The Role of Relational Governance for Achieving Sustainability in Infrastructure by using MEAT Criteria

Lisa Santen
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The Role of Relational Governance for Achieving Sustainability in Infrastructure by using MEAT criteria

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RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY
In the past twelve months, I have committed my life to relational governance, MEAT criteria, tender procedures, contract management and sustainability. When I started my bachelor in Architecture, eight years ago, I could not have imagined myself writing a graduation thesis, let alone for Construction Management and Engineering. In English.

But here it is, a research into the role of relational governance for achieving sustainability by using MEAT criteria. My concern about climate change and resource depletion and my growing interest in a circular economy led me to researching this topic. From a very general idea of combining sustainability and management, I finally arrived at this specifically demarcated topic. While it often felt like a lonely process, I had help from many people.

First of all, I would like to thank Hans Bakker. Of course for being the chair of the committee, for your critical view and the remarks through my whole report on typo’s and grammar mistakes. But what I am thankful for the most, is that you steered me into a research direction that happened to fit me best. At my kick-off, my focus was driven towards researching contract management, while my real interest lies at the relational aspect of agreements. I am happy that you suggested to have a second look at the relevance of relations.

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And finally, I can thank a hundred other people. But most importantly, my roommates, for asking or not asking about my day, the glasses of wine, walks on the beach, the flowers on my desk and the alcohol free champagne after my green light. You were a major support. Mom and dad, thank you so much for taking care of me in the last weeks of this process. It was Covid-19 that made me decide to live with you for a few weeks, but it turned out to be an extremely good choice. I loved the time I spent with you and all the good care and advice is much, much appreciated.

Enjoy reading! Lisa
Executive summary

Our modern society is driven by continuous developments. On several levels, the introduction of one development immediately leads to the start of another. As the world’s population has risen to almost eight billion people nowadays, our planet has a lot to endure due to the space and resources we exploit (“World Population Clock: 7.8 Billion People (2020) - Worldometers,” n.d.).

Worldwide, the infrastructure sector contributes significantly to the depletion of raw materials, the emission of greenhouse gasses and the use of water and land (Alfsen & Greaker, 2007; Enshassi & Mayer, 2005; Kubbinga et al., 2017a; Müller et al., 2013; Tafazzoli & Ap, 2016).

Because of the detrimental effect that infrastructure has on our planet, the business is in need of a transition. In the Netherlands, this has given rise to the ambition of Rijkswaterstaat, the executive agency of the Dutch Ministry of Infrastructure and Water management, to operate energy neutrally and circularly by 2030 (RWS, 2019).

One of the fields in which developments have taken place to make this transition, is public procurement. Several strategies were developed, but one strategy is to use award criteria that address sustainability aspects (Lenferink, Tillema, & Arts, 2013). These criteria are called MEAT criteria, which stands for Most Economically Advantageous Tender. This method allows a tenderer to write a tender bid in which he includes distinctive plans based on the MEAT criteria, that could be of added qualitative, or sustainable, value to the project.

Experience with sustainable MEAT criteria tells that this method does not automatically lead to sustainability, even though the MEAT offer is included in the contract requirements. Contractual governance is perceived to be insufficient for achieving sustainability by the use of MEAT criteria. Therefore, the problem statement is formulated as follows: there is a lack of insight in the role that relational governance plays in achieving sustainability via MEAT criteria in the construction process, ranging from initiation to realisation.

The goal of this research is to generate insight in how relational governance plays a role in the construction process in which MEAT criteria are used to achieve sustainability. The construction process is defined as the process that ranges from initiation up to and including realisation. In order to achieve this goal, the following research question was formulated:

“How can relational governance play a role when using MEAT criteria to achieve sustainability, ranging from defining the ambition to the delivery of a construction project?”

In order to answer this research question, a qualitative research approach was designed, supported by a literature study. The latter resulted in the definition of relational governance as comprising of seven elements that could play a role in the construction process. These elements are flexibility, collaboration, risk taking, risk sharing, information sharing, informality and trust. Secondly, the construction process was linked to the development of sustainability ambitions through MEAT criteria. The phases to be distinguished are the initiation phase, the preparation phase, the tender phase and the realisation phase. Respectively, every phase is characterised by the formulation of sustainability ambitions, the formulation of sustainable MEAT criteria, the formulation of a sustainable MEAT offer and finally the sustainable delivery.
The research was done by performing a multiple case study on three cases. Data was collected by document analysis and semi-structured interviews with, per case, a key actor from the client, the advisory firm and the contractor. The three cases that were studied, are public construction projects that have already been delivered, so the whole process could be analysed. Moreover, they include sustainability in the MEAT criteria. Insights were retrieved on the factors that contributed to the development of sustainability through the process. Moreover, the seven relational elements were presented to the interviewees to review the presence of these elements in the process. The expressions of relational governance were compared to the factors that contributed to the development of sustainability. Next to that, the contractual construction in which the MEAT offer was safeguarded in the realisation phase, was analysed.

Results from the data collection show that every element of relational governance was to various extents present in two out of the three cases. In these two cases the sustainability ambitions were achieved, according to the MEAT offers. Except for trust, all expressions of relational elements show similarities with the factors that contributed to the achievement of sustainability. Moreover, the contractual construction of these cases show deviations from the regular MEAT procedure.

From an analysis of the data, it appears that there are three elements that play a role during the whole process, albeit in various ways, depending on the phase.

Flexibility offers room for various opportunities and sustainable solutions throughout the project. In the early phases, a client needs to be flexible in order to give sustainability a chance. In the final phase of a project, flexibility should provide the possibility to make adaptations to the contract for the benefit of sustainability.

Risk taking is perceived to be inherent to flexibility, as unconventional solutions entail a certain amount of risk. For achieving sustainability, a client and a contractor should be willing to take reasonable risks during the whole process. By avoiding risks and offering standard solutions, no added value will be achieved.

Collaboration is the third element that plays a role in the achievement of sustainability. Collaboration by means of early involvement of market parties, enhances the chance that the contract preparations, MEAT criteria and the MEAT offer are better aligned with the market’s potential and the client’s ambition for achieving sustainability. Collaboration between contractor and client in the realisation phase could contribute to performing continuous optimisations on the sustainability and handling contingencies in accordance with the sustainability goal.

An implication of flexibility and risk taking was found in their relation to the MEAT procedure. This prescribes the translation of the MEAT offer to the contract requirements, constrained to the discount that was attributed to the offer. Therefore, if implementing sustainability solutions is not subject to a fixed budget, room for improvements can be made and risk taking attitudes will dominate over a risk averse attitude.

Relational governance seems to thrive by the presence of intrinsic ambition of the key actors involved. Bringing projects to a successful end, involves an important human factor. This can subsequently be supported by the formulation of a bold ambition statement about sustainability, as an expression of risk taking and flexibility. By
acknowledging the challenge that sustainability entails, the conditions for achieving the mission statement, can be established. This means that the mission statement should be leading during the whole project and take a prominent place in the MEAT criteria, in order to give it enough weight to the project. The flexibility that is inevitably required in the realisation phase, is limited by the MEAT procedure. Therefore it is recommended to practitioners to include a different contractual mechanism after the tender phase, that enables continuous optimisations and dealing with contingencies according to the benefit of sustainability by flexibility and risk taking.

Relational governance could play a role in achieving sustainability by using MEAT criteria, but it is on the condition that the right people are involved and that sustainability gets enough attention throughout the whole project, by formulating it as a bold statement that is supported by shared ambition.
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1. Introduction

1.1. Background

Our world is in a state of continuous evolution, the introduction of one development immediately leads to the start of another. More than over two centuries ago, the Industrial Revolution was the beginning of a process of industrial development that is still in acceleration. This involves an increased use of raw materials like water, sand, metal ores, crude oil and coal. Together with the Industrial Revolution came the exponential growth of our world population, from one billion around the year 1800 to almost eight billion nowadays (“World Population Clock: 7.8 Billion People (2020) - Worldometers,” n.d.).

All these people demand a lot from our planet’s resources as we keep producing more clothes, food, smart phones and computers. Also our built environment is expanding as our transportation modes increase and the growing population needs housing. The civil sector has a detrimental impact on the planet regarding resource depletion and greenhouse gas emissions (Alfsen & Greaker, 2007; Kubbinga et al., 2017; Müller et al., 2013; Tafazzoli, 2018). Moreover, a major part of the world’s water- and land-use can be assigned to this industry (Enshassi & Mayer, 2005). Not only the consumption of critical resources and the generation of waste and emissions, also the so-called urban heat effect is a result of our increasing construction activities.

As the infrastructure industry has a detrimental effect on climate change, this sector is in need of a transition too. Currently, the infrastructure sector is responsible for a significant share of the consumption of our raw materials (40%), 35-40% of the CO2 emissions, 40% of the energy consumption, 25% of the timber consumption, 40% of the solid waste generation and 16% of our global water use (Durdyev, Zavadskas, Thurnell, Banaitis, & Ihtiyar, 2018). In the Netherlands, Rijkswaterstaat strives to operate energy neutral and fully circular by 2030 (RWS, 2019). This ambition however has appeared to be subject to many barriers (Enshassi & Mayer, 2005; Kirchherr et al., 2018; Tafazzoli, 2018; Van Bueren & Priemus, 2002).

Many developments have taken place with the aim to achieve a more sustainable infrastructure sector. The common belief is that sustainability has to be considered as early as possible in a construction process in order to integrate it successfully in a project, hence creating sustainable value. Over the last years, value creation has become more important in Dutch public infrastructure procurement. This has led to the development of new contract types and procurement processes in which value creation, like sustainability, plays a significant role.

One of the ways in which public procurers make an attempt to include sustainability in their construction processes, is by establishing award criteria that address sustainability in the tender (Lenferink et al., 2013). These criteria are called MEAT criteria. MEAT stands for Most Economically Advantageous Tender and these criteria allow a procurer to find the best value for money in his project. By including solutions to these criteria in their tender bids, contractors have the ability to write distinctive bids. The tender bid of the winning contractor will subsequently be included in the contract requirements and thus becomes part of the contract. So ideally, the sustainability ambitions of a client lead to a sustainable MEAT criterion (or several criteria), which eventually
should result in an offer on sustainability, which will be inserted in the contract. This strategy, to use MEAT criteria for achieving sustainability, is also advised by the Green Deal Sustainable Infrastructure (DGWW) (Handreiking Aanpak Duurzaam GWW, 2016). This is the main Dutch agreement between public organisations, contractors, engineering firms, knowledge institutions and suppliers to achieve sustainability. Examples of sustainable MEAT criteria are the score on the CO2 performance ladder, reduction of GHG (greenhouse gas) emissions or the amount of reused materials that the contractor will use in the project (“MVI-criteriatool,” n.d.).

As the application of MEAT criteria for sustainability ambitions increases, the experience is that this procedure does not automatically lead to achieving sustainability. Alignment of the initial sustainability ambitions with MEAT criteria, the MEAT offer and the eventual delivery is not naturally reached, even though the sustainable offer is included in the contract requirements.

Contract requirements provide the agreements that construction projects have to be steered upon. Generally, most construction projects are controlled by steering on compliance with these contract requirements. This is known as contractual governance. While contractual governance is often used to control construction projects, it still leads to the common experiences of a misalignment between expectations and outcome (Abramowicz, Banaszak, Jaynath, & Zarrinkoub, 2018; Malhotra & Murnighan, 2002; O’Connor, 2009). Literature presents relational governance as the counterpart, substitution of or complement to contractual governance. Relational governance takes care of the relations between the different parties involved in a corporate agreement. Relational governance focuses on mutual trust, close collaboration and interaction. In terms of stakeholder relations, relational approaches are said to be related to better project outcomes (Verweij, 2015a; Verweij & Gerrits, 2015) as well as technical performance (Verweij, 2015; Verweij & Gerrits, 2015; Chan, Chan, & Ho, 2003; Larson, 1997).

1.2. Problem statement

As the achievement of sustainability does not follow naturally by using MEAT criteria, more systems that complement contractual governance, seem to play a role in this alignment. To be more specific, the role of relational governance in this system is yet unknown. Therefore, the problem is defined as follows: there is a lack of insight in the role that relational governance plays in achieving sustainability via MEAT criteria in the construction process ranging from initiation to realisation.

1.3. Research goal and research objective

This research will try to provide an understanding of how the process of achieving sustainability by making use of MEAT criteria works. Hereby, the focus will lie on the role of relational governance.

The hypothesis of this research is that relational governance plays a role in achieving alignment of sustainability ambitions and the delivery. Therefore the research goal is to generate insight in how relational governance plays a role in the construction process in which MEAT criteria are used to achieve sustainability. The construction process is defined as the process that ranges from initiation up to and including realisation.
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The objective of this research is to provide project managers with recommendations on the role that elements of relational governance have in the achievement of sustainability by using MEAT.

1.4. Research questions

In order to achieve the formerly mentioned research goal, the following research question has been formulated.

“How can relational governance play a role when using MEAT criteria to achieve sustainability, ranging from the ambition to the delivery of a construction project?”

Four sub questions provide structure as they each relate to a separate chapter of this report. The first sub question is the basis for the theoretical framework in chapter 2. Sub question 2 serves as guidance to design a research methodology in chapter 3. Chapter 4 will give the answer to the third sub question, which is the empirical knowledge that arises from the case studies. Lastly, in chapter 5, an answer to the last sub question will be provided, which leads to the conclusion of this research.

SQ1. “Where in the construction process in which MEAT criteria are used, could relational governance play a role?”
SQ2. “How can the role of relational governance in the construction process for achieving sustainability via MEAT criteria be assessed”
SQ3. “Which elements of relational governance play a role in the construction process using MEAT criteria in achieving sustainability?”
SQ4. “What are the implications of the elements of relational governance that play a role in the construction process using MEAT criteria for achieving sustainability?”

1.5. Relevance

1.5.1. Scientific relevance

Several studies have been conducted on the application of MEAT criteria in general, both in the Dutch construction industry as in other countries worldwide. These reports mainly focus on MEAT in the preliminary phases of a project; the preparation phase, the tender phase and the award phase, having led to a better understanding of how to apply MEAT in these first phases (Bergman, M.A., Lundberg, 2013; Dreschler, 2009; Stake, 2016; Stilger, S., Siderius, J., Van Raaij, 2016; Wondimu, P.A., Lohne, J., Laedre, O., 2018). Most insights were gained on the tender evaluation: how to objectively assess qualitative aspects, what type of scoring formula needs to be used and what weight should be assigned to each criterion. However, knowledge lacks on how compliance with MEAT offers should be safeguarded.

A PhD research by M. Dreschler (2009), How to apply the ‘Economically Most Advantageous Tender’ (EMAT) mechanism in the Dutch construction industry, targeted the suitability of different award mechanisms. Dreschler recommended other researchers to study the influence of MEAT on the success of projects and the reliability of bids.
This was confirmed by an assessment of the Dutch procurement market in 2013 and the application of MEAT criteria (Hardeman, 2013b, 2013a), in which it came forward that further research is required to point out if the final costs and quality of the product or process are in compliance with the initial tender and if any differences between the various criteria can be found.

Recently research has been carried out on the reasons for (mis)alignment between tender and practice in MEAT tenders from a contractor’s perspective (Born, 2019). Two recommendations for further research overlap with the goal of this research. The first one is to examine the role that increased communication between client and contractor plays in alignment of promised measures and realised added value. The second recommendation is to assess the influence of contractual management on the implementation of MEAT offers. Overlap is found in researching the process rather than specific factors in the tender or the criteria that lead to (mis)alignment.

Lastly, the MEAT procurement processes have yet mainly been researched on all criteria topics in general. However, research on one specific subject has not been conducted yet. Investigating MEAT criteria that are all meant to achieve sustainability, could generate insight in the evolution of a specific topic through the whole construction process, from initiation to realisation. This provides knowledge on which systems play a role in this development.

From a collection of researches on the barriers of sustainable infrastructure, one of the commonly appearing recommendations is for clients to require specific environmental measurements from their contractors (Enshassi & Mayer, 2005). Therefore, it can be valuable to evaluate the use of sustainable MEAT criteria, since it corresponds to scientific recommendations on how to deal with sustainability barriers.

Given this academic framework, it can be concluded that scientific knowledge is still missing in this field. This mainly regards scientific insights in the evolution of a MEAT criterion, from ambition to delivery, and what processes are involved in the alignment of ambition and delivery.

1.5.2. Practical relevance

The increased use of MEAT criteria in the Dutch public procurement has led to various experiences, both positive and negative. Practitioners have expressed their criticism on the fairness of the system as well as the use of MEAT criteria in order to achieve a certain level of sustainability.

