format stakeholder value creation dominates over resource-based value creation. Temporary relational approaches may include informal alignment of goals and agreements outside

	the contractual setting as well as the more formal structure of relational contracting (M.B. Jelodar <i>et al</i> 2016)
Partnering charter / target document	Trust is expected to emerge and grow, when a party is known to reliably make good faith efforts, to behave in accordance with prior commitments and does not take excessive advantage of an exchange partner (Weele 2019, p 371)
Sub-contractor, consultant, and architect in the partnering group	Relational project delivery arrangement such as IPD emphasizes early involvement of a broader group of subcontractors (and subconsultants) who are practically essential to project success (Lahdenperä 2012).
Target price or maximum price (division of bonus / malus - percentage division, interval, involvement of sub-contractor and designer, in planning phase / in construction phase or in both)	The success of fixed price contract depends on high degree of certainty. In the target and maximum pricing, the owner and the contractor share the savings or the overspend (pain/gain). This reduces opportunistic behaviours and create ownership for both parties. The art of target price is the ability to initiate a contract where all parties are somehow dissatisfied, but everyone can agree on the scope to deliver within the agreed cost and timeframe, which are described in the contract and which all parties are willing to sign and mutually committed to its fulfillment (Johansen and Malvik, 2020).
Open or close book	Open books improve transparency, and deepens collaboration between public owners and contractor, but should be proportionately implemented in a way that depends on risk level and complexity of the contract (Codex Advokat 2019).
Incentive program (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Relational contract form consists of incentive and behavioural parts. The incentive part act as the motivator for value and opportunity management, and the behavioural set up a working environment that supports and creates possibilities for managing opportunities by integrating different parties (Hietajärvi <i>et al.</i> 2017)

Table 26. Collaboration means in the contract corresponding with theories in the literature

Identified relational collaboration means in project operating system	Theoretical collaboration means in the literature that support the case projects perspectives
Target value design / delivery (Detail Design on production needs)	Target Value Design (TVD) strategy and process offers designers an opportunity to engage in the design conversation concurrently with those people who will procure services and execute the design. It focuses on designing based on the articulated project values, which become design criteria rather than mere aspirations (Thomsen <i>et al.</i> 2009). Target value management practice drives design to deliver customer values and develop design within the project constraints. Translating the unmet needs of

	a customer to value added insights allows for creative solutions (T. Blomquist, T.L. Wilson 2007).
Outreach communication approach (instead of reactive)	open a dialogue between the public owners and contractors enhances the development of optimal solutions (Buccino et al 2019).
Rules for change management (transactional vs. relational)	In relational collaboration-based contracts, trust is the ultimate relationship enforcement level, while the behavioural pattern influencing relationships is meant to evoke mutual trust which drives social principles and acceptance of certain practices as a general strategy, to achieve relational arrangements (M.B. Jelodar <i>et al</i> 2016).
Use of Key Performance Indicators	Public owners in the construction industry are not often the end users of the constructed artifact. project with high socio-economic profitability is prioritized over those with low socio-economic profitability. This philosophy provides a strictly rational reasoned order in regard to how to prioritize public projects (Nyeveier 2021). In relational contract stakeholder value creation dominates over resource-based value creation and this shift project KPIs framework (Hietajärvi <i>et al</i> 2017). various qualitative key performance indicators are also included in the reward system and the values they show influence the payments made to the service providers (Lahdenperä 2012).
Identity building around the team	A no-blame culture can be described as an emergent state that stems or emerges from collaboration in a team. It influences the effectiveness of a team. A no-blame culture is an important condition for cross-functional design teams to become effective in integrative project delivery methods used in the construction industry (Koolwijk et al. 2020). Bringing the key constructors together with the owner and the designers from the early stages of the project allow the major players to develop a much higher level of common understanding of the project (Thomsen et al. 2009)
Conflict Resolution Mechanism - Transactional vs. Relational (PRIME / Dispute Resolution Board, Broker, Conflict Resolution Ladder, etc.)	Relational project delivery arrangement practice, leads to collaborative, joint decision-making in projects by various management bodies including representatives of each collaborating party this reduces surprises and conflicts (Lahdenperä 2012).
Facilitation of systematic learning / experience transfer (Communities of knowledge and Communities of practice)	Value creation in the design process is characterized by iterations and strong reciprocal interdependencies where the design is gradually matured through learning (Kalsaas & Moum,

	2016). This is an apparent part of the learning process where the actors need abilities such as concrete experience, reflective observation, abstract conceptualization, and active experimentation to mature the design, since learning is a major process of adaptation (Kolb, 1984, p. 30, 32).
Visual operation and management (included in Last planner / involving planning)	Visual operation and management promote relational commitment based on Leans pull principle where parties i.e., project owners, contractor, and sub-contractor plan and execute together (Kalsaaas 2017 p, 42). Last Planner System (LPS) is an effective tool to improve the planning reliability and the project performance (Olano et al 2017).
ICE - Integrated Concurrent Engineering (detailed engineering with partial deliveries)	ICE generates co-located active design and planning where the project team coordinate physically to do real time design work (Aslesen & Bølviken, 2017, p. 138). The purpose is to gather all relevant fields of competence with the executive actors of a project, to enhance collaboration, trust and understanding between the actors. ICE enables mutually adaptive reciprocal interdependencies management (Kalsaas, Grindheim, & Læknes, 2017, p. 178). ICE leads also to a considerable reduction of designing time and cost by encouraging the actors to adopt a more concurrently working approach by exploring multiple solutions, eliminating less feasible choices over time (Ballard 2000).
Joint server and computer systems in the project	A vision for integrated computer system ensures a streamlined flow of information that allows parties jointly to address deviation and risk related activities which will reduce cost and lead time. This approaches also offer great opportunities for project organizations to generate novel solutions and develop practices (Hietajärvi et al 2017)
Smooth and Transparent information flow	Collaborative construction project arrangements have been identified as alternative solution to tackle the frustration felt toward the opportunism inherent imbedded in the traditional project delivery methods that lack transparent of information flow (Pertti Lahdenperä 2012).
Thematic workshops along the way (in addition to structured ICE meetings. Ex. Collaboration meetings and uncertainty analyzes, etc.)	projects often include external factors such as customers, suppliers or partners, and these contextual forces may lead to tension between internal and external demands which eventually demands proper stakeholder's management (N. Arvidsson 2009)

Table 27. Collaboration means in the operating system that improve schedules, increase productivity, & quality

Identified collaboration mean in organization of design and production in the case projects	Theoretical collaboration means in the literature that support the case projects perspectives
Joint management of the project (Project Governance Body)	collaborative characteristics in relational based contracts include inclusive decision making, open book accounting, risk-reward sharing, open communication and joint team building activities (Koolwijk et al 2020) project partnering (PP) focuses on delivering major capital assets where the owner and non- owner participants work together as an integrated, collaborative team in good faith, acting with integrity and making unanimous, best-for- project decisions, managing all risks of project delivery jointly, and sharing the outcome of the project (Pertti Lahdenperä 2012).
Integrated teams in project development	Another important distinguishing feature in relational contracts is the extent to which consensus amongst the project owner and contractor drives a sink-or-swim together mentality which results in a no litigation contract clause in alliances (Walker and Lloyd-walker 2012). In the early phases of project, the inter-organizational processes may create a creative chaos developing new ideas of buildings and constructions.
Rules for management (transactional vs. relational)	Transactional management focuses to avoid disputes and its driven by transactional contracting perspective build on formal framework that attempts to predict in detail uncertainties future interactions (Turner & Keegan, 2001)
Speed-dates (team development and mutual evaluation)	Time is increasingly seen as an important and limited organizational resource that must be used efficiently. This pressure affects team development in both temporary and permanent organizations and may create tension and pressure to perform for everyone involved (N. Arvidsson 2009).
Facilitation of systematic learning / experience transfer (Communities of knowledge and Communities of practice)	“While learning away from work can be rewarding, the scope for learning within the work environment may be greater than people realize, even though the former is structured, and the latter is not” (Belbin, 1994). identification of the project type prior to execution should provide a basis for a proper adaptation of managerial attitudes and management style, for the selection of project managers and project team members, for establishing the proper project organization, and for a better choice of managerial tools (Shenhar <i>et al</i> 2004)
Co-location of the partnering group	Intra and inter Organizational culture such as competence, team spirit, communication, and possibility for reflection, as well as organizational support and interest have been identified as the most influential factors in terms of enhancing the management of opportunities (Hietajärvi et al 2017)