*Fairness of the tender procedure*

In the Dutch infrastructure sector, the system of MEAT tendering is criticized. An article in Cobouw.nl stated that the prevailing thought of contractors regarding MEAT procurement is that it pays to lie. Contractors who offer bids that are too good to be true, often win the tender. During the execution of the works, it turns out that they deliberately do not fulfil their promises regarding the qualitative criteria (Koenen, 2018a). This is a distortion of competition and therefore quite bothersome for parties that do put effort in designing a fair tender. Others indicate that it is not always a matter of lying or acting on purpose; sometimes a contractor finds himself unable to deliver a certain objective, because he is hindered by external factors (Koenen, 2018b).
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The same trend is described in a report by the Dutch Public Procurement Expertise Centre PIANOo where it is stated that one of the experiences from the market is that clients do not check if contractors actually deliver their MEAT offers. A subsequent effect seems to be that contractors are awarded based on their ability to write a pleasing proposal instead of their ability to actually meet the requirements (Werken met EMVI, 2016).

Ineffective criteria for sustainability

There is criticism on the effectiveness of certain specific criteria that are often used. Several criteria have been used over the past years with the aim to achieve a certain level of sustainability in infrastructure projects. However, despite this increasing practical experience with sustainable award criteria, questions rise about the effectiveness for realising sustainability.

One example is that the CO2 performance ladder (a certificate that indicates a firm’s CO2 emission) has lost its distinctive character. In 2010, a high CO2 performance was not yet common, while nowadays almost every firm in the infrastructure industry performs on the highest level (Hardeman, 2013a). So when currently the CO2 performance ladder is formulated as a criterion, it will not necessarily lead to a significantly improved project when it comes to CO2 reduction, neither will it result in distinctive tenders. However, the CO2 performance ladder is still often used as sustainable MEAT criterion (Facts & Figures | analyse 2017 - Duurzaamheid in openbare aanbestedingen, 2017).

Effectiveness of the process

This research will be carried out at Witteveen+Bos, a Dutch engineering firm. As this company also expands its experience with MEAT criteria for achieving sustainability, more insight in its effectiveness is requested. These questions regard the alignment between the initial sustainability ambitions of a client and the final delivery of a project.

In the light of the current importance of sustainable development and the major transition that the infrastructure sector is going through, we should be critical to what we practise. False promises and futile attempts will not contribute to sustainable development, so continuous evaluation and improvement of our current practices is essential.

1.6. Research scope

For the clarity and focus of this thesis, a certain demarcation of the research field is required. The scope is defined by the boundaries of Dutch public infrastructure projects, integrated contracts, and a demarcation of the concept ‘sustainability’. These subjects will be illustrated in the following paragraphs.
1.6.1. Sustainability

As sustainability will often be mentioned in this report, it is important to clearly define what the meaning of sustainability will be in this specific research. Therefore, a short definition of sustainable development will be given, followed by a demarcation of the concept to this study.

1.6.1.1. Sustainable development

Already in 1987, the World Commission on Environment and Development defined sustainable development as development that ‘meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development, 1987). Robert Goodland (Goodland, 1995) perceives the definition of World Wildlife Fund as a less ambiguous one: ‘Improvement in the quality of human life within the carrying capacity of supporting ecosystems’ (World Wide Fund for Nature, 1993). Or, as he formulated in 1996: ‘development without growth in throughput of matter and energy beyond regenerative and absorptive capacities’ (Goodland & Daly, 1996, pp. 1002). As the current need for change is a result of growth (economies, world population, consumption), the last definition of sustainable development will be hold on to in this research. Stopping the growth of our economies, the world population and our consumption, is almost beyond control. However, decreasing the growth in throughput of matter and energy is something that lies within human power.

1.6.1.2. Sustainability

The formerly described definitions of sustainable development touch upon three core elements: economic growth, social inclusion and environmental protection (“The Sustainable Development Agenda,” n.d.). This is also commonly known as People, Planet, Profit; the Triple Bottom Line; or Triple P, defined by John Elkington (1997). His idea behind this theory is that these are the three constraints of sustainable development, that have to be balanced in order to be successful. This means that we should sustain economic growth, while enabling current and future generations to live healthy and quality lives, without harming the natural environment that provides us with non-renewable sources (Goodland, 1995). Although each of these three elements cannot be sustained without the presence of the others in order to reach sustainable development, only environmental sustainability will be considered in this research.

1.6.1.3. Environmental sustainability

Environmental sustainability regards the constraints on the activities that impact the availability of renewable and non-renewable sources on one side, and the generation of waste and pollution on the other side (Goodland, 1995). This requires the conservation and responsible use of air, water and land-resources (Holdren, Daily, & Ehrlich, 1995). The International Institution for Sustainable Development published a sustainable asset valuation tool on roads (Bassi, Mcdougal, & Uzsoki, 2017), in which a definition of environmentally sustainable infrastructure is given. ‘A sustainable road is one that limits environmental impacts throughout its life cycle, including manufacture of materials, construction, use and decommissioning. Environmental concerns are related to the design of the road, the materials used in construction and use patterns. The emission of greenhouse gases (GHG’s) and other pollutants should be minimized by efficiently using energy and resources’ (Bassi, Mcdougal, &
Uzsoki, 2017, pp. 1). Sustainable infrastructure thus considers all the phases from the start of the construction works to the end of the life cycle. In these phases, the environmental impact should be minimized. This requires a consideration of both in- and outputs.

The Sustainable Asset Valuation Tool: Roads, considers four characteristics of traditional infrastructure that each have its negative impacts on the environment (Bassi et al., 2017). These four characteristics are the alignment of the infrastructure, the materials and resources used, the stormwater management and the energy and environmental control. In short, they have their effects on the way nature has arranged itself, the habitats of flora and fauna, the provision of raw materials and the emission of GHG’s. An elaboration can be found in Appendix A- Sustainability, Table 12.

The European Commission has described four different categories of environmental pressures: materials as resource inputs and waste outputs, water (including emissions to water), land (including emissions to soils) and carbon and air emissions. These pressures have an impact on human health, natural environment and/or natural resources over thirteen categories like for example climate change, ozone depletion, human toxicity and water scarcity (Miedzinkski et al., 2013). An elaboration on these environmental pressures can be found in Appendix A- Sustainability Table 13.

The Inter-American Development Bank defined environmentally sustainable infrastructure as the combination of four design principles: climate and natural disasters, pollution, the efficient use of resources and preservation of the natural environment (What Is Sustainable Infrastructure: A Framework to Guide Sustainability Across the Project Cycle, 2018), see Appendix A- Sustainability, Table 14.

1.6.1.4. Definition of sustainability for this research

Following from the former three reviews of sustainable infrastructure, a combined description of environmentally sustainable infrastructure is defined. The construction of infrastructure requires a certain input. This input can be divided into (raw) materials, water, land, energy. The product of this input is defined as the output. This regards GHG emissions, solid waste, contaminated water and contaminated land. The third category to be addressed is the environmental impact. Hereby the author defines water scarcity, resource depletion, soil degradation, deteriorated water absorption, erosion, affected ecosystems and forests, land use and urban heating. Environmental sustainability could therefore be assessed as dealing with these three categories, in order to minimize the deteriorating environmental impact of infrastructure, or to even contribute to recovery of the environment.
The former table provides an understanding of environmental sustainability. For the continuity of this research and the connection with the Dutch infrastructure practice, the author will further use the categories as defined in the Green Deal Sustainable Infrastructure, Table 2 (Handreiking Aanpak Duurzaam GWW, 2016). These categories are Energy, Material, Water, Soil and Ecology & Biodiversity and each covers a certain part of environmental sustainability.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Energy use and CO2 emissions</td>
</tr>
<tr>
<td></td>
<td>Energy generation</td>
</tr>
<tr>
<td>Material</td>
<td>Material use (circular, no toxic emissions,</td>
</tr>
<tr>
<td></td>
<td>maintainable, social conditions)</td>
</tr>
<tr>
<td></td>
<td>Material production and construction</td>
</tr>
<tr>
<td>Water</td>
<td>Water quality (no pollution)</td>
</tr>
<tr>
<td></td>
<td>Water quantity</td>
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<td></td>
<td>Water safety and adaptive ability</td>
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<tr>
<td>Soil</td>
<td>Soil quality</td>
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<td></td>
<td>Soil system</td>
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<tr>
<td></td>
<td>Archaeology</td>
</tr>
<tr>
<td>Ecology &amp; Biodiversity</td>
<td>Biodiversity</td>
</tr>
<tr>
<td></td>
<td>Ecological structures</td>
</tr>
</tbody>
</table>

Table 2: Sustainability Categories, defined by Green Deal Sustainable Infrastructure, derived from (Handreiking Aanpak Duurzaam GWW, 2016)
1.6.2. **Dutch public infrastructure sector**

The Dutch public infrastructure sector will be the subject of this research. This means that the research is limited to projects that have been taken place within the Netherlands, and that have been procured by public organisations like Provinces and Municipalities by the rules of the Dutch Procurement Act (Aanbestedingswet, 2012). This act prescribes governmental organisations with the obligation for public tendering when the budget transcends an amount of €1.5 million. With public infrastructure, the author means constructions like roads, streets, highways, bridges and viaducts that are publicly accessible.

1.6.3. **Integrated contracts**

Over the past years, the execution works of public infrastructure have mainly been procured by integrated contracts, according to the UAV-GC 2005 (administrative conditions for integrated contracts). The most common type is a Design & Build contract. This allocates both the responsibility for the design as well as for the construction phase to a contractor, with the aim to generate a better alignment of both phases. Next to this type of integration, there are more advanced types of integrated contracts possible, like for example Design, Build, Finance and Maintain. This range of integrated contracts will be subject to the scope of this research, because integrated contracts provide a certain amount of design freedom to the market. By using MEAT criteria, a client is in the position to steer within this design freedom.
2. Theoretical framework

This chapter provides an answer to the first sub question that was formulated in chapter 1. “Where in the construction process in which MEAT criteria are used could relational governance play a role?” To be able to find an answer to this question, it is important to compose a framework of the theories that are subject to this research. First of all, the researcher needs an understanding of what relational governance is and what its implications are for the delivery of construction projects compared to contract management. Thereafter, an outline of a general construction process from initiation to realisation will be constructed. This provides insight in the activities that could contribute to the development of sustainability ambitions. The rules of public procurement will be described briefly, for that will be the connection with the consecutive outline of the theory on MEAT criteria.

This chapter will conclude with a proposed framework in which the connections between the construction process, the development of MEAT criteria and the presence of relational governance are visualised.

2.1. Governing interfirm agreements

Construction projects are an example of interfirm agreements, as a client hires the capabilities and the effort of several other parties to achieve the realisation of a project. This leads to the establishment of a long-term exchange relationship, which needs to be governed in order to succeed. Governance has been defined as a framework for how contracts are initiated, negotiated, monitored, adapted and terminated (J. B. Heide, 1994).

Two main governance forms can be distinguished: unilateral and bilateral. Both types will be discussed to understand what relational governance is. For this, the typology of nonmarket governance of interfirm relations by Heide (1994) will be used.

2.1.1. Nonmarket governance forms: a dichotomy

Nonmarket governance can be characterised as the governance of long-term interfirm relationships. These occur when a party does not have all the resources internally available for achieving a certain goal and therefore needs to obtain those resources from another party. As a result, a firm becomes dependent on the supply of another (J. B. Heide, 1994). Two main theoretical approaches can be distinguished in literature that both describe a conceptual framework for dealing with dependency and corresponding uncertainty in interfirm relations. On the one hand, a formal or hierarchical mode of interfirm organization can be distinguished. The other approach is semiformal or bilateral.

Formal and hierarchical organization modes arise from the need to control a transaction between two parties and by control minimize the risk of opportunistic behaviour of another party. As contracts are never complete, hierarchy is also used to deal with unforeseen situations and performance evaluation as a relationship develops (Li, Xie, Teo, & Peng, 2010; Mellewigt, Madhok, & Weibel, 2007).
RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

The second type of organization mode to be distinguished is semiformal or bilateral. The foundation on which the minimisation of opportunistic behaviour is built, is the mutuality of interest between parties as also described by Macneil and Dwyer, Schurr & Oh (Dwyer, Schurr, & Oh, 1987; J. B. Heide, 1994; Macneil, 1974).

2.1.2. Relational governance: a bilateral approach

The concept of bilateral governance, as introduced by Heide (1994), has been described by different scholars, albeit in various phrasing. Relational exchange (Dwyer et al., 1987; Macneil, 1974), relational contracting (Macneil, 1974), relational based contracts (Hosseini, Haddadi, Andersen, Olsson, & Laedre, 2017) and relational governance (Addae-Boateng, Wen, & Brew, 2015; Diatheopoulous, 2010; Fischer, Huber, Dibbern, & Hirschheim, 2012) all describe the same type of interfirm governance mechanism. Macneil defines relational exchange as the foundation of a relationship between two parties that share a certain goal. In order to achieve this, they collaboratively develop policies towards this goal. This barely differs from relational based contracts, which are specific contract structures like partnering and alliancing. These are built upon the creation of a trust-based relationship between two or more parties that share the same goal (Hosseini et al., 2017).

Theories about relational governance come forth from the belief that corporate agreements between different parties involve a social interfirm relationship that should be safeguarded. Investing in inter-organizational relationships is used as a way to achieve contract performance in terms of quality, time and budget (Hosseini et al., 2017), as it could deal with contractual hazards like uncertainty (Poppo & Zenger, 2002).

For clarity in this chapter, the author will further refer to the formerly described mechanisms with the term "relational governance". Its definition that will be used in the research is "governing the exchange between two or more parties by establishing a relationship, that builds upon the sharing of mutual goals."

The following paragraph will look into the elements that scholars have assigned to relational governance, in order to be able to understand how relational governance can be recognized and applied.

2.1.3. Relational mechanisms to govern an interfirm relationship

The definition of relational governance as previously given only considers the what and not the how. Therefore it is evident to understand what mechanisms are used for establishing such a bilateral relationship.

2.1.3.1. Relational norms

In literature, relational norms are described by various scholars. The views about which norms are of relevance to relational governance, slightly differ. Yet, the definition of a relational norm is generally agreed upon. Relational norms are defined as “expectations about behaviour that are at least partially shared by a group of decision makers” (J. Heide & John, 1992, p. 34). Decision makers in an exchange relationship can be considered the key players of the involved parties. The following relational norms were found in literature.

1. **Flexibility**
   Flexibility describes the mutual expectation of the willingness of parties in an exchange relationship to adapt or to make adjustments when changing circumstances occur (J. Heide & John, 1992; Poppo & Zenger, 2002). The interpretation of flexibility by Cannon, Achrol & Grundlach (2002) is taken a step further, namely as the idea that a contractual agreement between two parties is only the starting point of a relationship that will evolve over time and that will unavoidably be adapted as circumstances change.

2. **Solidarity**
   Solidarity refers to the mutual expectation that both parties highly value the relationship that they have, which results in parties acting on behalf of the relationship. This means commitment to each other, from the belief that success comes forth from cooperation (J. Cannon et al., 2002; J. Heide & John, 1992; Poppo & Zenger, 2002).

3. **Information exchange**
   This describes the mutual expectation that the parties involved in an exchange relationship will proactively share all potentially relevant information to the other party, even if that regards exclusive information. It enables the other party to act on the basis of complete knowledge and thus enhance the cooperation (Addae-Boateng et al., 2015; J. Heide & John, 1992; Poppo & Zenger, 2002).

4. **Mutuality**
   Mutuality shows some overlap with the interpretation of solidarity. It regards the attitude that reciprocity is the facilitator of each party’s success. In other words, the success of one party comes forth from the success of the other party, which leads to mutual responsibility (J. Cannon et al., 2002).

5. **Harmonization of conflict**
   Harmonization of conflict is about the extent to which parties are willing to both make adjustments in order to reach consensus during conflicts (J. Cannon et al., 2002).
6. **Restraint in the use of power**

Restraint in the use of power is about not making use of one’s bargaining position towards the other party, which is believed to be undermining the formerly mentioned norms (J. Cannon et al., 2002).

The relational norms described here, dictate the attitude from both parties in order to achieve a mutual goal according to the theory of relational governance.

**2.1.3.2. Collaborative activities**

Relational governance not only builds upon the presence of norms, but also on the use of collaborative activities. As was found by Zhou et al. (2015), collaborative activities have a negative effect on the presence of opportunism in exchange relationships, but only if there is consistency with relational norms. Thus, relational governance also relies on the use of collaborative activities.

Collaborative activities are said to be the behavioural aspects of relational governance. They are also described as relational routines (Poppo, Zheng, & Zenger, 2008) and relational processes (Zaheer & Venkatraman, 1995b).

1. **Joint action**

Joint action is considered by Zaheer and Venkatraman (1995) to be the action of getting parties in a relationship closer together. This is said to be facilitated by including both parties in a collaboration.

2. **Joint planning**

Joint planning refers to the mutual and explicit allocation of future risks between parties (Claro, Hagelaar, & Omta, 2003).

3. **Business plan sharing**

Business plan sharing is a relational routine described by Poppo et al. (2008) as a routine of information exchange where firms be transparent about their longer term views. This enables decision making that also benefits the future.

4. **Collaborative problem solving**

Poppo et al. (2008) distinguish collaborative problem solving as one of two relational routines. The same has been interpreted by Claro et al. (2003), who describes joint problem solving. Logically, collaborative or joint problem solving, describes the action of mutually solving problems in the spirit of maintaining the relationship.

Collaborative activities seem to be characterised by performing various actions jointly. These actions regard the planning of the exchange relationship and fair allocation of responsibilities and contingencies. Also, they
refer to the process of problem solving during the relationship. Joint action can be considered to be the start of joint planning, business plan sharing and collaborative problem solving. Joint action, or collaboration, could be continued in the planning activities, information exchange and problem solving.

When incorporating the relational norms that were investigated earlier, these norms can be seen as the conditions for joint action, joint planning, business plan sharing and joint problem solving in the spirit of mutuality in a relationship (Zhou et al., 2015).

2.1.4. Relational governance in construction projects: collaborative contracting

The previously described theory, gives a very conceptual insight in relational governance. In order to understand the implications of relational governance in the infrastructure sector, an applied perspective will be addressed: collaborative contracting in the construction sector has increased in popularity as an answer to the deficiencies of traditional contracting.

Traditional contracts are by some scholars believed to provoke self-protective behaviour and mistrust between the involved parties, because parties safeguard their own financial interests and protect themselves from unequal risk allocation (Abramowicz et al., 2018; O’Connor, 2009). This behaviour of safeguarding one’s own interest, is a reaction to the large risks that infrastructure projects entail, due to big scopes, many involved stakeholders and large budgets (Bosch-Rekveldt, 2011). In order to control these risks and safeguard one’s own interests, the tendency arises to compose very detailed and rigid agreements in contracts, and allocate a large part of responsibilities to other parties. This is believed to be the cause of friction between client and contractor.

Complex and uncertain projects are in need of a more collaborative approach (Abramowicz et al., 2018). It is therefore that the presence of relational governance in interfirm agreements for construction projects has increased in the past decade (Hosseini et al., 2017; Suprapto, 2016). Practical examples can be found in the development of different types of collaborative building organisation models that are mainly focused on establishing a relationship between the involved parties, instead of complying to formal agreements. In these contracts, the focus lies on achieving goals through close collaboration. Standard building organisation models with a high degree of collaboration are Design teams and alliances (“Bouworganisatievormen in de GWW | PIANOo - Expertisecentrum Aanbesteden,” n.d.). They have been built upon the idea that both parties in the agreement share the same view on the project: to get the best possible project outcome. This means that the strengths of each party should be combined in order to achieve the mutual goal and thus reach better project outcomes in comparison with traditional contracting (Abramowicz et al., 2018).

Instead of allocating risks to another party, a collaborative environment provides the conditions to take risks on the fundament of trust. Also, as opposed to a formal environment that results from rigid contract agreements, a collaborative approach advocates informality (A. Larson, 1992; Poppo & Zenger, 2002).
2.1.4.1. Collaborative contracting: trust and risk taking

Instead of controlling risks by unequal risk allocation and drawing up very detailed, yet always incomplete contracts, collaborative contracting assumes another perspective. Collaborative contracting advocates the establishment of an environment in which trust and the alignment of mutual expectations enable risks to be controlled (Das & Teng, 1998; O’Connor, 2009; Verweij, 2015b). When trust is present, it could increase the chance that another party shows desirable behaviour, which enhances the relationship. Trust is defined as ‘one’s belief and expectation about the likelihood of having a desirable action performed by the trustee’ (Das & Teng, 1998, pp. 494).

A relation between trust and risk management was found by Malhotra and Murnighan (Malhotra & Murnighan, 2002), who discovered a converse relation between interpersonal trust and risk. The efforts to mitigate risk early in the project, could impede the development of trust to take bigger risks in the future. This was substantiated by further research, finding that trust between two parties in a contract increases when the other party shows willingness to take bigger risks (Pillutla, Malhotra, & Murnighan, 2003).

2.1.4.2. Collaborative contracting: informality

Collaborative contracting is characterised by an informal way of control (A. Larson, 1992; Poppo & Zenger, 2002). Contrary to informal control tools, Luo et al. (Luo, Liu, Zhang, & Huang, 2010) perceive contracts as formal tools for enforcing contract compliance. Because relational governance in collaborative contracting is based on relational norms and interpersonal ties, informality is believed to play an important role. This view is substantiated by Malhotra and Murnighan (2002), who describe communication, norms and trust as informal structures. These can increase cooperation in interfirm relations (Das & Teng, 1998).

2.1.4.3. Collaborative contracting: practices

The previously described elements that characterise a collaborative contract are quite conceptual and not easily established by managerial intervention. For example, interfirm trust is something that should develop during the evolution of an interfirm relationship (Zanini & Migueles, 2013). It is therefore necessary to understand what practices can help to establish a collaborative environment. The following practices are recommended by Abramowicz et al. (2018).

1. To choose contractors that are willing to share information;
2. To choose contractors that are willing to share costs;
3. To choose contractors that are willing to share risks;
4. To choose contractors that favour long-term relationships over short-term profits;
5. To design win-win incentives for both contractor and client;
6. To stimulate the contractor to keep innovating and improving performance during the construction process.
Although these recommendations are formulated from the viewpoint of a client, they indicate the requirements for establishing a collaborative environment. They can also be linked to Verweij (2015b) his viewpoint on collaborative contracting. Verweij states that a cooperative approach is indicated by less focus on the contract itself and continuous collaboration during the execution of the contract.

2.1.5. **Contractual governance: an unilateral approach**

This paragraph shortly describes the composition of contractual governance, in order to be able to understand its role in common construction practices. This also enables the researcher to compare its role to the rules of MEAT procurement.

Contractual governance is based on unilateral/hierarchical relationships, that are controlled by written agreements (J. B. Heide, 1994). These written agreements cover clauses like handling contingencies and adjustments, specification and allocation of roles and responsibilities, and enforcing compliance with the desired output. All these agreements are written down in advance, and during the execution of the contract, the relationship is maintained by these agreements. A relationship is initiated by selecting a partner based on objectively assessable skills or qualifications. This can be identified in the tender phase, in which a client tries to find the right contractor for executing the job. Before a contractor is involved, the contract preparation is already being carried out. Without the involvement of the contractor, the roles and responsibilities are already allocated and written down in the contractual agreements. (Dwyer et al., 1987; J. B. Heide, 1994). By these detailed contract preparations, before a contractor is involved, flexibility is limited in the rest of the process.

2.2. **Public procurement in the Dutch infrastructure**

For finding the potential role of relational governance in the construction process, an understanding of the construction process, including the procurement procedures, is required. Firstly, the construction process, ranging from initiation to realisation, will be described. Thereafter, the practices of the procurement procedure by means of MEAT criteria will be outlined.

2.2.1. **Construction process**

Generally, a construction process ranges from the initiation to the realisation of a construction. However, nowadays, the phases after the realisation are considered to be of great importance too, since a more circular view is being adopted by the construction sector. This means that also the usage phase, including maintenance, as well as the demolition phase are included in the whole process. For this research however, the usage and the demolition phase will not be included.

This leaves the following four phases to be considered: initiation phase, the preparation phase, the tender phase and the realisation phase (Arjun, n.d.; “Inkoopproces | PIANOo - Expertisecentrum Aanbesteden,” n.d.).
Initiation phase

A project generally starts when the demand for the project arises. This is the early start of the project, in which the client formulates his objective, often in consultation of an advisory firm. It leads to the first feasibility study and investigation of the possible solutions. When enough substantiation is generated, the project continues to the preparation phase.

Preparation phase

In this phase, the objectives of the project are specified into more detail. It depends on the type of contract that the client is planning to use, to what extent the design is finalized. Traditional contracts demand the design to be almost fully completed at the end of the preparation phase, leaving no design freedom to the market. Other types of contracts, with a more collaborative character, provide more freedom to the market. Therefore the design is not completely finalised in the preparation phase, but project objectives are worked out into more detail. Also the tender procedure to be followed is chosen.

As an end result of this phase, all the documents that are needed in the tender phase should be completed. This generally requires a basic agreement, the demand specifications, which outline the project- and process requirements and the tender instructions (“Vraagspecificaties in de GWW | PIANOo Expertisecentrum Aanbesteden,” n.d.).

Tender phase

In the tender phase, the client puts the project to tender to the market. The market gets the opportunity to offer their services to the client, based on the client’s imposed project requirements. There are several available tender procedures that can be followed. These range from restricted to more open, from very rigid to more flexible (“Kiezen aanbestedingsprocedure | PIANOo - Expertisecentrum Aanbesteden,” n.d.). In public procurement procedures however, the involved parties should always act according to the rules of the level playing field, which prescribes equal chances for market parties (Huibregtse, n.d.).

The Procurement Act prescribes the possibility for clients to organize individual information rounds during the tender phase. During these information rounds, tenderers get the opportunity to align their ideas with the ambitions of the client. Although clients cannot evaluate the plans of the tenderers, they can give some insights in whether the ideas match with their ambitions.

After the market parties have submitted their offers, the client assesses the bids to decide which party has offered the most economically advantageous tender and is awarded the contract.

Realisation phase

The realisation phase is the phase in which the contract is executed. It regards the finalisation of the design, preparation of the works and the construction works. The extent to which the client is involved in this phase, depends on the type of contract that is used. With traditional contracts, the client has more involvement during the
realisation phase than with integrated contracts ("Contracteren: overwegingen en strategieën | Richtlijn herstelbeheer (water)bodemkwaliteit,” n.d.).

The end result of the realisation phase is the delivery of the final product.

Figure 1 visualises the previously described phases of a construction process.

2.2.2. Public procurement and MEAT procedure

As mentioned earlier, the tender procedure has to be organised according to the rules of the level playing field. Therefore the European Union has established rules for public procurement in the EU procurement directives ("Aanbesteden Europees en internationaal | Rijksoverheid,” n.d.). Within these directives, the general principles of public procurement law are recognized: equal treatment, non-discrimination, mutual recognition, proportionality and transparency ("Public procurement law in The Netherlands | PIANOo - Dutch Public Procurement Expertise Centre,” n.d.).

The general idea of public procurement is to provide equal chances to public orders or contracts with a minimum monetary value or cross-border interest for every supplier of works, services or goods. Therefore these contracts have to be procured via public tendering, which in short is the process of a contest being organised for contractors to apply for the job.

While formerly most contracts were awarded to the contractor that offered the lowest price, nowadays quality plays an important role in public procurement. According to the Dutch Procurement Law 2012, public tenders need to be assessed on qualitative value next to price only (Aanbestedingswet, 2012).

Currently, there are three different types of awarding mechanisms present in public procurement: 1) price, 2) cost (using a cost efficiency approach) and 3) Best Price-Quality Ratio (BPQR). These three types all fall under the umbrella term Most Economically Advantageous Tender, MEAT in short. It is prescribed to make use of the BPQR mechanism by default. Only in exceptional cases and if supported by sufficient motivation, the other two mechanisms can be applied (Aanbestedingswet, 2012).

The reason for awarding projects based on the best price-quality ratio is improving the quality of the works delivered. Experience from the past has learned that contractors would tend to deliver the minimal quality required if projects were awarded on lowest price bid. On the contrary, clients expected high quality. This has been one of the
reasons for the development of MEAT procurement. Best price-quality ratio awards have proven to be useful, especially in projects that are complex and cannot be fully determined in the construction specifications (Hardeman, 2015).

### 2.2.3. Most Economically Advantageous Tender Procedure

The MEAT procedure, in which the client searches for the best price-quality ratio, prescribes the inclusion of qualitative criteria in the tender instructions. These award criteria determine the qualitative aspects on which the bids will be assessed. The development of the MEAT procedure will be described per phase of the earlier defined construction process.

**Initiation phase – Ambitions**

Ideally the MEAT procedure starts at the project’s initiation phase. At this early stage the project demands are being investigated, which leads to an investigation of the project’s core values and a client’s ambitions. These ambitions can serve as the basis for the quality criteria that are used in the tender phase. *(Handreiking BPKV, 2019).*

**Preparation phase – MEAT criteria**

In the preparation phase, the project’s objectives are being translated into must-haves and nice-to-haves. The requirements that follow from this investigation, are included in the demand specifications. What the client considers as ‘nice-to-haves’ can be translated into MEAT criteria, also known as award criteria. These are included in the tender instructions and enable the conditions for distinctive bids. Moreover, they could serve to challenge the market to achieve higher quality.

**MEAT criteria**

MEAT criteria should be related to project specific demands, instead of a contractor’s characteristics of capabilities. This makes the difference between award criteria and selection criteria. Secondly, according to the general principles of public procurement, these criteria have to be transparent, proportional and non-discriminating. Therefore the formulation of the criteria should be unambiguous, so that only one interpretation by the tenderers is possible.

The Dutch public procurement act prescribes a maximum of three criteria. This is firstly to make it manageable for tenderers, because it demands a lot of time and money to write an offer on qualitative criteria. Secondly, too many criteria reduce the distinctive character of the MEAT procedure.

Not only provides the use of MEAT criteria the possibility for distinction, it could also enhance the project’s quality. It gives tenderers the opportunity to use their design creativity and it serves as an incentive to deliver added value to the project.

According to Rijkswaterstaat *(Handleiding BPKV 2017, 2017)* three types of criteria can be distinguished: performance criteria, quality criteria and price criteria. Price criteria are quite straightforward considering the formulation; a price unit. Performance criteria are formulated as quantitative units addressing for example time,
functions, CO2 emissions and other measurable performance units. Quality criteria are not quantitatively formulated. Examples are functionality, risk management and aesthetics. These criteria are assessed based on the expertise of the assessors.

*Tender phase – MEAT offer*

At the end of the tender phase, tenderers submit specific plans to the MEAT criteria in their proposals. If individual information rounds are used in this phase, the MEAT criteria can be a point of discussion, especially because of the design freedom that they provide, and questions that could arise.

After the bids have been submitted, they will be evaluated by assessors from the client. It is important that the assessors are able to objectively evaluate the bids in order to score the plans. Therefore, a client often requires from the tenderers to submit their plans written according to the SMART principle. SMART stands for Specific, Measurable, Achievable/Attainable, Relevant and Time-bound.

Based on the predefined weighting of every MEAT criterion and the bidding price, the subscription with the best price/quality ratio will result in the winning tender. There are several arithmetic approaches for defining the best price/quality ratio, of which value-based awarding is the most commonly used in the Dutch construction sector ("EMVI - Gunnen op waarde - CROW," 2016). Value-based awarding is an assessment method in which every quality aspect of the tender (MEAT offer) is translated into a fictional price that represents its value. The price/quality ratio is then determined by subtracting the fictional price, that the qualitative value represents, from the actual bidding price. This process is called the discount of the MEAT offer.

The tender that results in the lowest value, is the best price/quality ratio and thus the economically most advantageous tender (Chen, 2016; "EMVI - Gunnen op waarde - CROW," 2016).

*Tender value = Bidding price - Price of quality*

The offered price from the contractor is the total price he will receive for realising the requirements from the demand specifications including the added value, composed as a reaction to the MEAT criteria. This mechanism implies that the MEAT offer, or the added value, becomes subject to a fixed price (Figure 2).

*Realisation phase - Delivery*

After the contract has been awarded to the winning tenderer, the contractor in question goes into negotiations with the client to evaluate the tender and incorporate it into the basic agreement. According to the general principles of public procurement law the contractor has to comply with the plans of his tender bid, including the MEAT offer (Aanbestedingswet, 2012). Infringement of this agreement puts the client in the legal position to temporarily hold back payments or to terminate the contract.

The tender design is recommended to be translated into clear contract objectives that will be included in the contract agreements. Just like the MEAT plan should be written by the contractor in an assessable way, also the little room as possible to subjective interpretation of contract clauses (EMVI toepassen, 2014).
In conclusion, the following scheme in Figure 3 was composed, incorporating the development of sustainability ambitions, MEAT criteria, MEAT offer and delivery, per phase of the construction process.

![Figure 2: Financial structure of regular MEAT procedure (own illustration)](image)

![Figure 3: Development of sustainability per phase in the construction process (own illustration)](image)

2.3. The role of relational governance in the construction process

From the investigation of the various elements that are assigned to relational governance and collaborative contracting, a characterisation of relational governance is made.

Four described norms of relational governance seem to be the fundaments for achieving a relationship that is built upon collaboration. These are flexibility, solidarity, information exchange and mutuality.

These four elements can be regarded as the four pillars upon which relational governance can be executed.
2.3.1. Four pillars of relational governance

Flexibility should provide the conditions for both parties to act according to the objectives of the project, instead of acting according to the initial contract agreements. A flexible attitude can also enhance joint problem solving, as solving problems requires a creative thinking process. And when conflicts arise, a flexible approach to resolving these conflicts, can lead to harmonization.

Solidarity as second pillar is the fundament for acting reciprocally. When the involved parties show solidarity behaviour, they could be able to make decisions for the benefit of the project and put effort in maintaining a good relationship. When parties are solidary to each other, they are more likely to make small adaptations in order to reach harmonization of conflict. Moreover, solidarity could prevent parties from misusing their bargaining position towards the other party.

Information sharing can be seen as a prerequisite for collaboration, as it creates the opportunity to be open to each other. By sharing information, joint problem solving and joint planning can be facilitated, because it puts the other party in the ability to make the best choices, based on availability of information. Also to harmonise in conflicts, the exchange of information can make this process more easy, as it could provide better insight in each other’s interests. This may even prevent conflicts from arising.