Start-up meetings	Start-up meeting can be initiated through ICE meetings to gather all relevant fields of competence with the executive actors of a project, to enhance collaboration, trust and understanding between the actors. Startup meetings are mutually adaptive to manage reciprocal interdependencies (Kalsaas, Grindheim, & Læknes, 2017, p. 178).
Standardization (of materials or embodiments)	Workflow is more important in the construction industry as it challenging to reduce variation. One of the methods to achieve is the implementation of workplace standardization (Kalsaas, 2017 p 220-221). Standardization of process and materials enables the workers to work productive and with high safety rate (Klakegg 2017 p, 422)

Table 28. Organizational Collaboration means that could be transformed into contractual relational elements

5.2. Analysing the analytical model

Relational collaboration means identified in the case projects are analysed here and given numerical criteria to enhance understanding. The tables below present a matrix of relational collaboration approaches identified in the projects case studies. These approaches are mutually implemented in the target projects. The approaches were classified according to the analytical model above in consideration of the level of integration of collaboration means. In the tables the project phases are presented in their abbreviation letter as Di (development phase), and Co (construction), and colour codes are also used to differentiate extensive collaboration means implemented in other phases than those noted here. The ten case projects considered in the thesis are presented in the first row, while the elements presented in the first column are deployed as dimensional collaboration instrument used to critically consider if they have anything to do directly with relational collaboration aspects of the contracts used in the cases presented. The elements in the first column are presented sequential from contract strategy to operating system. In column two of the tables, awarding criteria is generated for elements presented in the first column. The awarding criteria 1 stands for relational collaboration element identified in the case projects which is coherent with the relational collaboration means described in the first column.

Table 29. presents the condition in the contract strategy that might have been included in the actual hard/formal contracts documents. These conditions include pre-contract relational collaboration arrangement like BVP and ICE. The denotation Di and Co as mention above stands for project development phase and construction phase respectively.

Case Project	E6 Helgeland Nord		E6 Helgeland sør		Rv3/Rv 25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandal by		E6 Kvithamm ar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co
No. Formal relational elements	4	7	6	5	8	0	9	1	9	11	12	4	11	6	12	7	14	2	6	0
No. Informal relational elements	11	2	8	4	5	11	1	11	14	11	5	8	11	3	15	9	15	0	0	0
Total	15	9	14	9	13	11	10	12	23	22	17	12	22	9	27	16	29	2	6	0
Conditions in the contract strategy that might have been included:	Criteria used to give 1.																			
Award criteria	1		1		1		1		1		1		1		1		1		1	
Contract form (BVP)	1		1		1		1		1		1		1		1		1		1	
Early contractor involvement ECI	1		1		1		1		1		1		1		1		1		1	
Form of contract (Incentives)	1		1		1		1		1		1		1		1		1		1	
Contract provisions	1		1		1		1	1	1		1		1	1	1					

Table 29. Observed and recorded collaboration means in the procurement phases of the case projects in the document

In table 30: colour coding is used instead of just numbers on showcasing the commercial relational collaboration elements that can be incorporated into the contracts actual document. The focus here are relational elements that support collaboration which can reduce opportunistic behaviours and suboptimization. Relational collaboration elements in this phase, stresses the importance of a chieving joint and a better method of managing risk and opportunity.

Case Project	E6 Helgeland Nord		E6 Helgelandsør		Rv3/Rv 25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandalby		E6 Kvithamar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co
Contractual relational elements	4	7	6	5	8	0	9	1	9	11	12	4	11	6	12	7	14	2	6	0
None-contractual relational elements	11	2	8	4	5	11	1	11	14	11	5	8	11	3	15	9	15	0	0	0
Total	15	9	14	9	13	11	10	12	23	22	17	12	22	9	27	16	29	2	6	0

Commercial instruments	Criteria used to give 1.	E6 Helgeland Nord		E6 Helgelandsør		Rv3/Rv 25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandalby		E6 Kvithamar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
Multi-party contracts	Measures to promote the relational, red sub-optimization															1		1			
Remuneration approved offer	Promotes trust in relationships during contracting	1			1						1				1						1
Operational responsibility for the Contractor	Feedback loop, promotes trust and commitment	1					1			1											
Guides for upstream and downstream contractual relationships	Framework condition for cooperation in the value chain if it promotes relational aspects	1						1		1				1					1		
Project goals beyond Time-cost quality	Greater focus on business and societal goals requires more collaboration								1			1		1				1			1
Letter of intent (i.e., use of temporary agreement that regulates	Promotes the relational	1			1				1			1		1					1		

conditions for a phase / open book intention) 1 step vs. 2 steps											
Partnering charter / target document	Promotes the relational	1	1	1	1	1	1	1	1		
Sub-contractor, consultant, and architect in the partnering group	Promotes the relational			1	1			1		1	
Personal replacements rights	Monitoring power	1	1	1	1	1	1	1	1	1	1
Right to replace the sub-contractor	Joint dialogue and decision making					1				1	
Target price or maximum price (division of bonus / malus - percentage division, interval, involvement of sub-contractor and designer, in planning phase / in construction phase or in both)	Target price which in TVD is a relational approach		1		1	1	1	1		1	
Open or close book	Open book build trust			1	1	1	1	1	1	1	1
Incentive program (Key	Given 1 if the incentives					1					
Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	reward cooperation		1		1	1	1	1	1	1	1
Sub-contractor, consultant and architect included in the target price	Promotes the relational				1			1		1	

1 Relational elements at development phase

1 Relational elements in the construction phase.

Table 30. Observed and recorded collaboration means in the contracting phases of the case projects in the document

Table 31 present the organizational criteria that support confidence and collaboration between the project owners and contractor. Openness and inter-organizational collaboration philosophy play important role in organizing. The collaboration means identified in this section emphasize the essence of trust development that leads to decentralized collaboration mechanism between the parties at organizational level, project team, and between the workers on the ground and their leader. Important to note contract walls exist between the parties but it is characterized as transparent.

Case Project	E6 Helgeland Nord		E6 Helgeland sør		Rv3/Rv25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandalby		E6 Kvithamar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co
Contractual relational elements	4	7	6	5	8	0	9	1	9	11	12	4	11	6	12	7	14	2	6	0
Non-contractual relational elements	11	2	8	4	5	11	1	11	14	11	5	8	11	3	15	9	15	0	0	0
Total	15	9	14	9	13	11	10	12	23	22	17	12	22	9	27	16	29	2	6	0
Organization (Design and Production)	Criteria used to give 1.																			
Pilot / signal / development project with extra support / attention	Promotes relational																			
Long-term horizon of the parties	1 if the perspective is collaborative. Necessary?																			
Joint management of the project (Project Governance Body)	1		1		1						1		1		1		1			
Integrated teams in project development	1		1		1		1	1	1		1		1		1		1	1	1	
Speed-dates (team development and mutual evaluation)									1	1										
Facilitator (driver to promote flow)																				
Co-location of the partnering group / (design group)	1										1		1		1		1		1	
Start-up meetings	1		1	1		1		1		1	1	1	1		1	1	1			
Standardization (of materials or embodiments) with partial deliveries)	1		1	1		1		1		1										
Industrialization (of product)	Promotes relational																			
																	1			

1 Represent relational elements in the precuring phase

Table 31. Intra and inter-organizational trust building collaboration means that can be included in the actual contract

In table 32. combination of colour coding and numbers are used to highlight particular collaboration means. Operating system supported by technology that promote practical relational collaboration in the project delivery is identified as significant in the table. BIM and visual design management are among the collaboration means acknowledged here that help coordinate the design efforts of multiple disciplines and allow for more automated and facile estimation of schedule and cost.

Case Project	E6 Helgeland Nord		E6 Helgeland sør		Rv3/Rv 25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandalby		E6 Kvithamar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co
No. Formal relational elements	4	7	6	5	8	0	9	1	9	11	12	4	11	6	12	7	14	2	6	0
No. Informal relational elements	11	2	8	4	5	11	1	11	14	11	5	8	11	3	15	9	15	0	0	0
Total	15	9	14	9	13	11	10	12	23	22	17	12	22	9	27	16	29	2	6	0
Operating system	Criteria used to give 1.																			
Target value design / delivery (Detail Design based on demand in the team and based on production needs)	Measures to promote the relational, red sub-optimization																			
Outreach communication approach	Promotes trust in relationsh																			
(instead of reactive)	ips during contractin g																			
Rules for change management (transactional vs. relational)	Relational : Joint decision-making																			
Use of Key Performance Indicators	Collabora tive KPIs gives 1																			
Identity building around the team (for example own logo)	Promote relational approache s																			
Conflict Resolution Mechanism - Transactional vs. Relational (PRIME / Dispute Resolution Board, Broker, Conflict Resolution Ladder, etc.)	Promotes the relational																			

6. Relevant experiences and findings

6.1. Resulting approaches

Document of the research study found the use of in-house construction experiences to implement elements that promotes relational collaboration means. The approaches also include integrating contractor's construction expertise and knowledge into the front-end of projects in the form of early contractor involvement ECI. Competitive dialogue CD and best value procurement BVP. These elements are acknowledged as value adding collaboration means. The awarding criteria 1 were used as an indicator for the presence of these collaboration elements in the different phases of the case projects in the document study. The total tally of criteria 1 is given in the third, fourth, and fifth row of the tables presented in chapter 5. There is fewer relational element discovered at case projects running in fully transactional contract framework than other case project with some sort of relational contract format. According to the theories in the literatures, most of the collaboration means that are identified in the document study could have been implemented earlier than later phases of the projects. In table 33. the letter X present already implemented collaboration means in the case projects that are studied in the document study, while the letter P represent potential Collaboration means that could have potentially be implemented which in return would have enhanced value adding collaboration between the parties.