Mutuality is the last pillar to be considered. The belief that success comes forth from the success of the other party, increases the feeling of shared responsibilities and can thus contribute to collaboration. Collaboration covers joint planning, joint problem solving and joint action.

2.3.2. Substantiating aspects to the four pillars

Other elements that were found in the characterisation of collaborative contracting, are informality and trust. An informal relationship might lead to an environment that facilitates collaboration and information sharing. Trust is a component that can be seen as something that develops over evolvement of a relationship, but only if parties act according to mutuality and show solidarity. This is because trust is about the belief and expectation of a party that the other party will act as desired (Das & Teng, 1998).

The effects of traditional contracting that were considered as deficiencies, are unequal risk allocation, rigidity, and mistrust. Collaborative contracting, which is built upon the fundaments of relational governance, is believed to be a solution to the deficiencies of traditional contracting. It could therefore be expected that relational governance entails the sharing of risks, flexibility and trust.

The presence of the four pillars over the whole construction process could enhance the relationship and have a positive effect on the outcome of a project. However, as these pillars describe concepts that are hard to allocate to a specific phase in the construction process, they are extracted into elements that are more specific and could be subject to managerial intervention.
2.3.3. Seven elements of relational governance

The first to be identified is flexibility. As the MEAT offer becomes fixed after the awarding, flexibility is required in the early phases of a project. This can be built in the ambitions and the MEAT criteria, to leave room for other or new solutions that the market can provide. When flexibility is used in the initiation phase and preparation phase, design freedom can be offered to the market in early phases.

The second element will be collaboration. In the initiation phase, collaboration between the client and his advisory firm can contribute to better formulated plans and ambitions. During the contract preparation phase, this can be continued, leading to well deliberated MEAT criteria. In the tender phase, collaboration could be present by choosing contractors that are willing to collaborate by sharing information, costs, risks and establish long-term relationships (Abramowicz et al., 2018). During the realisation, collaboration can contribute to joint problem solving for the benefit of the project and the achievement of MEAT offers (Verweij, 2015b).

Risk taking is decided to be an element of relational governance that can also be attributed to flexibility. If a party decides to leave design freedom to the market, for example by including this in the MEAT criteria, it can be seen as taking a risk, because the client cannot foresee what this will lead to. Thus a client should relinquish full control. Taking risks can be stimulated in the initiation and the preparation phase, by formulating project objectives that are for example innovative or unknown to the client. Showing the willingness to take risks early in the project, could enhance trust in later phases (Pillutla et al., 2003). Risk taking by deviating from the MEAT offer might be limited to the fixed budget in the realisation phase.

Risk sharing is seen as something that lacks in traditional contracting. By investigating risks early in the project during the preparation phase and allocating them fairly before the start of the contract, could take possible conflicts away as it shows signs of reciprocity to the contractor. Sharing risks could enable the environment for collaboration later in the project (Abramowicz et al., 2018; Verweij, 2015b).

Information sharing is also a pillar of relational governance. Information sharing might especially be of benefit during the realisation phase for solving problems and dealing with contingencies, when both parties have all the relevant information available. But also in the tender phase, mutual information exchange can lead to better aligned plans, when both parties are open to each other.

Informality is decided to be the sixth element of relational governance. Informal communication is a form of communication that can enhance mutual understanding. This could be present in the initiation and preparation phase between client and contractor to enable mutual understanding, which could lead to better inclusion of project’s objectives in the MEAT criteria. During the tender phase and the realisation phase, mutual understanding can be facilitated by informality (Ergen, 2011).
The seventh element is trust. While specific behaviours or activities in the construction process cannot easily be allocated to trust, it is included in this list of relational elements. As appears from literature, trust is an element that enhances a collaborative environment and follows from the presence of mutuality (McNeil in Diathesopoulou, 2010).

As an answer to the question that was put at the beginning of this chapter, Figure 4 presents the role that relational governance could play in the construction project in which MEAT criteria are used.

The MEAT offer that results from the tender phase, is in the regular procedure translated into contractual requirements. When the offer becomes limited to a fixed price, this procedure does not allow a lot of flexibility in the realisation phase. Therefore, it is argued that relational governance could play a role in the early stages of a project to have its impact on the later stages.
RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY
This chapter will focus on answering the second sub question in order to design a methodological approach for this study. The question that is addressed here is formulated as follows: “How can the role of relational governance in the construction process for achieving sustainability via MEAT criteria be assessed?”

From the previous chapter, it appears that relational governance could play a role in the successful delivery of complex projects. In order to find if and how relational governance can play a role in achieving sustainability by using MEAT criteria, a structured approach to investigate this should be designed. Therefore, findings from the literature chapter that were combined in the conceptual framework will serve as guidance for designing a research methodology. These paragraphs address the choice for using case studies, the methods for data collection and how these data will be analysed. Combined, these steps answer the second sub question.

### 3.1. Methodology design

The dynamics of a construction process could provide insight in the role that relational governance can play. A qualitative research approach fits best the objective of this research. Qualitative research is the collection of data that is of non-numerical form and has a more explanatory character than quantitative research (Verschuren & Doorewaard, 2010).

Case studies are a commonly used way to understanding a phenomenon in its context (Baxter & Jack, 2008). It requires the examination of a project (case) to understand the phenomenon. To assess the role of relational governance in the process of MEAT procurement and achieving sustainability, a case study approach is chosen for this research. It provides the researcher with the possibilities to gain an insight in different perspectives and the context.

After data collection, the acquired data has to be analysed in a structured and pre-determined way. The theoretical framework that was set up in chapter 2, serves as a mechanism for analysing the data. Contractual management is assumed to be more or less present in every case, since these projects are UAV-GC contracts and consider large budgets. Relational governance however, might also be present in these cases, albeit implicitly. A combination of the interview analysis and the document analysis shall serve as the foundation for researching the role of relational governance in the construction process for achieving sustainability via MEAT criteria.

### 3.1.1. The case study

A case study is a way to gather in-depth knowledge of a specific complex phenomenon (Baxter & Jack, 2008; Verschuren & Doorewaard, 2010). By studying a specific case, a researcher is able to map out all the ins and outs of the observed situation. According to Yin (2003), a case study approach should be used when the research is focused on answering ‘how’ and ‘why’ questions, when the behaviour of the actors involved cannot be manipulated by the researcher, when contextual conditions seem relevant for understanding the phenomenon to be studied and when the boundaries between phenomenon and context are hard to define.
When using cases to study a specific phenomenon, one could use multiple cases or a single case study. The benefit of using multiple cases is that it is easier to generalize the findings, because they can be verified cross-cases. A downside here is that the cases need enough similarities in order to be able to compare them and draw general conclusions (Verschuren & Doorewaard, 2010). A single case study on the other hand requires a very detailed description of the context and factors related to the phenomenon, since the findings of a single case study relate only to that specific case. It is relevant to provide others with enough information to apply the findings to other situations. A way in between multiple case studies and a single case study is a comparative case study. This strategy offers the researcher the opportunity to discover a causal relation between an independent and a dependent variable. Therefore two cases are needed that differ greatly on the independent variable (Verschuren & Doorewaard, 2010).

The type of available cases is not sufficient for conducting a comparative case study, therefore it is chosen to execute a multiple case study. It offers the researcher the ability to discover patterns of relational governance over multiple projects, connected to the use of sustainable MEAT criteria.

### 3.1.1.1. Multiple case study

Three different projects have been chosen to conduct research on. These projects all meet a predefined set of main criteria, which will be elaborated on in the next paragraph. Also, there is a set with sub criteria, that are inferior to the main criteria. However, every of these criteria is met by two out of three cases, leading to a triangular relationship between the three cases. It defines in advance certain similarities and differences between the cases. This could later in the analysis be extended with findings from the documents and interviews.

#### 3.1.1.1. Case selection criteria

The cases were selected based on two rationales. First, the cases all had to be within the scope of this research. So the cases have to be publicly procured infrastructure projects within the Netherlands, procured by governmental clients like Municipalities, Provinces or Rijkswaterstaat. Sustainability has to play a part in the tender phase. So there needs to be a MEAT criterion that is somehow related to sustainability ambitions. Also, in order to profoundly analyse the development of relational governance over the course of the project, the whole process from initiation to realisation has to be observable. The criteria are set out in Table 3. Table 4: Sub-criteria shows the set of sub criteria that connects the cases in a triangular way to each other. This could be helpful in explaining potential differences between the outcomes of the case studies.

A brief explanation and motivation for the chosen cases is given at the end of this chapter, in paragraph 3.2.
Publicly procured

UAV-GC (integrated contract) in realisation

Infrastructure

Within the Netherlands

Governmental organisation as client

Sustainability present in the MEAT process

Process covered from initiation to realisation

Table 3: Case selection criteria

<table>
<thead>
<tr>
<th>CASE</th>
<th>Design freedom</th>
<th>Specific sustainable MEAT criteria</th>
<th>Type of client</th>
<th>Part of bigger scope</th>
<th>Ambition from policy document</th>
<th>Process focused on market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case A</td>
<td>UAV-GC</td>
<td>X</td>
<td>Municipality</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Case B</td>
<td>UAV-GC</td>
<td>X</td>
<td>Province</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Case C</td>
<td>Design team</td>
<td></td>
<td>Province</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 4: Sub-criteria

3.1.1.1.2. Alternative case considerations

Three other cases were present to analyse, of which two were not yet delivered. Thoughts were made about still implementing them in the research, however the researcher decided that gaining knowledge over the whole process would lead to more sufficient data. The other possible case to analyse regarded the same scope as case B. While it could provide some interesting insights, the key actors could not all be reached. Moreover, the focus lay on innovation instead of sustainability and that was figured to be out of scope.

3.1.2. Data collection

Two main strategies will be applied for collecting sufficient and relevant data on the three cases. Since generalization is quite difficult based on only three cases, because it regards unique phenomena to be studied that can differ over every case, using multiple ways to collect data is recommended (Verschuren & Doorewaard, 2010). Examples are observation, document analysis and interviews.

The three cases in this research will be studied by means of document analysis and interviews. This provides the researcher with both an understanding of subjective as well as objective aspects regarding the studied phenomenon. This is required in order to be able to understand the characteristics of the problem. The data will be collected with a focus on the four phases that have been defined in Chapter 2. Per phase in the construction process (initiation, preparation, tender and realisation), certain factors play a role in achieving the deliverable of that phase (sustainability ambition, MEAT criteria, MEAT offer and delivery). These factors will be investigated by analysing relevant documents and by interviewing key actors in the process.
3.1.2.1. **Document analysis**

Per phase, certain documents are of relevance to analyse. These are the documents that have a connection to the formulation of sustainability ambitions, MEAT criteria and the MEAT offer. Also documents that contain information on how the process will be designed, considering the relationship between the involved parties, are considered relevant. This provides an overview of how the construction process, from initiation to realisation, is built up.

First, what will be retrieved is the ‘end result’ of each phase. This considers the sustainability ambition, the MEAT criteria and (if available) the MEAT offer. The final delivery in the realisation phase cannot be retrieved from documents, so that is to be discussed in the interviews.

Secondly, document analysis should point out which order of consecutive steps was taken prior to the conclusion of each phase. Not only the steps that were taken, also the involved actors are highlighted. For example, in the initiation phase, the following will be the result: *which steps and which actors played a role in formulating which sustainability ambition that served as a starting point for the MEAT criteria.* Appendix B - Document analysis maps out which documents will be subject to research and what will be retrieved per document.

Analysis of the information that is retrieved from the documents will be done by structuring them in a timeline of the construction process. Doing so provides the researcher with a clear overview of the consecutive order of actions.

The factors to be described are the steps that have led to these described end-results, or the development of sustainability ambitions.

3.1.2.2. **Interviews**

Obviously, not every step in the actual process is described in the formal documents. Therefore, the second part of the data collection will be conducting interviews with key actors in the process.

3.1.2.2.1. **Interviewees**

Because the topic of this research is the role of relational governance, it is important to consider various perspectives of the process. These are defined to be that of the client, that of the advisory firm and that of the contractor. From every party, a closely involved actor will be interviewed. From the client it should be a project manager, contract manager or someone else who was involved in the process of setting MEAT criteria. For the actor of the advisory firm, the preferred roles are contract manager or project manager. From the contractor’s side, it is also preferred to interview someone who was closely involved in the tender (writing the MEAT offer) and in the realisation phase.

3.1.2.2.2. **Structure of the interviews**

Interviews should complement the missing information for gaining a profound understanding of the phenomenon. First of all, unclear and remarkable findings from the document analysis will be verified or discussed...
with the interviewee. Secondly, the four phases of the process will be considered in order to find which factors have led to the end-result of each phase, according to personal views. Thirdly, the interviews are meant to give more insight in the relational part of the project.

There are several methods for conducting interviews, ranging from very structured to unstructured (Baarda et al., 2013). The difference regards the amount of influence the interviewer has on the answers that she is able to get and to what extent these answers are in line with the topic. Semi-structured interviews are a way to provide guidance to the topics that will be discussed, but leaves room within these topics for personal experiences and different perspectives. This type of interview is also known as topic-interview, as the researcher will decide beforehand which topics should be discussed (Baarda et al., 2013). The sequence of the topics and how the questions are put to the interviewee, depends on the natural flow of the interview.

Semi-structured interviews will be beneficial for this research as it provides the opportunity to seek for characteristics of relational governance present in the process. Yet, it will not limit the answers to the lines of expectations of the researcher, but other perspectives can be pointed out and contribute to a more complete, holistic understanding of the problem.

The first part of the interview is designed to gain insight in how the project developed. This will lead to a set of factors that resulted in the sustainability ambitions, the MEAT criteria, the MEAT offer and eventually the delivery. The aim of the second part of the interview is to investigate the extent to which elements of relational governance have been experienced. These elements follow from the literature review as follows:

1. Flexibility
2. Collaboration
3. Risk taking
4. Risk sharing
5. Information sharing
6. Informality
7. Trust

In order to challenge the interviewees and to prevent them from being guided into one direction, the formerly described elements of relational governance will be put forward with their opposites. This enables the interviewee to consider both sides of this topic, which is meant to provide a more in-depth insight in the process.

1. Information sharing versus information withholding
2. Risk taking versus risk aversion
3. Risk sharing versus risk transferring
4. Flexibility versus rigidity
5. Collaboration versus control
6. Informality versus formality
7. Trust versus mistrust

Because the formerly mentioned elements are not objectively measurable, the interviewees are asked for specific expressions of these characteristics. This allows the researcher to connect the elements of relational governance to concrete actions, steps or events.
An interview protocol is drawn up, which outlines the subjects to be discussed with the interviewees. This protocol can be found in Appendix C - Interview protocol

3.1.3. Analysing the data

After the interviews have been conducted, they are transcribed. After transcription, the interviews will be reviewed.

Firstly, the factors that come forward from the interviews as having contributed to the formulation of sustainability in each phase, are highlighted and set out in a time-line together with the factors from the document analysis. Per factor, the involved actors will be described too. For the realisation phase these factors regard the factors that contributed to the delivery of the MEAT offer. The structure of the relation in which these factors will be reviewed, is set out in Figure 5.

The second part of the interviews regards the consideration of relational elements in the process. Per phase, the interviewees describe whether or not these elements were present and how that was expressed. These findings will be connected to each phase in the same manner as the findings from the first part of the interviews. This structure is set out in Figure 6.

Figure 5: Structure of how the factors retrieved from document analysis (below time-line) and factors from interviews (above time-line) are related to the development of sustainability through MEAT criteria
3.1.3.1. Retrieving insights from the results

To find the relational elements that have played a role in achieving sustainability, the data from the first part of the interview and the data from the second part of the interview will be compared, per case separately.

3.1.3.1.1. Similarities: presence of relational governance

The researcher will attempt to find similarities between the factors that contributed to the development of sustainability (part 1) and the expressions of relational governance (part 2). If these are found, it is an indication that a specific relational element has played a role in the development of sustainability.

Thereafter, the researcher will have a second look at part 1 of the interview, to look for implicit presence of the elements of relational governance that were indicated to play a role in the development of sustainability. This will be substantiated by looking for key words and their synonyms that can be related to the description of the elements, as set out in Table 5.

The amount of expressions allocated to each element will be counted in order to get a feeling for its weight per phase.

3.1.3.1.2. Deviations: MEAT procedure

The financial structures that were found in the documents, are compared to the contractual implications of a regular MEAT discount, to see if deviations could be found. These deviations are consecutively compared to the findings of interview part 1.
If contributions to the development of sustainability, especially in the realisation phase, can be allocated to the contractual deviation, the role of the financial structure can be determined.

<table>
<thead>
<tr>
<th>Key words</th>
<th>Relational element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility, flexible, adaptations, looking for opportunities</td>
<td>Flexibility</td>
</tr>
<tr>
<td>Collaboration, together, mutually, shared, shared decision making, deliberation</td>
<td>Collaboration</td>
</tr>
<tr>
<td>Risk taking, risk control, unfamiliar, new, innovation, unpredictable</td>
<td>Risk taking</td>
</tr>
<tr>
<td>Risk sharing, sharing costs</td>
<td>Risk sharing</td>
</tr>
<tr>
<td>Information sharing, transparency, open, knowledge</td>
<td>Information sharing</td>
</tr>
<tr>
<td>Informality, communication, non-work related</td>
<td>Informality</td>
</tr>
<tr>
<td>Trust, faith</td>
<td>Trust</td>
</tr>
</tbody>
</table>

Table 5: Key words of relational elements for analysing interviews

3.1.3.1.3.  Cross-case analysis

A cross-case analysis allows the researcher to compare the results of single cases with each other. This provides a way to observe similarities and to interpret the data in a more generalised view.

Per phase, the expressions of the relational elements of all cases will be reviewed. When the same type of expressions are observed between two or three cases, it could be argued that it shows a trend. This shows stronger argumentation for the results.

3.2. Case description and motivation

This paragraph goes a little more into detail about the chosen cases. It motivates the choice for the cases and describes shortly what the cases are about. Also, the researcher addresses the limitations that the cases might bring about. The tables describe which actors are interviewed per case.

3.2.1.  Case motivation: Case A

This case is an example of a highly ambitious project, in which not only sustainable MEAT criteria were used, but the ambition was translated into specific sustainability requirements that had to be met. Interesting to investigate is the result of the market consultation. Moreover, the high ambitions of the client were explicitly communicated to the market in the tender phase.

Compared to the other cases, Case A is probably the least complex case, because it regards a relatively small project in quite a simple context. Not many actors with opposing interests were involved. The ‘simplicity’ of the case could have been a contribution to the successfulness of the project. Therefore this has to be taken into consideration during the analysis.

Also, this project was initiated more than 3 years ago. This means that not every detail lays fresh in one’s memories and during the interviews, the focus might lie more on recognition instead of recollection.
RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

3.2.2. Case motivation: Case B

This case is a provincial road construction project that consist of multiple sub contracts. Two sub contracts can be studied; B.1 and B.2. Both contracts included sustainable MEAT criteria, but the type of formulation was completely different. One contract formulated very specific, non-flexible sustainable MEAT criteria, the other offered more design freedom. Also, both sub contracts did not have explicit sustainability ambitions at the start. Since these sub cases belong to the same scope and have the same client, comparing them could lead to interesting insights regarding the sustainable MEAT criteria. There is an evaluation available from one of the procurement procedures, with experiences from the market. This can be taken along in the analysis. A limitation of this case is the fact that the project was procured already around six years ago, so some details might be forgotten.

3.2.3. Case motivation: Case C

Case C is a project that has recently been delivered. It was started in 2016, so it is quite a recent project. It is an interesting case to assess, since there was a specific sustainability ambition from the client at the start of the project: to realise a moveable bridge out of biobased composite. By making use of a Design team, a collaborative form of design and procurement, this ambition was translated to a bridge design of biobased composite. The collaborative character of the initiation phase makes this an interesting case to study, because of the relational aspects that are assumed to have been present in this phase. The focus on sustainability lies mainly on the initiation phase. It is therefore that it is considered a relevant case, because it could be compared to a case in which there is no focus on a certain phase.
4. Results

Three cases were studied by means of document analysis and semi-structured interviews. An in-depth insight in the development of the sustainability ambitions, through MEAT criteria until the final delivery was gained. In the following chapter, the answer to the third sub question will be answered: “Which elements of relational governance play a role in the construction process using MEAT criteria in achieving sustainability?”

This chapter starts with a process description of each case, divided into their separate phases. Per phase description, the factors that contributed to the development of sustainability and the sustainability formulation itself are provided.

Paragraph 4.4 presents the findings from the data analysis and interviews per case separately, these are the elements of relational governance that have played a role in achieving sustainability. A cross-case analysis is performed in paragraph Cross-case analysis4.5. This presentation compares the relational elements in order to distinguish general trends. Thereafter, the findings on the deviations of the cases from a regular MEAT procedure are presented. This chapter is finalised by the results from a validation step with two experts.

4.1. Case description Case A
Client: Municipality A
Project Type: Spatial development
Year: 2016-2018

This project considers a spatial development of one of the main streets in the vicinity of city’s central train station. Because the municipality has a sustainability vision for the whole city, the ambition for this project is to realise the ‘most sustainable street’ of the city. This should not only be reached in the materialisation and the processes, but also in the appearance.

4.1.1. Case A Initiation phase – Sustainability ambition

- To realise one of the most sustainable streets of the city
- To realise a healthy and green street
- To realise a future proof and sustainable street
- List of 200 opportunities divided over four categories, of which two sustainable categories

Figure 7: Formulated sustainability ambition of case A
Start of the project
The engineering firm got involved early in the process to assist the Municipality in investigating the sustainability opportunities for this project. The Municipality left a lot of freedom to the advisory firm to formulate the sustainability vision. This task was perceived as a big challenge by the advisory firm, which is why many resources were invested in defining sustainability opportunities for this project. The project leader from the client was said to have a feeling with sustainability, which was indicated as one of the reasons that this orienting approach was supported. Secondly, the good project culture reduced the need for control by progress proceedings. Trust was said to be present in the project team, which supported the investigation of opportunities rather than risks.

Investigation of opportunities
In the initiation phase many actions were performed to investigate the sustainability opportunities for this project. This included workshops and brainstorms with the project team, but also with stakeholders, residents, experts on circular economy, the architect and research institutes. The collected opportunities were substantiated by desk research on the embeddedness of sustainability in other projects, the newest techniques and methods.

All this information was consecutively organized according to the Omgevingswijzer, after which a Multi Criteria Analysis filtered the undesired and unfeasible options. The remaining opportunities were compared to the initially formulated criteria in order to assess their match. This resulted in a list of sustainability opportunities that served as a guideline for the contract in the contract preparation phase.

Early market approach
A preliminary design was already made by an architect and served as the basis for the final design. When the engineering firm got involved, they immediately approached the market even before the contract was made. The aim of this market approach was to gain knowledge on how to procure the ‘most sustainable street’ in order to align the client’s expectations with the market’s capabilities. This was done about one and a half year prior to the tender and led to knowledge that was used during the contract preparation.

Sustainability ambition
The formulated ambition that was the end-result of this phase, was to realise the most sustainable street of the city. This was divided into four sustainability categories, of which two can be allocated to environmental sustainability: a healthy and green street, and a future proof and sustainable street. A list of 200 sustainability measurements substantiated this ambition.
4.1.2. Case A Preparation phase – MEAT criteria

In the contract preparation phase, the opportunities from the list of 200 measurements were allocated to either the preliminary design, the contract requirements, the design freedom or outside of the contract’s scope. This choice was based on the following criteria: relevance for the project, the feasibility, technical feasibility, the experience, the greening (integration of nature values of biodiversity), climate change (CO2 reduction), health, costs (investments relative to traditional solution) and risks in execution. This resulted in a contract in which many sustainability measurements were integrated. The measurements that were not translated into requirements, ended up in the MEAT criteria category, formulated as ‘innovative sustainability opportunities’. These measurements were included in an inspiration document for the tenderers.

It was partly due to the contract manager from the client that both parties succeeded to include all these sustainability measurements in the contract. Incorporating so many sustainability requirements demands a lot of work and precision.

As a result of the early market conversations at the start of the project, the client and the advisory firm designed a back-up option to be included in the contract. This back-up option was meant to control the risk of a sustainable solution not being in accordance with the client’s aesthetics wish. A small contract clause prescribed the power for the client to rely on the back-up option.

Sustainability in the MEAT criteria

The tender document included five MEAT criteria, of which four were allocated to sustainability. Even though these criteria could potentially conflict with each other, the risk was taken to include them all and leave the trade-off to the market. As achieving a 100% score on all criteria is not possible, the idea was to challenge the tenderers to design the most sustainable or optimal combination of the four criteria. Aiming to provide the tenderers with enough design freedom to achieve this optimal solution, the materialisation of the preliminary design was released.

Another round of market consultations was held at the end of the contract preparation phase, during which the proposed MEAT criteria were a point of consideration. As a result of this, the weighing of the maintainability and Life Cycle Cost (LCC) criteria was lowered, because the market indicated the conflicting relation between high sustainability and high maintenance costs.
There were four MEAT criteria allocated to sustainability, of which one was divided in two sub criteria. Out of these five, two were of quantitative and three were of qualitative nature. The quantitative criteria addressed the Environmental Cost Indicator (ECI) and the Life Cycle Costs. The qualitative three were Circular Economy, Maintainability and Innovative Sustainability options.

4.1.3. Case A Tender phase – MEAT offer

Figure 9: Sustainable MEAT offer of case A

Safeguarding sustainability in the tender

At any time during the tender phase, the client was available for face-to-face contact with the contractors in individual information rounds. This provided the opportunity for the contractors to ask questions and to verify their plans with the client’s ambition. During these information rounds, the focus was laid on the project’s content. The contractor perceived this as a very valuable way to ensure that sustainability was well integrated in the tender bid and that the plans of the contractor were well aligned with the client’s expectations.

The fact that assessment on the ECI score had a substantial weight in the criteria, stimulated the contractor to include innovative solutions that would contribute to reaching the best possible ECI score and thus reduce the environmental impact. This was enabled by the quantitative character of this criterion, as potential risks of the innovative solutions are not considered in the ECI score.

Writing a sustainable tender bid

For writing the tender bid, the winning contractor consulted a circular economy expert. The contractor focused mainly on the aspects in the reference design that had the highest influence on the Environmental Cost Indicator. For these aspects (the mould, the street bricks and the asphalt bike lane), alternatives with a lower environmental impact were designed. This was done by looking for innovative solutions that were already proven in pilots, but also by making use of local suppliers. The high weight on this criterion triggered the contractor to optimize this value, which led to an offered ECI of around €43.000 instead of €122.000.

The innovative sustainability opportunities were invented during a brainstorm with an external consultant, who was hired to stimulate the creative thinking process. A little less attention was given to the LCC criterion. For this aspect, the best possible solution was offered, within the boundaries of the ECI.
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**Expectations of the winning contractor**

The contractor was said to share the same ambition as the client: to realise the most sustainable street of the city, which led to the development of a good project culture during the realisation.

### 4.1.4. Case A Realisation phase – Delivery

#### Finalizing the sustainable design

After the contract was awarded to the winning contractor, the final design was made prior to the execution phase. Integrated design sessions with the contractor and the client were held in order to align expectations and to assure that the client knew what was going to be executed.

At that time, the outcome of a study into the impact of street bricks on noise disturbance revealed that street bricks would lead to an unacceptable level of noise disturbance. However, one of the main wins on the ECI score was reached by the reused street bricks. As a result of this contingency, the initially offered sustainability score decreased significantly. While this risk was allocated to the client, the contractor designed an alternative solution that even reached a better ECI value than the initial design. This solution included an innovative asphalt mixture from the contractor, who saw this unforeseen circumstance as an opportunity for a pilot of an innovation. A 10-years guarantee on this innovation was offered by the contractor to reduce part of the client’s risk. This contingency also led to the exploration of an alternative solution for the sewage system, which led to reduced costs.

#### Safeguarding sustainability during the execution

Compliance with the contract was monitored by means of System-based Contract Management, which is a risk-based method. So monitoring was done on aspects that bore the most risk. However, sustainability was said to be so well integrated in the contract and the project’s culture, that it was in little need of monitoring. When adaptations to the design were made due to contingencies, the ECI score would be updated. This led to a constant monitoring of sustainability. Even more, during the execution of the works the contractor and the client kept a critical attitude towards the project and invested time in looking for opportunities to improve the ECI score. This resulted in a few significant adaptations.

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**Figure 10: Final delivery regarding sustainability in case A**

- ECI of €39.017
- Epoxybitumen street instead of paving stones
- Aquaflow instead of sewage system
- Local trees
- Local sand mixed with humus for the trees
- Self-sufficient lighting system
- Bamboo traffic signs

---
Contractor shared the same ambition as the client and wished to realise the most sustainable street of the city, which would be a good reference project for the contractor. Sustainability remained a point on the agenda during frequent and intensive progress meetings, in order to stay focused on the sustainability ambitions.

Delivery of sustainability

The contractor had offered an ECI score of €42,375,96 in the tender. Several improvements were made during the realisation: 1) replacing the street bricks for an innovative asphalt type with a longer life cycle, 2) an alternative for the sewage system, 3) planting local trees in local soil fertilised with hummus, 4) adapting the lighting to a self-sufficient system, and 5) placing bamboo traffic signs. The result is an ECI score of €39,017,-.

4.2. Case description Case B

Client: Province B
Project Type: Highway construction
Year: 2013-2016

This project is part of a bigger scope, that considers the development of a big central highway through the province. Its objective is to improve the province’s accessibility, the road safety and the liveability and to give a qualitative impulse to the surroundings. The latter regards agriculture, nature, water management, recreation and tourism, cultural history and social-economic aspects. In order to keep the enormous scope of the project manageable, the project was divided into 19 sub-contracts. This case is about one part of the total scope and includes among other things an aqueduct and a road construction.

4.2.1. Case B Initiation phase – Sustainability ambition

Start of the project

The initiation phase covers the whole scope of the project. During this initiation phase, the Province decided to divide the initially three sub contracts into more sub contracts. This led to the whole project scope being cut into 19 parts. The main objective of the project was to realise new a connection that does not cut through living areas, but goes around them. This offered the opportunity to improve the quality of the surroundings.

The advisory firm got involved at the start of the project to compose all the contracts and lead the tender procedures.
Political sensitivity
Because the road cuts through nature, the initiation of this project led to a lot of resistance from local residents and other stakeholders. A lot of effort was put in the creation of support, which enhanced the political sensitivity of the project.

Sustainability ambition
At the initiation of the project, the Province formulated several ambitions, however no clear sustainability ambitions were present.

4.2.2. Case B Contract preparation phase – MEAT criteria

Newly adopted tender strategy
The tender for this sub contract had already been put in the market, before the new Procurement Act came into force. However, the project was put out to tender with the inclusion of MEAT criteria. Yet, the client had little experience with this assessment procedure.

As some time had passed since the initiation of the whole project and the contract preparation for sub contract M2, the Province imposed an adapted tender strategy. This prescribed the use of MEAT criteria that addressed at least sustainability and the reduction of hindrance.

Objective MEAT criteria
When the tender document was drawn up, the client showed his doubts towards the use of MEAT criteria, because it entails a certain subjectivity. Therefore, they wished for an objective assessment method. After a lot of discussions and deliberations with the advisory firm, it was decided to impose the MEAT criteria as a box checking system. The client had one main problem that he wished to be solved in the MEAT criteria, which was reducing the hindrance to road traffic to a minimum. Because the criteria were imposed as a box checking system, the solution for this problem, was already designed by the client. Sustainability, formulated as the reduction of CO2 emissions, was incorporated in this predefined solution. The decision to include sustainability had two reasons. First, it was said to be a good political selling point. Secondly, it could easily be integrated in the proposed solution for traffic hindrance, which was perceived as killing two birds with one stone.
The MEAT criteria

The MEAT criteria that resulted from these discussions, were seven solutions to limiting traffic hindrance and reducing CO2 emissions. Per criterion, the contractor could subscribe on one of the pre-defined amounts or percentages. For example, for the supply of steel per ship, the contractor got to subscribe on the following options: $\geq 40\%$, $\geq 60\%$ or $\geq 80\%$.

4.2.3. Case B Tender phase – MEAT offer

Figure 13: MEAT offer of case B

No distinction in the tender phase

In the tender phase, two individual information rounds were provided by the client for the contractor to align ideas with expectations.

However, the MEAT criteria appeared to fall short in their distinctive character. As the assessment was done a quantitative manner, the client did not exactly know how the contractor was planning on achieving the values that he offered. All the bids were almost exactly the same. Every contractor had offered the best score on every criterion, only the price offers differed. Thus, eventually the assessment came down to scoring on the lowest price. The offered price of the winning contractor was significantly lower than those of the other contractors.

Writing the tender offer

By imposing MEAT criteria as was done in this tender, the design freedom was taken away. Contractors do not get the opportunity to be creative and offer a potentially better solution, also regarding sustainability.

The contractor approached these MEAT criteria by handling them as contract requirements. Therefore, an investigation of the soil streams was made, in order to fit that in the MEAT criteria. The choices for supplying materials per ship was made because it was imposed in the MEAT criteria, but also because it turned out to be economically more efficient. Sustainability did not play a role in this consideration.

4.2.4. Case B Realisation phase - Delivery

Figure 14: Final delivery regarding sustainability in case B

- No specific CO2 reducing process
After the project was awarded, it quickly became clear that the client foresaw major risks in the execution plans of the contractor for the aqueduct. That led to an adaptation of the design of the works. While the MEAT criteria and therefore the offer were designed on the reduction of traffic hindrance and the reduction of CO2 emissions, the new execution design only took into consideration the reduction of traffic hindrance. This led to the sustainability ambition to disappear, because neither the client, nor the contractor steered upon CO2 reductions during the realisation. The project was monitored on the daily issues instead of the tender bid in order to timely deliver the project.