	Phase 1 Acquire	Phase 2 Development	Phase 3 Construction	Phase 4 Operations			
Business development	Feasibility	Concept development	Pre-engineering	Detailed Engineering	Realization & delivery	Completion and Handover	Operation and maintainance
BVP, CD, ECI, PPP	P	X			X		
Lean construction principles	P	P			P		P
Multi-party contract form	P	X			X		
Joint opportunity & risk management	P	P			P		P
Project sustainability	P	X			X		P
Informal value adding collaboration	P	X			X		P
Inter-organization project portfolio	P	P			P		P
Innovation and learning		P			P		X
service-enhanced	P	P			P		X
Sleeping relationship		-			-		P

Table 33. Potential vs implemented collaboration means among the case projects in the documents

6.2. Project characteristics and relational implications

The execution process of project from project owner’s perspective tends to replicate similar sequential steps as show in figure 23. Different and significant relational collaboration approaches are introduced in these different phases of project execution. The intensity and diversity of the relational collaboration at the organizational level are determine by the project characteristic and the underlying possible implication.

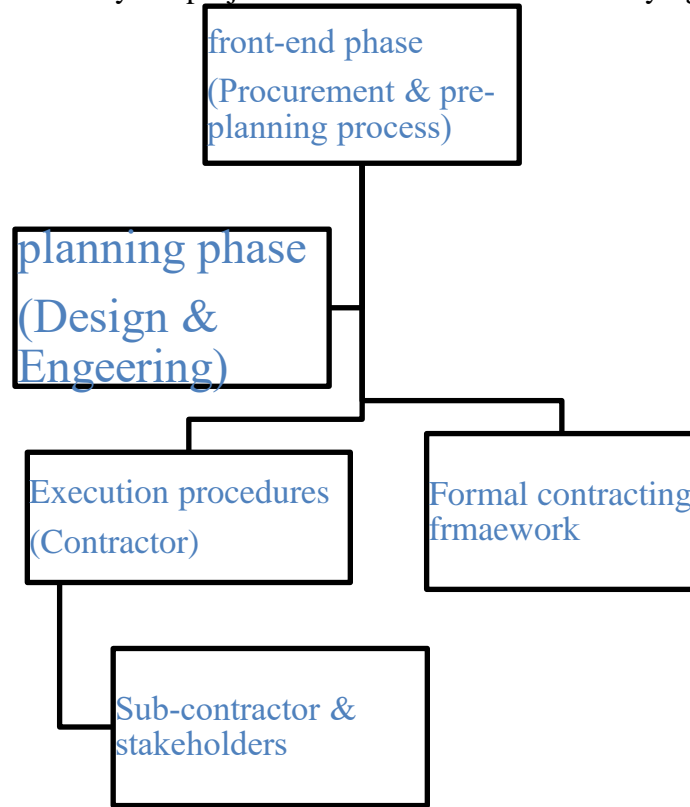


Figure 23.. Illustrates the process of project delivery from project owner’s perspective

The empirical data shows that the project characteristics leads to practical implication which are denoted as negative implication. However, experiences noted in the case projects in the document validated that, different levels of collaboration engagement counteract the effects of these implications and eventually allows team to explore, develop a shared understanding and document both the “current state” of how a project operation is performed and the “future state” of the project once that process has been optimized. Table 34. summarizes possible practical implication resulting from distinguishable project characteristics and possible collaboration mean to counteract. The project characteristics presented here are obtained out of the description of the case projects in the document study, while the implications are hypothetically developed in the thesis.

Project characteristics	Hypothetical Implication	Level of informal Relational engagement
High level of technological complexity involved in the project	Difficult to obtain information Difficult to handle obstacles encountered	Reliable, & high level of supplier, contractor, and client
High level of involvement by various parties	Difficult to communicate or resolve conflicts	Joint server, sink-or-swim together mentality, no-blame culture

Weak technical background or lack of expertise and experience in project team	Difficult to deal with unexpected events	Early contractor involvement, visualization & transparency
Public owners are undertaking many similar projects simultaneously	Tight financial situation	Deploy CD, BVP, PPP,...
Benign environment with little external stakeholders' interference, flexible regulations, and favourable economy	More project execution flexibility More financial resources and time buffers	Facilitation of systematic learning / experience transfer (Communities of knowledge and Communities of practice)
Tight project schedule	Little time slack	Speed-dates (team development and mutual evaluation)
Large project scale	High expected project risk loss	Integrated teams in project development. Joint risk & opportunity management team.

Table 34. Present project characteristic with possibly underlying implications

6.3. Intervention point

Project have different phases, the idea phase, the planning phase, and design. These three phases fall under the time-geographical frame-line of preplanning and planning phase of projects. The empirical data emphasize the importance of implementing relational elements at the interface of pre-panning and planning phase of projects to enhance a contract form, designed around a non-adversarial legal and commercial framework with elements of value creating collaboration at the contracts` level. The graphical presentation of the relational collaboration elements in chapter 5 indicates that there more relational collaboration approaches in the development phase of the case projects than in other project phases. Figure 24 extracted from the document study advocates for this understanding.



Figure 24. Illustrating project intervention point (preplanning and planning phase) (Document study)

6.3.1. Why this intervention points important?

In order to understand the importance of this particular intervention point demonstrated in figure 24. The thesis reflects back the metaphorical analyzation of figure 8. where (Walker and Lloyd-walker 2012) analyses the project lifecycle from a human development perspective. In their analyzation (Walker and Lloyd-walker 2012) suggest that various intervention points in project Lifecyle, can be seen as project embryo, nurturing and sustenance measures where the project is actively shaped and influenced through access to valuable external resources at the stages, so that the best possible outcome at birth is encouraged. In this analyzation project front-end phase is identified as the optimal invention point as later intervention may not result to the desired effect.

7. Discussion

7.1. Public owners and contractors' interaction interface

The thesis resulted in an understanding of how Relational type, operational strategy and organizational aspects (i.e., the project owners own unique attributes) influence and are influenced by the specific industry.

The conceptual model of determinants of effective product development processes in the process industry is in this thesis applied as inspiration when analysing how new public infrastructures can be developed. Construction processes consist of actors belonging to different organizations (Kalsaas et 2020). In the process industry the collaboration among different actors from different companies and organizations is described by inter-organization processes. Inter-organization processes could be identified when working in the early phases of the project and the entire building processes with different actors from different organizations with different interests. The literature considers these inter-organization processes an important factor that can lead to a creative chaos of developing new ideas of building and construction skills that evolves from relational based collaboration.

At the marketing level, the project owners and contractors have different view on project life cycle. From project owner's viewpoint, project life cycle consists of conceptualization, planning, execution, and termination, while contractors perceive project life cycle as, search, preparation, bidding, negotiation, implementation, and transition. These conflicting viewpoints create different time geography for the project owner and contractor. Element that promotes relational collaboration approaches in constructions contracts merges project owners` and contractors' viewpoints and interest. The relational collaboration approaches help the parties to focus on instrument that generate value for the end-user (customer). Having end-user focus means shifting from a goal of profit maximization to a goal of optimizing the utilization of sources to provide superior service to the end-user. This includes to maximize the value of customers project by meeting the jointly agreed project goals (Cova & Salle 2005).

From a time-geographical perspective the empirical data indicate that owners` requirements may be analysed, based on how internal and external stakeholders articulate value creating collaboration in the early phases of the project. Stakeholders' interests fluctuate between phases until the construction project and procurement agreements are settled with the contractors. By opening the processes through a time-geographical perspective, these can be visualized and integrated and thereby show the complexity of value creating collaboration in public procurement processes. Case projects like E39 Mandal east- Mandal city and Kvithammar-åsen are both most advanced and innovative projects that are exceptionally based on the principles of integrated project delivery (IPD) methods. In these project suppliers are involved as early as in the preparation of zoning plans and project conceptualization process to generate trust and deeper relationship between the parties that are based on commitment and project success. Despite of the agency for relational collaboration development, these case projects rely on financial reward and penalty provisions driven motivation to meet the goals of the projects.



Figure 25. Aerial view of case project Mandal east-Mandal city (Google)

7.1.1. Building trust through Strategic briefing

Public owners build public infrastructure that are considered as national assets. The relational interaction between the public owner and the contractor must be founded on the interest of the public users. To achieve this, public owners have obligation over the contractor`s professional behaviours and can therefore conduct extensive background checks to ensure the contractor fully committed to the project in good faith, with integrity and contributing to actions that are solely best for the project (Riksrevisjonen 2019). These actions could include deeper understanding of how public owners identify, develop, and transform end-user needs into a strategic written brief, create stakeholder value within the project, its environment over time. The project owners on the hand should encourage contractors` knowledge, expertise, and experience to be adopted in early phases of the project, directly or indirectly (Wondimu et al 2016).

The empirical data from the document study shows that the public owners` capability to develop a new vision for the project and to find new functional solutions during the early stages of the project has an impact on developing end-user value, which has practical influence on the physical and social environment of the public project. When developing ideas, the public owners benefit from developing a strategic brief, where end-user needs are streamlined throughout the entire phases of the project. This would shift the focus from resource-based value creation to end-user value creation. It is important to note that public project owners act as representatives of the needs of the end-users. The relational collaboration approaches developed during the project life cycle are aimed to avoid uncertainty which could lead to adversarial relationships during the project life cycle. The inclusion of value-based relational briefing as a method for identification and evaluation of effectiveness and sustainable functionality and technical specifications, help the parties to develop a transparent business relationship that benefits both the project owners and contractor in the short- and long-term visions.

Experiences in the document study further emphasized front-end management as a key to have good influence on relational dimensions, both in-between project and during project, hence reducing the total costs of the project. Moreover, using more resources in the early planning phase of the projects, diminishes the need for implementing amendments in the later phases of the project when it is much more expensive. This is due to the cost of amendments is at its lowest and the uncertainty is at its highest, in the front-end phase (Lahdenperä 2012). The earlier the contractor including the architect and designer are involved in the

planning of the projects, the more likely they can positively influence on pushing for addition amendments earlier in the planning phase, at a lower cost than if they are not involved in the planning.

7.1.2. Jointly constructed project

The document study emphasizes the importance of public owners of exploring the possibility of modifying the project and engaging openly with the contractors on proposes to go even further in co-creating and co-constructing the project with the contractors, designer, and other important stakeholders before contract articulation. This enhances collaboration based joint construction approach which further helps the parties to forge flexibility and reciprocity in their mutual benefit. The major implication of discontinuity in project is a potential lack of owner-supplier bonding. Unlike relational collaboration-based construction project deliver method, traditional construction projects are comprised of many two-party contracts that create a vertical chain of relationships that flow back to the owner, but do not interconnect project participants across contractual lines (Thomsen et al. 2009). Relational elements like BVP, ECI, and CD are referred in the document study as key collaboration instruments to wage and build mutual trust between the parties, and delegate responsibilities to the suppliers in the front-end phase of the project. To gain the benefits of BVP, ECI, CD, and PPP the literatures advises, contractors should be selected at a stage where they can exert real influence on the project. Evidence from the document study shows some case projects included BVP element such as the use of open budget with ceiling which allows the parties to know in advance the probable cost of the project which create room for economic incentives. There were also challenges related BVP which were visible in document study. This include the project owners lack the mechanism to measure if time and cost have been saved in the procurement process. Competitive dialogue (CD) is another value-based procurement process identify in the empirical data from the document study. Traces of All the five phases of CD (preparation phase, pre-qualification phase, dialogue phase, evaluation phase and project execution phase) have been mention in the document study. There was parallel research of CD conducted on some of the case project in the document, they include Helgeland Nord and South. The owners claimed that they have acquired innovative, value-adding, and improved solutions in the case projects (Wondimu et al 2018).

When it comes to early contractor involvement ECI, the method looked more familiar, as the empirical data reveals that there is wider potentiality for ECI in all the case projects in the document study. Experience with early involvement of contractor in the documents study pinpoint in different directions. Some of the contractor in the case projects believe that they should participate in the regulation phase of the project to ensure better constructability solutions, taking into consideration the owners value creation perspectives. Others signal that the owners should first conclude the regulation phase and land acquisition processes before involving the contractors. Case projects where contractors were involved very early in the project with equal responsibility for both planning and executing the project has delivered better results than the later choice. The project owners also reveal that they use ICE meetings to come up with multidisciplinary based solutions. Decision-making mechanism initiated through ICE meetings are designed to reach a consensus to a great extent. The ECI meetings brings together different actors operating at different geographical levels and where the individual organization or actor lacks the resources or power to act alone and implement the desired changes without collaborating and co-creating knowledge with the other actors.

7.2. Owner-Contractor Relations

7.2.1. Choice of contractual instruments

The framework of construction contract can be founded either on transactional or relational. In the transactional contracts, the project owners decides unilaterally and in principle the scope of the project and monitors the result, while the contractor only delivers the project asper the owners' specification and within the cost and agreed timeframe. The framework of transactional contracts could be described as rigid and hardly incorporate dynamism and contractor involvement. The lack of relational collaboration mechanism in

transactional contract leads to mistrust and gray areas in the contract document. This often leads to contractual dispute which can eventually escalate to legal hurdles. The literature emphasizes that integrated project delivery methods which are based on relational collaboration such as project alliancing, often set policies and procedures that promote no-blame-culture, however, standardize relational arrangements also may have opposite effects. This raises the question whether all relational collaboration elements can be included in the contract formal document and standardized or whether they should remain non-contractual element as it is in most scenarios? The analytical model presented in this thesis make a point of relational collaboration stages and transition areas or incubation periods. When the maturity level of the relational collaboration arrangement increases the trust and commitment increases as well. Hence more relational collaboration element can be included in the contract document, thus the employment for a collaboration contract based on elastic and transparent boundaries that operates on swift flow of information, and technical sharing. Such contract even encourages fundamental assumption that risk and uncertainty should mutually be addressed continually throughout the project life cycle.

(M.B. Jelodar et al. 2016) reflects that relational collaboration arrangement consists of non-contractual alignment of goals and agreements outside the contractual setting as well as the more contractual structure of relational contracting. The empirical data indicate the successful relation arrangement require redefining the working relation between the project owners and the contractor. Traditionally, there working relationship start with acquaintance and commencement of projects, but the notion of relational contracting call for mutual planning and relationship development at the conceptualization level of the project front-end phase. Early relational building helps the parties to build trust. This is because trust cannot be mandated or enforced through a set of regulation but needs to be earned. Trust is realized through fulfilling commitments (Thomsen et al. 2009).

Experience in the document study shows that clear communication between the parties, feedback loops, and team interaction intimately facilitate the development of trust and higher commitment. The model developed in chapter 4 considers these aspects in a relational maturity level dimension between the owners and the suppliers. In the maturity level ladder, there are incubation periods through transition. In this transition period the relational interaction between the parties is in the process of evolving to a new height or level. The transition periods occur between projects or between project phases where the owner and supplier normally reflect their relational performance in the previous project or project phase. Successful performance generates more relational collaboration arrangements to be integrated into the contract document.

7.2.2. Contractual collaboration means

Parties in construction practically incorporate certain non-contractual collaboration means which are not formally indicated in the contracts` hard documents. Cases in the document study are trying to understand why these non-contractual collaboration elements are considered important by the parties in the construction. In general, it is understood that working relationships are formally orchestrated through contracts; nonetheless arrangements such as partnering recognize that difference and even divergent goals of parties need to be met and aligned, in order to achieve desired strategic outcomes that benefits all parties.

The concept behind the research in the document study was to give an increased understanding of the evolving Norwegian contracts pattern in the construction industry and its implication for activities concerning public and private project delivery methods. The document study investigated non-contractual relational elements that could be practically included in the formal contracts. These collaboration elements advocates for a powerful collaborative working culture that signifies the importance of teamwork, two-way communication rout, and joint decision-making concessions. Project owners and contractors need sometimes more than just trust to overcome unforeseen events. Moreover, the level of maturity and professionalism in application of collaborative and relational collaboration approaches in the construction industry particularly in Norway is far from its optimal point. These factors together with lack of experience and legal hurdles related to the procurement process and contracting, compels the project owners and the contractor to engage in back-stop plans that limits the benefits of relational approaches. The backstop is monitoring measure that

the owner like to implement to assume authority, but this may have implication on the trust level between the parties (Högnason *et al* 2019).