4.3. Case description Case C

Client: Province C
Project Type: Bridge construction
Year: 2016-2019

This project is part of a bigger scope, which is the construction of a new 12 km highway, including the (re)construction of aqueducts and bridges. Case C involves the replacement of a moveable bridge for cyclists. As the Province had the ambition to realise some profiling model projects within the bigger scope, the replacement of this bridge was found to be a good opportunity for achieving this. The ambition was to design and construct a bridge out of a bio-based composite. This project’s innovation and design were developed in a Design team.

4.3.1. Case C Initiation phase – Sustainability ambition

Figure 15: Formulated ambition of case B

Development of the ambition

This innovative construction started with the ambition of the Province and the official principal to realise a final top-of-the bill project within the bigger scope. Besides, the Province had the intention to be a leader in the transition to a circular economy, which is why sustainability ambitions are included in the policies of the Executive Council. At the time, the official principal had attended a congress about bio-based composites and got enthusiastic about realising such an innovation in the Province too. Subsequently, this led to an investigation of civil constructions that still had to be realised in the projects scope, to look for potential constructions that could be manufactured in a bio-based composite. The investigation was performed by the client and led to the decision to launch this innovation for a moveable bicycle bridge replacement.

This idea was pitched to the Province with the aim to get the resources to further investigate the opportunities in collaboration with the market and educational institutions.
Formulated ambition

The ambition at the end of the initiation phase was to realise a moveable bicycle bridge in a bio-based composite, in collaboration with the market. Because the client wanted to be involved in the development of the innovation, the decision was made to do this in a Design team.

4.3.2. Case C Contract preparation phase – MEAT criteria

- Bio-based composite (knowledge and expertise)
- Ambition to realise a 100% bio-based bridge deck for a 17-meter span

Figure 16: Formulated MEAT criteria in case C

Feasibility study

The advisory firm was already involved as contract manager for the bigger scope of projects in the Province and they participated in the feasibility study that followed the initiation phase. Research into the market potential and technical achievability were meant to lead to substantial knowledge to decide whether or not to continue the innovation.

The results of the feasibility study provided enough substantiation to continue the innovation. Due to the limited amount of producers that would have the capability to develop this innovation, it was decided to perform two separate tender procedures: one for the constructor of the bridge and one for the producer of the bio-based material.

Risk controlling

In order to control the risk of failure in the development of the innovation, a back-up option was included in the contract requirements. That provided the client with the opportunity to manufacture the bridge in glass fibre, in collaboration with the same producer and constructor.

MEAT criteria

When the tender documents were drawn up, the project team had formulated the ambition to realise a bridge deck with a 17 meters span, made from a 100% bio-based material. It was important to put this forward in the tender documents, as the project team had the intention to find partners that shared the same ambition. This resulted in a MEAT criterion that addressed the proposed approach for collaboration in the Design team, which was to enable the project team to choose the right partners.

The other MEAT criterion addressed the knowledge and expertise that was needed for the development of the innovation. For the constructor, sustainability or knowledge about bio-based composites was not included in the MEAT criterion. For the producer, the MEAT criterion addressed the knowledge about bio-based composites.
4.3.3. Case C Tender phase – MEAT offer

- Ambition to realise a 100% bio composite (producer)
- Thorough material study (producer)
- Design leader that was familiar with the Province (constructor)
- Expert in moveable constructions (constructor)
- Organisation consultant (constructor)

*Figure 17: MEAT offer of case C*

**Individual information rounds**

During the tender phase, individual information rounds were held in order to check whether the written ambition matched the intrinsic motivation of the tenderers. Oral explanations were believed to offer the right environment to get acquainted with the motivation of the tenderers.

**MEAT offer of processual approach**

A well deliberated approach of the process was offered by the constructor, for he had understood the need for collaboration. Secondly, he introduced a design leader that was familiar with the client, an expert on moveable constructions and a collaboration consultant.

The offer of the producer was based on performing a thorough material study, by which he was able to show his expertise. It led to faith by the client that this party would be the best partner to try to realise their ambitions.

4.3.4. Case C Realisation phase – Design

- 22-meter span
- 82% bio content
- Whole deck of bio-based composite
- Steel piling (instead of concrete)
- Recycling the concrete from the old bridge

*Figure 18: End-result of design phase regarding innovation and sustainability in case C*

**Dissolution of realisation contract**

After the Design team was completed with a producer and a constructor, the realisation contract, that was also tendered, was dissolved. All parties quickly agreed that the uncertainty about the innovation and the resulting design, did not provide the right grounds for how the realisation works were procured. It was decided to do the tender of the realisation after the design was completed.
Development of the innovation

During the design phase, several compositions of materials were tested by the educational institutions that the Design team collaborated with. These compositions were tested on their constructive characteristics. Several different combinations of mixtures and constructions were researched in order to try to achieve the optimal sum of combinations. This led to a design with 82% bio content.

Improvement of the design

After the best mixture was found, the architect got involved to design the bridge. The initial idea was to manufacture the 17 meter moveable span in a bio-based composite. However, the architect triggered the Design team to build the whole bridge in bio-based composite.

To realise the whole bridge deck from bio-based material would lead to significant additional costs. So in order to get the (financial) support from the Provincial Council, the design had to be improved to cut costs. This resulted in the maximisation of the span of the moveable part from 17 meters to 22 meters.

The Provincial Council approved and financed the new design, which was partly facilitated by the project manager who was also able to release costs in other provincial projects that he was involved in.

Including sustainability

When the Design team continued to the final design, the mindset grew to put more effort in achieving sustainability values. This resulted in the reuse of concrete of the old construction in the new construction and compensation of the consumed energy in another project. Secondly, the use of concrete was reduced to a minimum, partly to match sustainability values, partly also to contribute to the aesthetics of the construction.

4.3.5. Case C Realisation phase - Delivery

- 22-meter span
- 82% bio content
- Whole deck of bio-based content
- Steel piling (instead of concrete)
- Recycled concrete from the old bridge

Figure 19: Final delivery regarding innovation and sustainability in case C

Safeguarding the design

As the final design was already completed and ready to be put to tender, all the specifications of the design were put in the contract requirements, to guarantee continuation of the Design team’s efforts.

The final design was transferred to the realisation teams during a ‘warm’ handover session. Despite the initial idea of only making the preliminary design in the Design team, this evolved in the agreement to continue the works until the final design. Therefore, the realisation teams were provided with a nearly complete design to be executed.
Three months prior to the start of the execution works, the realisation team from the constructor was already introduced in the business of the Design team to get familiar with the contract and the financial conditions. During the realisation, the Design team was maintained in order to prevent knowledge and expertise from being lost. The Design team functioned as an overarching steering group and client of their own colleagues and continued to work out their plans.

4.4. Findings – Relational elements

This paragraph presents the findings from the separate case studies. The research looked into factors that the interviewees indicated as contributions to the development of sustainability. These contributions were subsequently linked to the expressions of elements of relational governance that the interviewees mentioned. An extensive table that presents these findings per phase, can be found in Appendix D - Relational elements per case. These tables present 1) the similarities that the researcher found between the factors that contributed to the development of sustainability per phase and the expressions of relational governance per phase and 2) the implicit expressions of relational governance that were mentioned in the first part of the interview. These relational elements were thus found to play a role in achieving sustainability by the use of MEAT criteria. Not only the elements are presented, but also the expressions, as these are explain the contribution in their context.

Case A and case C showed many expressions of relational governance over the process that were linked to the achievement of sustainability. Case B on the other hand, came forward as having maintained a mainly contractual governance approach. The following paragraphs present which relational elements were found to be present in relation to sustainability per case. A table outlines these elements per phase. The number that is given behind each element, only tells something about the different expressions that were found. They do not tell anything about the significance or the importance.

4.4.1. Elements of relational governance that play a role in achieving sustainability - Case A

Case A entailed many elements of relational governance that were found to be of contribution to the achievement of sustainability. What can be seen from the following table, is that expressions of flexibility, collaboration and risk taking were present in every phase. From the moment that the contractor got involved, other expressions came forward too. Information sharing and informality were mainly regarded between the client/advisory firm and the contractor. As the tables in Appendix D - Relational elements - Case A show, case A can be characterised as a case in which relational governance has played an important role in achieving sustainability.
This project started with the ambition to realise ‘the most sustainable street’ of the city. The interpretation of this ambition was subsequently defined in collaboration with the advisory firm. By formulating this ambition, the client showed the courage to undertake a project in a way that increases uncertainty for the aim of achieving sustainability, which was seen as taking a risk: “So they had the courage, because on the one hand, you always have to show ambition and then you take the risk that you cannot predict everything” (A.4).

The goal of the project was clearly sustainability and the initiation phase was focused on creating the right primary conditions for achieving this ambition. This was done by gaining insight in the market’s potential, investigation of all the possible solutions and collecting knowledge about the contract demands from the market. Interviewees explained this as expressions of flexibility and collaboration.

During the tender preparations, the ambition was translated into MEAT criteria. These criteria were composed in collaboration with the market, which was observed in the conversations that were held with contracting firms in order to create the right conditions for writing a sustainable tender offer. The incorporation of the market was indicated as an expression of collaboration.

The tender phase was focused on getting a sustainable offer from the contractors, which was facilitated and steered upon by the MEAT criteria that provided design freedom in the materialisation, the process and innovative sustainability opportunities. This was perceived as an expression of flexibility. The aim was to provide the market with the opportunity to include their expertise in the design to make it as sustainable as possible. By providing design freedom to the market, the uncertainty and unpredictability increased, and so this was indicated as a sign of risk taking.

During the tender phase, the client provided an unlimited amount of individual information rounds in order to increase the alignment of expectations and tender offer, which showed the presence of flexibility. Moreover, the conversations were, by the contractor, characterised as informal dialogues.

The tender phase resulted in an ambitious offer that was made by the winning contractor, in which he achieved sustainability in the materialisation and the process. Flexibility was seen in the fact that the contractor made design choices based on the sustainability objective instead of the individual profitability goal. The contractor indicated the presence of risk taking and risk sharing, both as a result of the MEAT criterion that assessed the tender offers on the ECI value. It made the contractor take the risk to include innovative solutions and materials in his offer.
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But it was also perceived as a sign of risk sharing by the client, as it showed the client’s willingness to accept unfamiliar offers.

The tender offer clearly defined the sustainability plans, but there was still room for improvement, included in the innovative sustainability opportunities. This was seen as a sign of flexibility.

Many expressions of flexibility and collaboration were found in the realisation phase. These were mainly attributed to the optimisations that were performed after the contract got awarded. Although the role allocation was clearly defined and the client himself was not actively involved in the realisation phase, optimisations to the design and the implementation plan were performed in mutual agreement, during the whole realisation phase. This was a sign of collaboration and flexibility.

4.4.2. Elements of relational governance - Case B

No elements were found to have played a role in achieving sustainability in this project. However, elements contradictory to these relational elements, were often indicated by the interviewees. These are set out in Appendix D. The researcher displayed the factors that contributed to the development of sustainability. Because sustainability was not achieved in this case, the factors had a negative contribution.

A few relational elements were found to be present in this case, but they were not linked to sustainability. The relational elements that were present in the realisation phase, were linked to safeguarding the objective to reduce traffic hindrance, which was the focus of the MEAT criteria.

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Table 10: Elements of relational governance in case B

Case B initially lacked the ambition for sustainability, which is why it barely played a role in the initiation phase. This phase was indicated as quite a rigid phase, because the project was subject to the political sensitivity and the requirements regarding aesthetics.

The adapted strategy from the Province to include sustainability in the tender, which was imposed in the preparation phase, led to the inclusion of a sustainable MEAT criterion. However, the inclusion of sustainability in the MEAT criteria was a political selling point rather than an ambition. Therefore, it was incorporated in the MEAT criteria the considered the real ambition: reducing traffic hindrance. The amount of CO2 emissions that would be
reduced with this predefined solution, was seen as additional value. Due to this predefined solution that the MEAT criteria prescribed, achieving sustainability would not be stimulated by the market’s input.

The presence of risk taking in the preparation phase was indicated because the client performed upfront optimisations to the design for the assumed benefit of the contractor. By doing so, the client took the risk that potential design failures would be allocated to him. This type of risk taking resulted in a reduced amount of uncertainty regarding the design, because the client had control over a bigger part of the design. However, this was not related to sustainability.

Quite a strict tender procedure was experienced by the interviewees. Individual information rounds were not of much added value to the MEAT offer, as the criteria already clearly defined the solution. This tender procedure resulted in non-discriminative tender offers, because of the objective MEAT criteria. These offers were focused on the reduction of traffic hindrance by performing most of the transports per ship or per tube. This was said to reduce CO2 emissions at the same time. Therefore, the winning contractor was chosen based on his low price offer.

The realisation phase is characterised by delivering the project according to the standard UAV-GC contract clauses. Initially, both parties agreed upon the wish for collaboration, which is why it was believed to be unnecessary to strictly steer upon MEAT offers. Instead, steering was done on daily issues and fulfilment of the objective to reduce traffic hindrance. However, the client indicated that the need for control increased during the realisation phase. This happened because the monitoring activities pointed out that the contractor had not fulfilled every promise. Therefore, he experienced control rather than collaboration during the realisation phase. On the other hand, the contractor indicated the presence of collaboration with the client and the advisory firm.

Signs of flexibility were indicated with regards to the adaptation of the contractor’s implementation design, that was perceived by the client to carry too many risks. Therefore the initial plan was changed in order to reduce these risks, while the objective from the MEAT criteria was still taken into consideration. This indicates that there was flexibility to reconsider the design but still keep in mind one of the project’s objectives (to reduce traffic hindrance).

4.4.3. Elements of relational governance that play a role in achieving sustainability and innovation - Case C

The use of the Design team for the development of a bio-based composite material led to the establishment of a working environment in which relational elements played an important role. Starting an innovation was seen as taking a risk, which was, just like flexibility, present during the development stages of the project. As can be derived from the tables in Appendix D, there is a connection between several expressions of flexibility and risk taking. Risk sharing is quite often present, which can be explained by the fact that the involved parties worked in a Design team. This also explains the presence of collaboration. The process of case C showed to be very collaborative and open,
which made the development of the innovation to be perceived as “a perfect completion of the Province’s ambitions” (C.1.6).

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In case C, sustainability played a role implicit to the innovation part. It was the ambition of the Province to be a leader in the transition towards a circular economy, which was the motive to launch an innovation with bio-based material. This ambition was indicated as a sign of risk taking. The Province was said to “consciously have been willing to take a certain risk by starting this trajectory, with the chance that it would fail” (C.2.1). It showed the courage to undertake a project in a way that increases uncertainty for the aim of achieving sustainability.

The ambition statement was formulated after a feasibility study into the possibilities of launching an innovation with bio-based composites for a bridge deck. This shows the presence of an investigation of opportunities and the formulation of a bold statement.

In the preparation phase, the ambition was continued by translation to MEAT criteria and contract requirements. Because the focus was on the processual approach, sustainability was not explicitly included in the tender procedure. The client looked for a partner with a shared ambition that was expressed in the way the contractor presented himself, rather than in the way he presented his sustainable plan. This resulted from the outspoken intention to collaborate with the market, as a result of the lack of expertise at the client’s side, and showed the presence of collaboration during this phase.

Design freedom to the market was shifted to the design phase, which provided the opportunity for the client to focus on the processual approach during the tender. This phase was organised by using individual information rounds, which were indicated as expressions of flexibility and informality, because they served to gain an understanding of the ambitions of the contractor.

Flexibility was observed in the design freedom that was provided to the market. The open tender procedure of case C in which a process approach was discussed, resulted in the choice for two parties that were trusted to share the same ambitions, without having any clarity about the design. This was allocated to the presence of collaboration.

Many expressions of flexibility and collaboration were found in the design phase and the realisation phase. Most of these expressions were attributed to the optimisations that were jointly performed on the design.
Especially during the design phase, the role allocation was flexible and there was a big sense of shared responsibilities, which led to risks being shared. During the realisation phase, the roles in the realisation teams were clearly defined, but a collaborative environment remained present at this stage. This was observed because the Design team stayed involved during the realisation and a ‘warm’ handover session was organised to transfer the ambition and the collaborative environment to the realisation teams, which was allocated as expressions of information sharing and collaboration. During this realisation phase, the different parties in the Design team acted as client of their own party, which made communication between the realisation teams and the Design team easier and enhanced collaboration. When the realisation phase started, the final design was almost complete and considered to be the optimal design. Therefore, little to no flexibility towards the design was needed in the realisation phase.

4.5. Cross-case analysis

The three analysed cases show big differences. Case A and case C show that the initial ambitions were achieved and, when looking at the development of sustainability, even improved on certain aspects. The third case (B) however, shows that the presence of sustainability decreased over the course of the project. Appendix D - Relational elements per casedisplays the combined cases in tables per phase, which gives an overview of the present elements of relational governance. As can be seen in these tables, cases A and C show clear presence of relational elements, while few elements were found in case B.

Some overlap between the various expressions can be observed, which shows that several elements of relational governance generally play a bigger role in achieving sustainability than others.