7.2.3. Value adding non-contractual collaboration means.

What kind of non-contractual relational collaboration elements in contract create value for clients, contractors, and end-users, i.e., for society, the municipality, and users? One approach used in the research in the document study was to understand the complexity of ongoing contract processes over time as a key factor in identifying value adding activities in the eventual building processes. However, value adding activities are difficult to analyse especially when related to resources that have an immaterial character, e.g., knowledge, know-how and social relations (Bröchner 2009, p. 21). Immaterial resources are difficult to identify and measure. The characteristics of immaterial resources and how these resources are developed are according to the resource-based view in the theory chapter is about creating unique resources and dynamic organizational capabilities, difficult to imitate and replace. The industry and the context of the studied processes in terms of technology strategy and organizational issues are therefore important to consider when developing a relational contract meant to improve value creation instrument in the construction project. Furthermore, non-contractual value adding activities demand that actor to be equally valued and their dialog needs to fill the democratic dialog criteria that encourages the role of the actors to be equally subjected to discussion (Karlsen and Larren 2014 P.144). This pushes the actors outside of their comfort zones and propels them to cogenerate and accept others may have the better arguments. It is clear in the empirical data, that non-contractual relational collaboration elements add significant value to the project complex activities. Culture plays important role in the level of non-contractual acceptance level between the parties. In Norway and the Scandinavian at large, the non-contractual collaboration arrangement between the parties are regarded more productive due to cultural norms and expectations of good will in the society.

7.2.4. Efficiency vs effectiveness

Relational collaboration approaches require the ability to execute. Collaboration means that are not executed as planned may eventually lead to inconsistent results and proxy for collaboration. Actors need to be efficient and effective in action and they should have a common understanding of the issue at hand and how it can be solved. Efficiency and effectiveness are not the same thing. Efficiency is defined as the ability to accomplish something with the least amount of wasted time, money, and effort or competency in performance.

Effectiveness is defined as the degree to which something is successful in producing a desired result (T. Blomquist, T.L. Wilson 2007). At contract management level efficiency could be the process of organizing and managing activities, resulting the production of a given output, inform of artifact with fewer resources i.e., lower cost, while effectiveness on the other hand emphasizes the importance of developing and producing better or new approaches of contract strategy management. These new approaches could be regulated in a contractual or non-contractual collaboration arrangement.

The observation recorded in the document study look closely the implication of similar creative activities on the collaboration between the owners and the contractors. Another factor that plays an important role is balancing the contractual collaboration means and non-contractual collaboration means. The project owners would like to assume some control, while the contractor prefer to transfer risk to the owner. These divergent interests create grey areas that limit the potentiality for relational arrangements. The common thread in the lines of relational collaboration arrangements is the recognition of efficiency and effectiveness being increased through the adoption of collaboration norms.

7.2.5. Joint budgeting

The empirical data shows that collaboration-based contract strategy and early contractor involvement can be combine with target price. One of the procedures is to determine the product of the project and then establish the lowest target price possible. Another option is to decide the target price and then maximize value creation. Setting the target price is challenging and it has implication on the project life cycle. The owner negotiates a target price that provide the highest value for many. Contrary the contractors negotiate for target

price that give them the opportunity to earn more money without conceding too much of their tangible and non-tangible resources to the owners. (Johansen and Malvik, 2020) emphasizes that the art of target price is the ability to initiate a contract where all parties are somehow dissatisfied, but everyone can agree on the scope to deliver within the agreed cost and timeframe, which are described in the contract and which all parties are willing to sign and mutually committed to its fulfilment. The ambition behind the target price implementation is to enhance economic incentives as exceeding profit would be shared among the parties. Another aspect in target price collaboration means is the concept of value driven contract strategy where the framework of the contract is design in a way that the focus shift to the scope of the project rather than over emphasizing the constrains of cost and time.

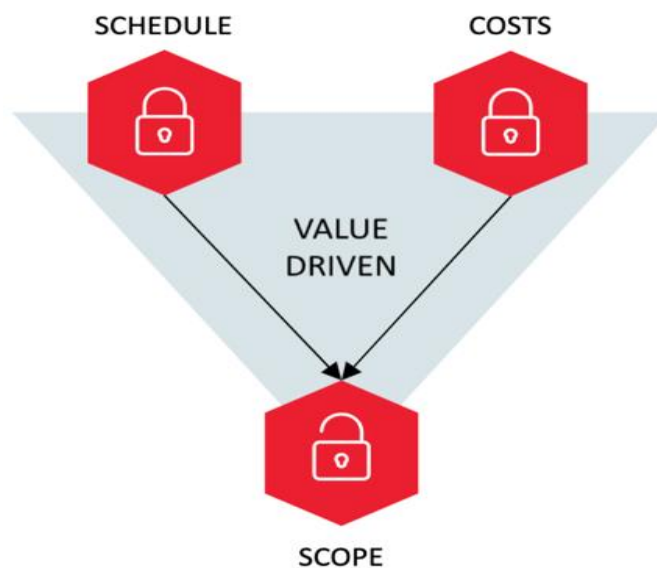


Figure 26. The framework of value driven contract strategy (Atanasijevic et al 2019)

7.3. Level of collaboration integration

Understanding the level of relational collaboration integration in a collaboration-based contract strategy is important. At the top level of the pyramid is the project owner and the supplier. The collaboration at this level has both the characteristics of professional and personal, where collaboration at this level happens between management-to-management (administrative), buyer-to-supplier (purchasing) and engineer-to-engineer (technical). The agreement reached at this level is implemented by the project teams at the lower level of the pyramid. The quality of the relational collaboration arrangement depends on the level of relational collaboration integration between the project owner as an organization and the contractor as an organization. Time is increasingly seen as an important and limited organizational resource that must be used efficiently in project management. This pressure tests the agility and resilience of the organizations and may create tension and pressure to perform for everyone involved. But there are also differences in the level of expertise and elasticity in various organization. In the context of construction project organizations, an environment with a no-blame culture where team member from various organization background such as electrical engineering, sustainable design and architecture have to closely collaborate and coordinate their actions across disciplinary and organizational boundaries to accomplish shared goals (Koolwijk et al. 2020). A major shift is to engage the team in collaborating context to define the problem, rather than critique a proposed solution.

When it come to the project lifecycle, as noted above it important to developed integrated relational collaboration arrangement particularly at the front-end phase of the project. Project alliancing, project partnering and IPD have clear policy and procedure in early involvement than the traditional Design-Bid-Build (DBB) where the owner has different individual contract with the designers, contractor, and sub-contractor. In the DBB approach, the contractor and sub-contractors are not involved in the design phase or rather activities in the front-end phase of the project. Therefore, when a problem arises, parties would not look for a solution, but try to put the blame on each other. This would foster a transactional mentality

amongst the project team members and acts as a barrier, and thus hindering close collaboration, and impeding the development of trust, and integration of activities.

7.3.1. Social and Organizational value

The collaboration means measured in the empirical data amplify those relational contracting approaches create contractual communities which embodies a fundamental assumption that unforeseen events are inevitable, and they must be resolved mutually between the parties during the project. The finding also indicates that public infrastructures have greater public interest which create stakeholders' and end-users' value propagation that can be categorized into human, organizational and social capital. Moreover, the project owners and contractors belong to organization which rely on the organization's project portfolio management. The portfolio is regulated in the framework of the organizations project governance model for allocating resources which is coherent with the size and magnitude of the project (Martinuso 2012). In the context of human, organization and social capital, the human capital in delivering project is a result of the actors' individual capability of taking decisions and performing the activities conducted during the idea, planning, design, and construction phases of the building project. The organizational capital is developed within the construction project by actors performing different value activities in inter-organization constellations, in knowledge, creating a goodwill value within the owners and contractors' firms, usable in coming construction projects. The social capital is developed based on the public owners' ambitions to create infrastructures with symbolic value and on the distinctive feature of having created future beliefs in the public sector. For instance, the Norwegian Public Roads Administration (NPRA) are responsible for all road construction in Norway and must thus have a set of standards, in order to secure that a road built in one region by one contractor is similar to a road built in a whole another region of the country to create a symbol of ownership and equality in the country.

On the other hand, the NPRA engages with external and independent professionals that are not members of the NPRA and contractors' firms. The purpose of engaging with this group is to support the NPRA in decision making regarding environmental and socio-economic consequences of choices and actions in the project. For the purpose of enhancing value-adding collaboration the committee consist of project owners, and users and other interest groups. The committee of road owners consist of municipalities, counties, and people responsible for regions. The other committee consist of interest parties, including both public agencies and other organizations with stake in the surroundings of the road, such as organizations covering the environmental, car owners, cyclists, disabled people and so on. The result from the document study shows through this organizational and social arrangement construction process of public infrastructure is an economic input, throughput, and output process where economic, social and organization value is created (Vegvesen 2021).

7.3.2. Operation and maintenance

Existing literature on industrial services recognizes that after-sales services are often one of the main profit generators for the supplier (K. Artto *et al.* 2008). Maintenance is a type of service that does not only refer to maintenance but also to operations support, outsourcing and other types of services that relate to operating or developing the existing installed base (Blomquist 2007). Hence maintenance services are extensive both in number and volume where the core projects deliveries no longer play an important role in terms of profitability. Results in the document study shows that case project like E39 Mandal East, implemented DBM contract form which provide maintenance clause in the contract provisions. This will give the owners and the contractors opportunity to develop ongoing business relationships which will foster trust and understanding between the parties. Developing the relational collaboration dimensions both in between projects and during the project will help practically the contractor to easily become attractive for emerging tender while the owners will feel secure to award their tender to partner, they trust. Data from document study indicates that project owners favour pre-qualified contractors to share and involve them in the conceptualization of their project. However, due to the procurement legislation of fair bidding project

owners are required to treat all contenders equally and without favour. There are no litigation consequences in maintaining sleeping relation during post project periods, as this will give the project owner the possibility for direct procurement in the future or develop clear and consist background information about the contractor they desire.

7.4. Success and Challenges with relational contracting

7.4.1. Success

Relational collaboration-based contracts have proven and delivered good processes, high efficiency, and artifact with high quality for the end-users (Johansen et al 2021). Collaboration means both contractual and non-contractual fosters organizational culture such as competence, team spirit, transparency, communication, and possibility for reflection as well as intra and inter-organizational support and learning. The results show that, although the high numbers of contractual relational elements provide collaboration, due to high level of trust between the parties, there were similar or higher numbers of non-contractual collaboration means employed in the project phases. This due to the fact that effect of these collaboration means is based upon a relationship of trust between the parties and which responsibilities and benefits are apportioned fairly and transparently. Among the success factors identified in the empirical data include the essence of joint decision making. Both the owners and the contractors exercised some sort of monitoring powers, although in general the requirement for unanimous decision-making is also presented. However, consensus may not always be reach on every decision, but parties were required to submit to the results of a majority vote.

Evidence in the document study reveals that collaboration-based contract strategies provide new form of project procurements, development, construction and operation relationships of coordination and integration of the performance of the project network actors in mega projects. Furthermore, the empirical data also incaves that these strategies support behaviours that improve work methods, manage uncertainty more successfully, and respond to challenges of project risk management, something that increases innovation capacity and improves value creation practises in intra and inter-organizational level.

7.4.2. Challenges

All is not well with collaboration contracting strategy. Relational contracting has legal and organizational culture challenges. In the Norwegian context there no national contract standards currently configured for relational contracting format. Much of the challenges evolves from power struggle between the parties. Open book arrangement is a common relational collaboration approach that project owner and contractor often implement. Open books allow the owner and the contractor to have full access to their books. This relational approach is somehow perceived impractical as the contractor do not charge more than what actual cost dictates and has no jurisdiction to pay for the owners' costs. This may convey an understanding that the owners are able to push through contract terms that are unitarily beneficial to them, and which do not provide any special benefits for the contractor. In this context, open books do not generate any incentives to cooperate more than the parties would have done under a normal contract standard. Owners consider monitoring as more costly than trust and a balance between the two extremes should sought by the parties before engaging in collaboration-based contract framework.

The provisions of no blame culture in relational contract strategy may backfire as the lack of liability may become a source for contradictions and conflicts and to the determination of the vulnerable system. This arises through weakly developed common strategy, weak coordination mechanism and organizational structures that impede flow and stable propulsion in production, a culture that can lead to individual actors sub-optimizing (favouring special interest before the project interest) and contract with incentive systems that limit relational collective behaviours.

8. Conclusion

The objective of this thesis was to examine value adding collaboration means that can be included in the formal contract strategy. The theoretical background on collaboration-based contracting format with regard to the traditional, national standard based contract suggest that concepts such as trust, commitment, and teamwork based on communication and collaboration are the main attributes of relational contracting system. The study aims to understand contractual collaboration means and non-contractual collaboration means by analysing them in the context of value creation and use of contract forms in support of the application of relational contracting in construction.

Accordingly, a simplified model that taking into consideration implemented contractual and non-contractual collaboration means in relation to the existing theories in the literature has been developed in the thesis. This model is further analysed, and respective relational element identified was given a standard criterion 1. Experiences and evidence from the document study are extensively discussed on to scope the issues that surround initiatives to promote a collaboration-based contract in order to validate the role and importance of multiparty and relationally based contract form like PA, PP, and IPD.

The adaptation of contractual and non-contractual relational collaboration arrangements in contemporary practice in the construction industry in Norwegian context engenders good faith and holistic perspective of the final outcome of the project. The normative elements that seem to be predominant in owner's supplier relationship that are relationally grounded as per the document study can be encapsulated as follow:

- Developing and complying with rule of procedure, with end-user and project focused relational collaboration arrangement structure with clear line of communication, roles, and duties
- Joint decision-making ability with possibility of democratically based consensus
- Incentives that focus on the project as whole to discourage opportunistic behaviours and short-term interest
- Clear direction on performance indicators
- Visualization and transparency
- Outreach mechanism with internal dispute resolution and proactive dispute avoidance framework

The cumulative proposition of the non-contractual collaboration means presented in the empirical data concurs that it is advisable for the owners and contractors to express their technically grounded obligations and relational practices in a detailed agreement in order to develop an effective relational driven contract strategy. Contract as defined in the literatures is understood as a legally binding agreement between two or more parties, it is therefore equally important to include non-contractual collaboration means in the contract with intention to create binding relation that are certain and not obtained under conditions of economic duress.

Finally, success and challenges related to the implementation of collaboration-based contracting system is been appraised with consideration of collaboration means like ECI, CD, BVP, and others like open books and target price. However, review of the of literature argues that the success and decline of collaboration strategy depend on the party's performance and their aim to generate ever-increased end-user value. In context with this thesis the public owners of the case projects under study are committed to the ambition of adapting modern project delivery methods, characterized by collaborative planning strategies on collective digital platforms and servers. Their willingness to integrate non-contractual collaboration means that are not practically proven before suggests that their approach is assertive and future-minded. Lastly, the coronavirus pandemic demonstrates how critical strategic relational collaboration articulated relationship between project owners and suppliers are important for valuing the extensive aspects of integrated project delivery alignment. The economical downfall in the transactional market and the restrictions of physical interactions due to the measures taken to reduce virus contamination has precisely elaborated the importance

of having shared and relationally driven uncertainty management approach that allow parties to operate on joint servers that helps navigate through unforeseen event like the current pandemics.

9. Future work

The research on some of the case projects are not yet concluded. This would give opportunity for future studies to compare contractual and non-contractual collaboration means in a deeper and in organizational alliances context that support relational project in contrast to traditional, transactional contracts. The objectives of such study would be to achieve an evaluation on how the parties to complex, long-term construction project singularly public projects intend to work together with their actual working relations. Collaboration means are not mathematical numerical that can be adjusted or studied in simulations. Therefore, reconstitution of organizational strategy both physical and cultural framework are needed to be studied and observation and experiences be included as part of elements in the empirical data.

Future study needs to take into consideration the possibility of developing a conceptual model that consist of different levels collaboration means that considers transactional level, intervention level, inter-organizational level, relational arrangement level and allowable non-contractual relational collaboration arrangement level. This research would possibly be able to practically observe the viability of a such model in a detailed case study. Other potential goal in a similar research could be to empirically investigate how construction actors, owners and supplies value and judge their relational collaboration arrangement based on the identified collaboration means in the document study.

Trust and commitment have been identified in this thesis as the corner stone for the success of relational collaboration arrangement. It is understood that these components cannot be parametrically measured. Future work should consider establishing a level of maturity for these relational attributes as project owners and supplies trust level can be weaken and strengthen by different factors than cannot conceptually be prepared for in advance. Ascertaining practical values for these attributes is essential to the best practice notion of a chieving appropriate and fit for purpose relational collaboration arrangements. Furthermore, the practical outcome of such study may also consider the nature and role of incentives as relational glue that provides the parties the potential to derive mutually attractive rewards.

Traditional contracting system are guided by the national standards that are compatible with the framework and mechanism of monitoring and control that is desired by the Norwegian project owners and suppliers. The traditional contracting arrangement precautionary setts predetermined boundaries that addresses responsibility and liability related issues in context with risk aversion and transfer intentions. These mechanism despites of their limitations are favoured among most project owners and supplier as they consider these parameters secure and predictable. Future studies collaboration-based contracting arrangements should consider developing a backstop verification mechanism that ensure that parties in relational agreements adheres to their commitment of fulfilling their obligation by advancing project goals rather than individual organizations' interest.