4.5.1. Relational elements in the initiation

The initiation phases of case A, B and C are characterised by different approaches towards the procedure that was to be followed. Three different general ambitions regarding sustainability can be distinguished: one solely focused on the sustainability goal (A), one in which sustainability is initially lacking (B) and one in which the innovation implies the longer-term goal of sustainability (C).

But when looking at the type of formulation, cases A and C show a similarity. Both ambitions were formulated as bold statements: to realise the most sustainable street of the city and to build a civil construction manufactured from a 100% bio-based material. In both cases, these bold statements were seen as expressions of risk taking and showing courage. In case A, this resulted in the investigation of opportunities (flexibility and collaboration), and in case C, it was a result of a feasibility study (flexibility and risk sharing). Thus, in both cases, an investigation of opportunities and the involvement of the market’s potential can be distinguished. Such an investigation of opportunities, was lacking in case B.

If the secondary criteria from Table 4 are considered here, it can be seen that cases B and C are both part of a bigger scope. This scope appeared to be a limitation to case B, as it was subject to the conditions for the other sub contracts it was connected to. Also the political sensitivity of the project left little opportunity for flexibility. Case C
on the other hand, was also part of a bigger scope, but its interfaces with the rest of the scope were less complex, because it regarded only a bridge instead of a road and multiple additional civil constructions.

In conclusion, two trends could be distinguished that are expressions of relational elements and contribute to achieving sustainability:

1. Formulating bold statements as an expression of risk taking;
2. Investigating opportunities, including the market’s potential, in a diverging approach as an expression of collaboration and flexibility.

4.5.2. Relational elements in the preparation

Two complete different tender approaches regarding sustainability were observed in cases A and C. Case A looked for a specific sustainable tender offer, steered upon by the MEAT criteria, and provided design freedom in the materialisation, the process and the innovative sustainability opportunities. Case C on the other hand, only looked for a processual approach regarding the innovation and the teamwork in a Design team. While these approaches differ, trends can be distinguished in the design freedom (flexibility and risk taking) that was left to the market and the collaboration that played a role in the preparation phase. The latter observed in either involving the market to provide feedback on the MEAT criteria, or to organise a tender procedure that was designed for finding a partner with shared ambitions.

The optimisations that the client performed on the design in the preparation phase of case B, were indicated as signs of risk taking. This type of risk taking differs from the other two cases, that showed risk taking as a result of flexibility and thus an increased amount of uncertainty for the benefit of the sustainability goal. However, risk taking in case B resulted in a reduced amount of uncertainty, because the client had a bigger part of the design in control.

In conclusion, two trends could be distinguished that are expressions of relational elements and contribute to achieving sustainability:

1. Design freedom to the market as an expression of flexibility and risk taking;
2. Involvement of the market as an expression of collaboration.

4.5.3. Relational elements in the tender

Relational elements were less present in the tender phase than in the other phases. For every element, various signs were present, but no clear trend can be distinguished. However, although allocated to different elements, some explicit factors, seem to be playing a role. Both cases A and C indicated the individual information rounds as expressions of flexibility and informality. On the contrary, the individual information rounds that were held in case B, were not said to be of contribution to the development of sustainability in the tender, nor were these indicated as signs of relational elements.

The three different approaches that were indicated in the preparation phase, varying between the three cases, can also be distinguished in this phase and are described as follows: 1) to actively align expectations with design
plans (A), 2) to strictly answer questions about unclarities (B) and 3) to understand one’s ambitions (C). Logically, these various approaches led to various tender offers.

From the combination of expressions of relational elements that were found between the cases (Appendix D - Relational elements per case, two general trends could be distinguished. Firstly, the individual information rounds, or any form of face-to-face communication, during the tender phase were perceived as expressions of flexibility, collaboration, information sharing and informality (A, C).

Secondly, the aim to find partners that share the same ambition could be discovered in both case A and case C. Differences can be found in the mechanisms to achieve this. In case A, finding a partner with the same ambition was done by imposing MEAT criteria based on the project’s perspective and selecting a contractor that made design choices based on the project’s perspective. In case C, this was done by looking for the processual approach regarding the innovation as well as the teamwork. The mechanism of case A was perceived as signs of collaboration, risk sharing and risk taking. The latter was a sign of collaboration.

In conclusion, two trends could be distinguished that are expressions of relational elements and contribute to achieving sustainability.

1. Face-to-face communication as expressions of flexibility, collaboration, information sharing and informality;
2. The aim to find partners with a shared ambition as expression of collaboration, risk sharing and risk taking.

4.5.4. Relational elements in the design and realisation

Optimisations to the design during the realisation phase were a result from collaboration between the contractor and client in which both parties made adaptations for the benefit of sustainability, instead of putting one’s own interest first. This working relation was present in case A and case C, albeit in different forms. In case A this working relation was not captured in a contract form, while in case C, the type of relation was contractually defined as a result of the Design team structure. In case B, adaptations to the initial design were also executed, however, in order to reduce risks, whereas cases A and C showed flexibility for improvement of the project.

Although the optimisations in case A and the optimisations in case C were performed in different stages (during the realisation and during the design phase), the similarity can be found in the involvement of both parties: optimisations were performed when both parties were able to jointly participate in this process.

It can be seen that cases A and B, that both followed a standard UAV-GC procedure, had different outcomes and different working environments as a result of something else than a contractual agreement.

In conclusion, two trends could be distinguished that are expressions of relational elements and contribute to achieving sustainability:
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1. The project’s objective is leading in design choices, design optimisations, contract adaptations and role allocation as expressions of collaboration, flexibility and informality;
2. Joint decision making as an expression of risk sharing, collaboration and information sharing.

4.6. Findings - Deviations from MEAT procedure

This paragraph describes the deviating financial structures that were subject to this project in relation to the MEAT criteria. Case B showed no deviations from the regular MEAT procedure and is therefore not included.

4.6.1. Deviations from MEAT procedure - Case A

The Municipality provided extra financial resources for the MEAT criterion ‘innovative sustainability opportunities.’ This MEAT criterion was a separate criterion that was assessed on value and the fictitious discount was included in the award mechanism. However, the offer to this criterion did not become a part of the contractual requirements. This means that costs related to the offered innovative sustainability opportunities were not included in the fixed price. Thus, the client facilitated these innovative sustainability opportunities outside of the contract requirements. Figure 20 shows the construction as was applied in case A.

![Figure 20: Financial structure of MEAT offer - Case A](image)

4.6.2. Deviations from MEAT procedure - Case C

Sustainability was early in the project seized by the client in launching the innovation for bio-composites. It is for that reason that sustainability was barely present in the MEAT criteria. Instead, the tender was focused on the approach of the technical process and the approach of the collaborative process.

Here, the price that was offered by the tenderers during the tender, was the built up from the estimated time efforts in the Design team phase and the hourly rates of the involved employees.
In mutual collaboration of the producer, the constructor and the client, the innovation was launched, completed and estimated, with inclusion of fixed sustainability measurements. This financial structure is visualised in Figure 21: Financial structure of MEAT offer - Case C.

4.6. Validation

The results that were found in the cross-case analysis, were discussed with two experts from Witteveen+Bos in order to validate the generalisability of the results. Firstly, an introduction to the research approach and the consulted literature was given. Thereafter, the case choices were explained, as well as the results from the case studies. These results and the interpretation of the results were subsequently discussed with the experts. In the following figure (Figure 22) the role of the relational elements that could play a role in the process from initiation to realisation using MEAT criteria for achieving sustainability were set out.

Secondly, the role of the discounted MEAT offers to the flexibility in the realisation phase was discussed. This resulted in the suggestion that realising the sustainability offer that results from sustainable MEAT criteria, is limited due to its contractual implications.

4.6.1. Confirmed results

The elements in the upper row were recognized as being of importance not only to the delivery of sustainability, but to the delivery of integrated contracts in general. Especially in the first two phases it was confirmed that integrated contracts ask for input from the market and that that involves a certain risk, that is to say, that a client gets something that is new or unfamiliar to him. To that extent it differs from a traditional contract in which every detail is already defined.

Also for the realisation phase, the role of flexibility to act towards the sustainability goal instead of the promised measurements, was confirmed. And it was recognized that the mechanism of MEAT discount on the sustainability offer, limits flexibility and risk taking during the realisation phase.
The cases that were used, were regarded as useful, due to the similarity in size but the differences in scope, which made the processes comparable. The size was perceived to be manageable enough to study the project profoundly.

4.6.2. Amendments

Although risk taking as an implication of flexibility was recognized, it was indicated to be in need of fine tuning. A public client cannot take unreasonable risks as the budget involves public money. When a client leaves design freedom to the market, this is always done within certain boundaries. That is already a controlling measurement against unreasonable risks. Risk taking was therefore recommended to be defined better.

Also, the motivation came forward that sustainability is not always in need of flexibility, in providing design freedom to the market, in the contract preparation phase. Putting out a final design to tender, made by an expert on sustainable constructions, would suffice too. This has led to a remark in the conclusion.

Flexibility and risk taking were considered to be important not only regarding governance practices, but also regarding one’s attitude towards a project. The people involved should have a flexible attitude towards sustainability when they wish to realise a sustainable project, because it might indeed involve solutions that are new or unfamiliar.
This led to remarks about the role of people’s ambition in the process, which was indicated as missing in the results. Ambition of the project team was perceived to be of importance for achieving sustainability, and the continuation of ambition through the whole project, was said to be an exception rather than the rule.

Lastly, the figure required was not perceived to be self-explanatory, and the limitation of MEAT discount to the realisation phase was not included.
5. Discussion

In the previous chapter, the results of the case studies were presented per case and in a cross-case analysis. This provided an insight in the elements of relational governance that played a role when using MEAT criteria for achieving sustainability. In this chapter, the researcher will combine the expressions and interpret the results as an answer to the following sub question:

“What are the implications of the elements of relational governance that play a role in the construction process using MEAT criteria for achieving sustainability?”

As appeared from the results, case A and case C show a clear presence of relational elements that have played a role in the achievement of sustainability. In case B on the contrary, the sustainability criterion that was formulated, quickly disappeared after the tender phase. While some relational elements were present, no element could be linked to be playing a role in the development of sustainability.

The generalised expressions of the relational elements will be regarded per phase by describing the context in which they appeared. This will also include the presence of ambition, as this was suggested to be included after the validation step. Paragraph 5.2 describes the role of the relational elements in the financial structure as a result of the deviation from the regular MEAT procedure.

Thereafter, the role of ambition as appeared from paragraph 5.1, is highlighted in paragraph 5.3. A small remark on the role of the four other relational elements is made in paragraph 5.4. This will be followed by the implications of flexibility, risk taking and collaboration in 5.5. Because flexibility and risk taking are limited by the MEAT procedure, the implications of this mechanism regarding relational elements, will be the last paragraph (5.6) before providing the final lessons learned.

5.1. Placing the relational elements in their context

5.1.1. Initiation - Risk taking, collaboration and flexibility as a result of intrinsic ambition

1. Formulating bold statements as an expression of risk taking;
2. Investigating opportunities, including the market’s potential, in a diverging approach as an expression of collaboration and flexibility.

The initiation phases of case A and C are characterised by the presence of flexibility, collaboration and risk taking. Flexibility and collaboration are mainly present in case A, while case C is characterised by risk taking. Yet, similarities between the expressions can be indicated and resemblances can be found between the factors that led to the establishment of these relational elements.

While case A and case C followed different building delivery models, the initiation shows a resemblance in the ambition. Not only were these ambitions formulated on paper as bold statements, they were present in the motivation
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of the involved actors themselves. It could be argued that this had a significant impact on the establishment of the diverging step of investigating the various opportunities and market’s potential for realising the ambition.

The ambitious environment in case A may have been established by the involvement of the right people. The project manager that acted on behalf of the client was an external project manager who had affinity with sustainability. Moreover, the project leader from the advisory firm that was hired to prepare the whole tender procedure, was someone who’s expertise regards sustainability. He was very eager to participate in this project because of the challenges he believed this ambition entailed. “...we really wanted to do this project. But I was also really struggling with the fact that, when I would have realised that most sustainable street, in the end, you have just built another asphalt road. So how can I be proud to have made the most sustainable road?” (A.1.2)

Having two project leaders who’s intrinsic motivation is to achieve something like building the most sustainable street of a city, is an unique characteristic of case A. This could very well have been the reason for the establishment of the flexible and collaborative initiation phase, because they were willing to invest extra time and resources upfront in achieving their sustainability goal. Not only did the involved project leaders share the same affinity with sustainability, they also had a good interpersonal connection.

The collaborative element of the initiation phase could be discovered in the early market approach that was undertaken. The aim was to gain insight in how contractors are usually limited by contracts when a sustainable project is put out to tender. Secondly, there was a lack of knowledge of the capabilities of the market, and the client wished to gain insight in how to trigger the market to invest in writing a sustainable tender bid. This shows resemblance with information exchange, which is used to enable parties to make the best decisions, based on the provision of the right information (Addae-Boateng et al., 2015; J. Heide & John, 1992; Poppo & Zenger, 2002). Another similarity can be found with harmonisation of conflict, as it shows signs of willingness to adapt one’s own procedures in order to meet the needs of the other party (J. P. Cannon, Achrol, & Gundlach, 2000).

But there could be more benefits allocated to this approach, they led to appreciation and enthusiasm from the market.

Just like case A, case C started with a bold statement and imposed a challenge to the project team, who was asked to put this innovation into practice. The decision to launch the development in a Design team resulted from two insights. Firstly, the client acknowledged to be missing the sufficient knowledge to develop this innovation on his own. Secondly, the client believed to be an ambassador of the ambition, and so he needed to be actively involved. The initiation phase of case C is not characterised by collaboration with the market. Rather, this phase focused on investigating the feasibility of the innovation by doing research into the market’s potential. Just like in case A, the opportunity to do this research was facilitated by the client. Financial support from the Executive Council stimulated the project team to seriously investigate this opportunity. This might have contributed to establishing the motivation towards the rest of the process.
What can be concluded from both cases, is that several patterns are present that seem to be facilitating the flexible, risk taking and collaborative attitude of a client during an initiation phase for achieving sustainability. It starts with the intrinsic motivation of the right people in the project team, because they have the power to create support. Secondly, the ambition should be shared by the client, because he facilitates the resources that are needed to invest in sustainability. Thirdly, by clearly defining a sustainability goal, in the form of a bold statement, it becomes easier to steer upon that goal in the initiation phase. Lastly, the bold statement could serve for parties to see the sustainability objective as a challenge that they are willing to take, which might lead to unfamiliar or new solutions. The latter shows that it should be acknowledged that sustainability is yet not something that naturally occurs in construction. Therefore, it should also be handled as a challenge.

Case B on the contrary, lacked the presence of ambition by the client. Sustainability was a detail, that served mainly as a political seller. Therefore, it did not get attention in the initiation phase. This phase was indicated to be a rigid and risk averse phase, because the project was of such political sensitivity, that the client felt no mistakes could be made. This might be one of the reasons that few other opportunities were investigated.

5.1.2. Preparation - Continuation of flexibility, risk taking and collaboration to communicate the ambition

In the preparation phase of case A and case C, many elements of relational governance were indicated as playing a role in the achievement of sustainability. Collaboration, flexibility and risk taking are present in both cases, albeit in various forms. On the contrary, case B is characterised as rigid and risk averse.

1. Design freedom to the market as an expression of flexibility and risk taking;
2. Involvement of the market as an expression of collaboration.

A collaborative environment during the preparation phase was present in both case A and case C. This was either shown in the organisation of market consultations or the acknowledgement of the need for collaboration with the market.

The very active involvement of the market in case A, led to the collection of feedback on the presumed MEAT criteria and tender procedure. Subsequently, the client showed a flexible attitude towards the design: adaptations were made as a result of the market’s advice. More specifically, the market indicated that a favourable ECI score could have an adverse impact on the maintainability and Life Cycle Costs. This conflict was acknowledged by the client and they decided to adapt the weight of the MEAT score as a result of the market’s feedback, so it would have a smaller influence. A second expression of flexibility is found in the design freedom regarding the materialisation. The client decided to release the materialisation that was included in the urban design in order to leave that to the market. This was a result from the conviction that sustainability could be achieved by the right materialisation, which was left to the expertise of the market. This improved the tender procedure and thus enhanced the project regarding sustainability.
The willingness that the client showed to adapt his accustomed contract strategy to meet the needs of the market, can be linked to the harmonization of conflict (J. P. Cannon et al., 2000) and shows signs of solidarity.

Whereas in case A the collaboration with the market is proactively initiated and benefitted from, in case C, the intention to collaborate is present. So even though the collaboration between client and contractor was not yet established in the preparation phase, it does play a role in this case. This is found in the preparations for finding two partners in the tender phase that would be fit for a collaboration in a Design team and achieving the project’s objective. Therefore, the preparation phase approached the tender phase in a more processual way. This automatically led to a certain amount of flexibility in the preparation phase, as the client did not determine many design specific requirements upfront, only the type of materialisation that should be used. Therefore, the opportunity to design the optimal solution was left entirely to the Design team and its combination of expertise and different viewpoints.