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Appendix

	Type of project (transport project or construction project)	Transport project	
	Contractor (and other suppliers by multi-party contract)	Hæhre	
	Project Name	E6 Helgeland North	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	road development contract (VUK)	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	"B3 Requirements for offers and special competition rules (9 pages),	
		C2 Special contract provisions (41 pages) "	Construction/Execution phase
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	"- K1 Technical solutions and implementation of the contract = NOK 80 million - K2 Traffic flow = NOK 40 million - K3 Environmental considerations = NOK 30 million - K4 Construction time = NOK 6 million S = T - K1 - K2-K3-K4 "	

	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	One Step	"Operation contractor is involved in planning and construction "
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Most of Function Descriptions, but also some detailed description	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		turnkey contract with operational responsibility
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)		Fix-sum
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Losers Fee	Loser Fee
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	No
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General	NS 8402	"NS8407 + med operating agreement for 15 years "

	<p>contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>		
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 	Type of project (transport project or construction project)	Transport project	
 	Contractor (and other suppliers by multi-party contract)	Skanska (with Hæhre as sub-contractor)	
 	Project Name	E6 Helgeland South	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	road development contract (VUK)	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition initiated 08042016 - 409 pages is the offer with prices - 38 pages the competitive basis it selves.	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	<input type="checkbox"/> K1 - Organization and management of contract = 110 mill <input type="checkbox"/> K2 - Sensitive areas = 30 mill <input type="checkbox"/> K3 - Technical solutions = 50 mill <input type="checkbox"/> K4 - Traffic flow = 40 mi	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	

	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	One Step	"Operation contractor is involved in planning and construction "
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Most of Function Descriptions, but also some detailed description	Functional description and description of financing model
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		turnkey contract with operational responsibility
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)		Fix-sum
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Losers Fee	carries out as a target price contract with an incentive. Furthermore, agreement must be achieved on agreed target price with associated conditions within six months. after contract signing. In addition, a separate contact supplement is being developed in collaboration that regulates the relationship.

			If no agreement is reached on the agreed target price, the contact's provision on areas of sensitive clause applies.
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	No
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time		"NS8407 + med operating agreement for 15 years "

N/B K1, K2.... Stands for contract 1, 2, ...

 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	Skanska	
 	Project Name	Rv. 3/rv. 25 Løten-Elverum	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Competitive negotiation and PPP	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis 433 pages	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Award criterion 1: Price 80% Award criterion 2: Plan for implementation and organization of the project 6% Award criterion 3: Quality 8% Award criterion 4: Health, environment, and safety 6%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Hybrid – driven by dialog about task understanding	

		and then negotiation 3 envelope in three rounds	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	PPP contract - development, (incl. Re-regulation) construction, operation and financing model	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	PPP contract	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	PPP	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Fix-sum	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	1) Payment for Availability (BT) 2) Payment for Operating Standard (BD) 3) Payment for Security (BS) 4) Early Payment of parts of the Construction Cost (TBB) (milestones	

		handover veg 50 of cost% Failure on one of these 4 leads to a reduction of payment - i.e., there is a penalty in the agreements / negative incentive	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time	Based on NS8407 and experiences from previously completed PPP project	

The abbreviations are in Norwegian ex: BT; Betaling for Tilgjengelighet,....

 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	Br Dokken	
 	Project Name	E16 Fagernes-Øylo	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Turnkey contract with relational arrangement	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis 105 pages plus presentation	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Award criterion: consideration: Total amount in Offer 50%: K1 - Assignment organization 20%; K2 - Assignment completion 30%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competitive dialogue	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	2 steps	

Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Functional Requirements	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with relational arrangement	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Billable work with target price	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Calculation of remuneration. The contractor receives the fixed sum Profit and Indirect costs. In addition, the contractor is reimbursed the actual documented Construction Costs NOK for NOK up to the Final Target Price. If the Construction Cost is lower than the Final Target Price, the contractor will receive a percentage of this saving as a bonus /	

		incentive ("Bonus"). The percentage depends on the offered percentage for profit and indirect costs	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Remuneration: Hourly rates and purchase of services, with a surcharge of 10%	Target price agreement. % Rate profit and indirect costs Percentage of savings to contractor 0 - 5%: 0%; 6 - 14%: 30%; 15 - 20%: 60%; 21– 30%: 80%
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well	NS 8407	

	as deduction and bonus schemes related to the condition of the road and slack time		
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 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	FCC & Rambøll	
 	Project Name	E6 Ulsberg-Vindåsliene	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	integrated relational arrangement with target price	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	5 documents - 1.Task description, 2. Special contact regulations, 2.2 Special contact regulations - remuneration, 1.1 description of Scope of work, 1.2 Requirements for implementation and technical description	
Contracting	Supplier-Prequalification (Yes/No)	Plan	Build
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	BVP method	BVP 5 criteria that are evaluated with different% weight Award criteria: The criteria include: Quality criteria - Name: K1 Performance justification / Weighting: 25% Quality criteria - Name: K2 Risk assessment / Weighting: 15%

			Quality criteria - Name: K3 Competence and experience / Weighting: 30% Price - Weighting: 30%
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))		BVP
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)		Two steps - development phase with target price
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))		Own part of contract
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		Turnkey contract
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Target price	Billable work with target price
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)		The target price arrangement, give ground for bonus sharing

	<p>Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)</p>	<p>Se over</p>	
	<p>Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	<p>NS 8402 with budget but it says that the entire implementation is carried out in accordance with NS8407</p>	

 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	Hæhre	
 	Project Name	Mandal East-Mandal city	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated relational arrangement with target price	Turnkey contract with fixed price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Competition basis which in total consisted of 8 chapters	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	BVP method	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Award criteria Weighting Total Offer amount 15% K1 - Performance justification 30% K2 - Risk assessment 25% K3 - Competence and experience for key personnel 30%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	BVP	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with	Two steps - target price	

	letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)		
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	Functional descriptions	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with collaboration means (development phase as part of the planning phase)	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Billable work that goes over to Target price	Target price with bonus incentive
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)		The target price arrangement, give ground for bonus sharing
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	See over	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based		NS 8407

	<p>on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>		
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 	Type of project (transport project or construction project)	Transport Project	
 	Contractor (and other suppliers by multi-party contract)	Hæhre	
 	Project Name	E6 Kvithammar-Åsen	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated relational arrangement with target price	Turnkey contract with fixed price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Contract Chapter D1.1 Description of scope of work - E6 Kvithammar-Åsen Contract Chapter D1.2 Requirements for implementation and technical description	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Integrated collaboration phase with re-regulation, lasts until design completion	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	N/A	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	N/A (BVP)	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Two-step contracting, with an option for a turnkey contract	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code	Functional descriptions	

	1 Standard description for road contracts or NS3420 Description system building and construction)		
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Total consultancy contract	NS8407 Turnkey contract (with an option on IPL with its own contract provisions)
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	N/B	Fix-price
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	No, not beyond the option of implementation (either as a turnkey contract or IPL)	No
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No, not beyond the client's budget price (goal-oriented design).	No, not beyond the client's budget price.
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible	No	NS 8407

	<p>for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>		
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 	Type of project (transport project or construction project)	Transport project	
 	Contractor (and other suppliers by multi-party contract)	Peab	
 	Project Name	E6 Kvål-Melhus	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated project delivery I - with target price	Integrated project delivery II - with target price
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Contract for integrated project delivery, A0 Content descriptive part, A1 Description of scope of work, A2 Description of IPL, A3 Requirements for implementation and technical description, C1 Milestones, E4 Performance justification, F4 Agreement for implementation of phase 1. 108 pages	
		Plan	Build
Contracting	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous (Doffin): Performance justification / Weighting: 25% Risk assessment / Weighting: 20% competence and experience / Weighting: 30%	

		Price - Weighting: 25%	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for tender competition / competition with negotiation or tender competition))	Competition with negotiation (and BVP)	
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Two-step contracting / Integrated project delivery (IPL)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction))	Functional descriptions	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)		IPL (turnkey contract)
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Full cost in Phase 1, based on hourly rates	Billable work with surcharges for risk and profit. Target price.
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Incentive for more work in step 2	KPIs related to bonus payment: Unforeseen closure of E6, Completion, Number of absence claims, Number of incidents related to the environment

	<p>Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)</p>		<p>Range with 0% (more than 5% budget overrun), 25% (between 2.5 and 5%) and 50% (less than 2.5%)</p>
	<p>Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>		<p>redeveloped IPL contract. The owner has an option on NS8407 with a fixed price.</p>

 	Type of project (transport project or construction project)	Construction Project	
 	Contractor (and other suppliers by multi-party contract)	Skanska	
 	Project Name	Helse Sør-Øst/Sykehuset i Vestfold HF	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Integrated project delivery IPL	
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	In-house developed IPD contract. American pattern	
		Plan	Build
Contracting	Project Phases covered by the contract (Regulation plan, Procurement, Execution contract in figure from "Degree of freedom" or Pre-planning / sketch, planning / engineering and Execution / execution).	Preliminary project was available, but not binding	
	Supplier-Prequalification (Yes/No)	No	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for	Offer competition with negotiation	

	tender competition / competition with negotiation or tender competition)		
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Yes)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	?	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Turnkey contract with option IPD	
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Target price	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	Bonus linked to target prize	KPIs related to bonus payment: Unforeseen closure of E6, Completion, Number of absence claims, Number of incidents related to the environment
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	Bonus linked to target prize	Range with 0% (more than 5% budget overrun), 25% (between 2.5 and 5%) and 50% (less than 2.5%)

	<p>Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	<p>In-house developed IPD contract. American pattern</p>
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 	Type of project (transport project or construction project)	Construction Project	
 	Contractor (and other suppliers by multi-party contract)	Veidekke	
 	Project Name	Horten Vgs	
Background information	Implementation model (includes more of a contract strategy): 1) design-build (DB) 2) early contractor involvement (ECI) 3) design-build-maintain (DBM) 4) design-build-finance-maintain (DBFM) 5) Alliances 6) IPD / IPL	Competitive Dialogue	Turnkey contract NS8407
	The tender announcement (date, number of pages, possibly several versions)		
	Contract documents available, including attachments. Description and number of pages.	Plan	Build
Contracting	Project Phases covered by the contract (Regulation plan, Procurement, Execution contract in figure from "Degree of freedom" or Pre-planning / sketch, planning / engineering and Execution / execution).	Preliminary project was available, but not binding	
	Supplier-Prequalification (Yes/No)	Yes	
	Award criteria (Only lowest price or most economically advantageous (if so, which criteria and weighting?))	Economically most advantageous	
	Form of contract (direct purchase (not off. Owner), competitive dialogue, tender competition (/ competition with negotiation) or tender competition (BVP nevertheless follows the rules for	Competitive Dialogue	

	tender competition / competition with negotiation or tender competition)		
	Early involvement of contractor / One or two-step contracting (with, for example, consultancy agreement - with letter of intent / option on turnkey contract if the parties agree on design and price - and any turnkey contract afterwards, the latter requires a short description)	Yes)	
Risk and Opportunity management	The performance description (Functional descriptions or position descriptions (such as SVV Handbook 761 Process code 1 Standard description for road contracts or NS3420 Description system building and construction)	Yes, award criteria	
	Form of contract (PPP, turnkey contract with operational responsibility, execution contractor - including general contract, main contract, and subcontracts)	Competitive Dialogue	Turnkey contract NS8407
	Contract type (Fixed sum (locked prices and amount), sum contract (Adjustable prices and amount), unit-price-contract or billing work) (Compensation format?)	Fixed sum	
Process Instruments	Incentives (Key Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	No	
	Target price (division of bonus / malus - percentage division, interval, involvement of UE and designer, in planning phase / in construction phase or in both)	No	
	Contract provisions: 1) NS8401 - General contract provisions for designing 2) NS8402 - General contract provisions for consultancy assignments remunerated according to time spent 3) NS8405 - Norwegian building and construction contract 4) NS8406 - Simplified Norwegian building and construction contract with the winner of the tender. 5) NS8407 - General contract provisions for turnkey contracts 6) In an IPD contract, both the client, contractor and consultant are included as equal partners in a so-called multi-party contract. The model is based	NS8407	

	<p>on trust, the open book principle and continuous problem solving. 7) In-house developed contract provisions. PPP In a public-private partnership (PPP), the client will be responsible for planning, including the preparation of the zoning plan. After the end of the contract period, the road goes to the public sector. The contract itself controls the price format, which often includes an annual sum to be paid to the PPP company, as well as deduction and bonus schemes related to the condition of the road and slack time</p>	
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involvement ECI	phase is given 1																				
Form of contract (Incentives)	Provides some incentive for cooperation between contractor and sub-contractors	1		1		1		1		1		1		1							
Contract provisions	In-house developed contract provisions that promote co-operation are given 1	1		1		1		1	1	1			1		1	1					

Commercial instruments	Criteria used to give 1.										
Multi-party contracts	Measures to promote the relational, red sub-optimization								1		1
Remuneration approved offer	Promotes trust in relationships during contracting	1		1			1		1		1
Operational responsibility for the Contractor	Feedback loop, promotes trust and commitment	1			1		1				
Guides for upstream and downstream contractual relationships	Framework condition for cooperation in the value chain if it promotes relational aspects	1			1			1			1
Project goals beyond Time-cost quality	Greater focus on business and societal goals requires more collaboration					1		1		1	
Letter of intent (i.e., use of temporary agreement that regulates	Promotes the relational	1		1		1		1			1
						1			1		

conditions for a phase / open book intention) 1 step vs. 2 steps											
Partnering charter / target document	Promotes the relational	1	1	1		1		1	1		
Sub-contractor, consultant, and architect in the partnering group	Promotes the relational					1			1		1
Personal replacements rights	Monitoring power	1	1		1		1	1	1		1
Right to replace the sub-contractor	Joint dialogue and decision making						1			1	
Target price or maximum price (division of bonus / malus - percentage division, interval, involvement of sub-contractor and designer, in planning phase / in construction phase or in both)	Target price which in TVD is a relational approach		1		1		1		1		1
Open or close book	Open book build trust				1	1	1	1	1		1
Incentive program (Key	Given 1 if the incentives						1				

Performance Indicators as a basis for bonuses - related to HSE, achievement of milestones, etc.)	reward cooperation		1		1	1	1	1	1	1	
Sub-contractor, consultant and architect included in the target price	Promotes the relational				1				1	1	

1 Relational elements at development phase

1 Relational elements in the construction phase.

(instead of reactive)	ips during contractin g																			
Rules for change management (transactional vs. relational)	Relational : Joint decision-making							1			1		1	1		1	1			
Use of Key Performance Indicators	Collabora tive KPIs gives 1					1			1		1		1		1					
Identity building around the team (for example own logo)	Promote relational approache s	1		1			1			1							1			
Conflict Resolution Mechanism - Transactional vs. Relational (PRIME / Dispute Resolution Board, Broker, Conflict Resolution Ladder, etc.)	Promotes the relational		1		1		1	1	1		1	1		1		1				

Facilitation of systematic learning / experience transfer (Communities of knowledge and Communities of practice)	Promotes the relational									1						1					
Visual management (included in Last planner / involving planning)	Promotes the relational								1						1			1			
ICE - Integrated Concurrent Engineering (detailed engineering with partial deliveries)	Monitoring power								1			1	1	1	1						
Requirements for BIM	Promotes relational					1		1		1					1	1	1			1	
Joint server and computer systems in the project	promotes relational aspect	1		1		1		1	1		1			1		1					

Smooth flow of data	Strengthens reciprocal interdependencies	1		1			1		1	1						1				
Transparent information flow	Promotes trust & commitment	1					1		1							1		1		
Thematic workshops along the way (in addition to structured ICE meetings. Ex. Collaboration meetings and uncertainty analyzes, etc	Promote relational arrangements and learning	1				1	1		1		1	1			1					
Closing workshop (lesson learned)	promotes relational aspect in upcoming projects	1													1		1			

Case Project		E6 Helgeland Nord		E6 Helgelandsør		Rv3/Rv25		E16 Fagernes - Øylo		Ulsberg-Vindåslien		E39 Mandal øst-Mandalby		E6 Kvithamar-Åsen		E6 Kvål-Melhus		Helse Sør-Øst/Sykehuset i Vestfold HF		Horten Vgs	
		Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co	Di	Co
Contractual relational elements		4	7	6	5	8	0	9	1	9	11	12	4	11	6	12	7	14	2	6	0
		11	2	8	4	5	11	1	11	14	11	5	8	11	3	15	9	15	0	0	0
15		9	14	9	13	11	10	12	23	22	17	12	22	9	27	16	29	2	6	0	
Total																					
Organization (Design and Production)	Criteria used to give 1.																				
Pilot / signal / development project with extra support / attention	Promotes relational							1				1		1		1	1	1			
Long-term horizon of the parties	1 if the perspective is collaborative. Necessary?					1		1	1					1				1			

Industrialization (of product)	Promotes relational																	1			
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