The need for collaboration in case C can be characterised as arising from the idea that the success of one party is dependent on the success of the other (J. P. Cannon et al., 2000). This would make the involved parties feel the responsibility to try to achieve the 100% bio-composite ambition.

What can be learned from both cases is that both clients acknowledged the need for collaboration, coming from a knowledge gap that the client was aware of. It could be argued that this acknowledgement on its turn results from the bold ambition statement in the initiation phase. This could have facilitated clear guidance in the initiation and preparation phase. Imposing a clearly defined goal, might have made it easier to determine what resources were needed to achieve that goal. Thus the client could decide what resources were not internally available, which is where the need for the market arises.

Flexibility seems to be a prerequisite to the type of collaboration that was found in the preparation phase. If a client is willing to include the expertise of a market party for achieving sustainability, an implication is that the client should be flexible so that he can incorporate the learnings from the collaboration with the market. This type of flexibility that was found in cases A and C deviates from the flexibility described in literature, which is more focused on adaptations in the contract due to contingencies or changing circumstances.

Collaboration with the market was not present in case B. The client had a clear objective, which was to reduce traffic hindrance. The predefined solution, including the reduction of CO2 emissions, was incorporated in the MEAT criteria, without gaining input from the market. As a result, no room for creative opportunities was provided. This shows similarities with the need for controlling the outcome of the tender phase, and can thus be allocated as a sign of contractual governance (Luo et al., 2010). The lack of flexibility in case B was present in the imposed MEAT criteria, as it was said that these criteria left no design freedom to the market. This immediately took away the opportunity for other ideas to achieve the same objectives.

The bold statement that was perceived as a risk being taken in the initiation phase, includes the risk of unfamiliar solutions, or that the project will not work out as initially intended. This attitude was continued in the preparation phase. Both parties showed the courage to continue this risk when preparing the tender. As a result, the
client of case A imposed the ECI score as a MEAT criterion. The risk of a good ECI score is that the proposed solution has a detrimental effect on the design’s aesthetics. Launching an innovation, as done in case C, was also perceived a risk, as it entails the possibility of failure. Yet, both cases showed that these risks were controlled by the inclusion of a back-up option in the contract. So although both projects entailed considerable risk, it did not impede the client to continue to pursue the sustainability goal. This might have been a result of the ambition that was present within the project team.

Case B is more characterised by risk aversity. The client in this case was afraid to be held accountable for the outcome of a subjective MEAT assessment. The risk was taken away by composing an objectively assessible tender, which shows the cause of the non-distinctive tender offers.

What can be seen from the three cases, is that risk taking and risk aversion in the preparation phase could play an important goal to the continuation of sustainability objectives. In the preparation phase, a sustainability ambition has to be translated into contract requirements and MEAT criteria. And by making sustainability explicit, awareness of the involved risks increases. Risk aversity could therefore impede the continuation of sustainability onto the tender phase. However, it is observable that the two cases in which the risk was taken, a successful delivery was the result.

5.1.3. Tender - Flexibility, collaboration, risk taking, information sharing and informality to align ambitions

The tender can be seen as the interface between the client’s ambitions and the interpretation of the contractor. As it regards the transfer of ambition to another party, alignment should be safeguarded. In most projects, individual information rounds provide an environment in which this can be pursued. While the tender phase was in all cases perceived as a generally formal and rigid procedure, due to legal implications, several relational elements were indicated to be present and playing a role for achieving sustainability.

1. Face-to-face communication as expressions of flexibility, collaboration, information sharing and informality;
2. The aim to find partners with a shared ambition as expression of collaboration, risk sharing and risk taking.

Cases A and C show that individual information rounds, as expressions of collaboration, served different goals in each case. In case A, the possibility for multiple information rounds was provided with the aim to align expectations with plans. This gave the tenderer the opportunity to improve his tender bid, as he was able “to continuously adjust your course and test your ideas” (A.17). The client on the other hand, had the opportunity to get a feeling about the ambition of the tenderer. It was also indicated that during the conversations in these information rounds, people were able to pronounce their ambition towards each other. This led to faith in the winning contractor, because he had indicated that he shared the same ambition to realise the most sustainable street and to complete an iconic project.
For case C, the information rounds served as a mechanism for the client to find a partner with the same ambition regarding the project’s objective. Because the MEAT criteria of this case were designed on the processual approach, oral explanations were valued extra important in the search for partners with the same ambition.

Although individual information rounds are subject to the legal implications of the Procurement Act and pure informal dialogues are therefore impossible, a certain amount of informality was experienced in both case A and C. The presence of informality was said to make communication easier and therefore led to better mutual understanding because “the conversation as part of the tender procedure, already gave the feeling of familiarity” (C.8).

From the contractor’s perspective in case A, assessment on the ECI score was perceived as a sign of risk sharing between client and contractor. A very ambitious company director was deeply involved during the tender phase and the realisation phase, aiming to continue the ambition over both phases. Because the contracted firm had a high sustainability ambition, this project was seen as the perfect opportunity to realise their sustainability ambitions and “in this capacity, we tried to contribute and did I compose a project team in order to obtain the best tender offer”. By assessing on ECI score, a client showed to be prepared to get innovative or unfamiliar design offers. This could affect the aesthetics of the design, but they could also lead to more resistance from the technical management. The risk that the client took in the preparation phase, stimulated the contractor to be less risk averse in the tender phase. This enhanced the sustainability level of the tender offer, because the risky design choices improved the ECI score. The contractor indicated that “the fact that the ECI score is so much valued, triggers to invest in it” (A.13).

It could be argued that the more design freedom and the more interpretability there is in a tender, the more insights in the approach and the motivation of a contractor could be generated by individual information rounds. This is because a contractor has to be more open to obtain the right information. Also, by having conversations in person, it is much easier to assess one’s motivation for a project. Multiple interviewees indicated that a person could best be judged in personal conversations. For example, the type of words that people use in a conversation says a lot about the role they see for themselves, or talking to someone in person releases more about the intrinsic motivation than a well written plan.

5.1.4. Realisation – Flexibility, collaboration and risk taking for continuous improvements

The design phase of case C is for the interpretation of the results included in the realisation phase of case A and C.

It can be seen that the realisation phase includes a lot of relational elements in various forms. Outstanding in both cases A and case C, is the indication of a ‘good collaboration’ by all interviewees. Although expressed in various ways, the message was the same: a good relationship (is partly characterised by informality and) provides the conditions for the achievement of the sustainability ambition through good collaboration. A good collaboration is described by continuous optimisations, decisions based on the benefit of sustainability, task allocation based on people’s capabilities, mutually solving problems and integrated design sessions.
This was different in case B, in which the contractor and the client showed different views on the relationship.

Two trends were discovered in the cross-case analysis. The first is that the project’s objective, the bold statement, was leading in design choices, design optimisations, contract adaptations and role allocation. This trend was found in all three cases and was perceived as expression of collaboration, flexibility and informality. Flexibility is present in the attitude towards the contract, that will evolve over time due to contingencies, changing circumstances, and the occurrence of new opportunities (J. Heide & John, 1992; Poppo & Zenger, 2002). Collaboration, in the form of joint action (Verweij, 2015b), facilitated the implementation of optimisations, adaptations and role allocation, which was also seen as taking a certain risk.

The second pattern is that of joint decision making, which was discovered in both case A and case C. The interviewees experienced this as a sign of risk sharing and collaboration. The joint decisions regarded optimisations to the sustainability level, which involved certain risks. By taking these risks in joint consideration, they were shared accordingly. This can be related to the theory of relational governance and relational norms, as an indication of solidarity and mutuality between the two parties, for it shows the commitment to the relationship and shared responsibilities (J. Cannon et al., 2002; J. Heide & John, 1992; Poppo & Zenger, 2002).

In case C, this pattern of being led by the ambition statement was mainly present during the design phase with the Design team. While the development of the innovation showed that the initial goal to realise a bridge with a 100% bio-based material, was unrealistic, the ambition did not disappear. Instead, a flexible attitude, collaboration and the informal ambiance in the Design team contributed to a reformulation of the ambition to realise the whole bridge in a bio-based material. This shows that eventually, it was the attitude of the involved parties that led to the achievement of sustainability, as it was not formulated in the ambition statement. Due to the attitude, or the motivation, of the people involved and the informal atmosphere, they were able adopt a flexible approach to the project. Optimisations were performed as a result of collaboration. The latter was in this case seen as task allocation based on capabilities, shared decision making, and decision making for the benefit of the project.

The same can be observed in case A. Continuous optimisations that were performed during the realisation phase, came forth from the interaction between contractor and advisory firm. It was said to be the character of the collaboration to be looking for improvements and not to take the initial plans for granted. This was a result of the shared ambition to achieve the sustainability objective. But also the phases prior to the realisation phase could have been of contribution to the establishment of this type of collaboration. The client had focused so much on the sustainability objective, that it created a culture of ambition that was inevitable to reject. The contractor was said to be reflecting the culture that was already present in the project team during the first phases of the project. Therefore, relational elements like flexibility and collaboration could have been present in order to achieve sustainability by jointly looking for possible improvements and by implementing them in joint consideration.
5.2. The financial constructions as contribution to sustainability

5.2.1. Financial construction for sustainability - Case A

The extra financial resources that were provided to invest in innovative sustainability opportunities, facilitated a certain amount of flexibility in the realisation phase. This contributed to the optimisations that were made to the design during the realisation phase.

Still, the contractor indicated that flexibility during the realisation was limited due to the fixed price mechanism, which applied to the other four MEAT criteria. While optimisations to the design and the MEAT offer were performed, financial discussions were held. This was declared to happen because it was difficult to trace back the differences in costs between the optimisations and the initial offer.

5.2.2. Financial construction for sustainability - Case C

The fact that the MEAT criteria in this case were focused on the process rather than a specific offer, sustainability was barely present in the MEAT criteria and thus also not in the Design team agreement. Sustainability developed during the evolution of the innovation and the increasing sustainability ambitions of the Design team.

Because a Design team requires transparency between the involved parties, the execution price was determined in mutual accordance, and the price estimate was clear to everybody. The price was thus by all parties considered to be fair. Hence, not all risks were transferred to the realisation team, but the Design team was responsible for its own share. The Design team provided the conditions for a flexible environment in the development of the innovation, in which the flexibility was needed the most.

5.3. The role of ambition

What can be learned from the previous paragraphs, is that the elements of relational governance were facilitated by the presence of ambition. This did not come forward from the literature review regarding relational governance, because it does not describe a reciprocal relation between two or more parties. An ambition can be shared though, and it seems to play an important role in achieving sustainability.

In both cases in which the initial sustainability ambitions were realised by using MEAT criteria, there were highly ambitious people present at the start of the project, who initiated the investigation of opportunities and put a lot of effort in defining sustainability. Consequently, the ambition was continued over the whole process.

The importance of a shared ambition is explained by the project manager case C as “That collaboration- you want to commit parties for this adventure. Because, basically, that is what it is, to share that risk and to be willing to put a lot of effort in it to see how far we can go and what possibilities there are. So it was more about embracing the ambition, collaboration, and thinking about the processual approach of the research trajectory” (C.10).

This project was awarded based on shared ambitions instead of technical plans. All parties indicated that this enabled the continuation of ambition through the design phase. And it was for the aim of transferring this ambition
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over the realisation phase, that efforts were made to include the realisation teams early in the process. This shows that ambition facilitates collaboration.

It could be concluded that the role of intrinsic ambition of key players might be of significance for creating the conditions in which relational elements can be facilitated to contribute to the achievement of sustainability.

5.4. The interplay of the relational elements

This research used a set of seven relational elements to study the cases and look for the presence of relational governance. These elements were based on literature and defined with the aim to catch the managerial aspects of the relational norms and activities. It appeared that collaboration, flexibility and risk taking were mainly found to be present in the cases. However, that does not mean that the other elements were absent.

5.4.1. Informality, information sharing and risk sharing as implications of collaboration

Their role could be addressed differently according to achieving sustainability. Just as the previous insights into the role of ambition suggested that an intrinsic motivation is the fundament for establishing flexibility, collaboration and risk taking in the process, informality, risk sharing, and information sharing could be argued to be implications of collaboration. This is substantiated by the finding that most expressions of relational informality, information sharing and risk sharing, were also allocated to collaboration. It was also found that cases A and C did not lack the presence of these elements, although not in direct relation to achieving sustainability. They do however determine a good working relationship.

5.4.2. Trust as enabler of relational elements in the realisation

While trust is the only element that cannot be enforced by managerial acting, the question was asked to the interviewees whether they experienced the presence of trust or mistrust during the process.

A clear development of the type of trust that was present can be distinguished. Both case A and C showed the presence of trust in the capabilities of the other party at the start of the collaboration. Observations of trust were present in the initiation phase. This was expressed in the client trusting the advisory firm or his external project manager to be capable of safeguarding their ambitions. Later in the project, the outcome of the tender phase provided the contracting party with the trust that the contracted party would be able to realise the expected sustainability.

During the development of the realisation phase in case A and the design phase in case C, interpersonal trust grew. As literature already shows, trust can be a positive contribution to individual’s attitudes and behaviour, which could result in enhanced collaboration (Zanini & Migueles, 2013). This is subsequently linked to better performance.

The presence of trust was also linked to the possibility to take risks. In case A, this came to expression by starting to execute an adaptation to the contract requirements. However, this adjustment was not yet contractually documented. Literature describes this as allowing “individuals to conduct transactions without the need of safeguards against possible opportunistic behaviours of others, enabling them to accept greater risks in these transactions.” (Zanini & Migueles, 2013, p.84). Thus it shows that indeed, when trust is present, it could enable the circumstances in which parties could take a risk for the benefit of the project.
In case C, trust was described in the ability to position oneself in vulnerability to the other parties. This was said to be the condition for the collaboration that was present in the Design team, which enhanced the mutual problem solving and fair risk allocation. The relationship between trust and vulnerability is recognized in literature, that describes trust as the willingness to be vulnerable towards the counter party (Mcevily, Perrone, & Zaheer, 2003).

Comparing the role of trust to the relationship in both cases is difficult, due to the different ways of relationship establishment. However, the presence of trust can in both cases be indicated to have played a role in enabling collaboration, flexibility and risk taking.

5.5. The implications of relational elements for achieving sustainability

Paragraph

5.2. Placing the relational elements in their context

Initiation - explained how the elements of relational governance that were found in the case studies, were present. In the following paragraph, the implications of their conceptualisations will be explained per element.

5.5.1. The role of flexibility

Flexibility was found to be the ability of a party to be open to various possibilities, even if these are new or unfamiliar. Thus, already in the initiation phase this could play a role in formulating sustainability ambitions. A similarity with risk taking is found, as opening up to new technologies or innovations could entail risks.

The ability to open up to new opportunities, follows its way through the preparation phase, when MEAT criteria are drawn up. A flexible attitude can foster the inclusion of design freedom for sustainability in the MEAT criteria. Therefore, it is very important that a client values the expertise of a contractor and provides the required freedom to the contractor accordingly. This gives contractors the opportunity to design more integrated sustainability solutions. In regular integrated contracts, a contractor should not be withheld by the trade-off between several MEAT criteria to include sustainability in the contract. Therefore, a client should be very careful with imposing criteria that limit sustainability. These are for example aesthetics and costs.

Flexibility in the realisation phase is seen as the ability to adapt the design or the execution plan to the circumstances. When contingencies arise or new opportunities occur, both parties should be capable and willing to act flexible towards the design. This can facilitate the safeguarding of sustainability promises, or it could improve the sustainability.

While flexibility can contribute to achieving sustainability, this often comes with taking risks. A public client cannot take irresponsible risks that lead to major increased costs, as projects are paid by public money. Moreover, a public organisation has the responsibility over a big group of stakeholders, which often leads to a trade-off between several interests. As this entails very careful deliberation, flexibility throughout the project may not have a significant impact on its stakeholders. This might lead to a project’s delay, unsatisfied stakeholders and in worse case legal proceedings.
5.5.2. **The role of collaboration**

Collaboration in the initiation phase is determined to be the action of dealing with the knowledge gap by gaining insights in the market’s potential. A formal collaboration is not yet established in the initiation and preparation phase. However, when a client has the ambition to achieve sustainability in his project, by using MEAT criteria, early market involvement is required. If a client does not have the knowledge available to design a sustainable project, the tender documents have to be fit to the market’s potential. And this is best achievable by enabling conversations with the market. An additional effect is that it provides the opportunity to highlight the importance of the sustainability goal as early as possible.

In the preparation phase, collaboration is using the insights in the market potential for preparing a good fit in the design and tender. This improves the sustainable MEAT criteria and aligns them with the capabilities of the market. With the same motivation as for the initiation phase, the market should be involved prior to the tender phase, in order to collect feedback on the the assumed tender procedure.

When the tender phase starts, communication by means of dialogues between client and tenderer, plays a role in alignment of MEAT criteria and MEAT offer. It can be seen from the cases, that informal information rounds could be beneficial to the creation of a relationship and the mutual understanding of the goal. This is de moment that the type of collaboration changes from collecting insights by the client for the tender preparation, to creating a mutual understanding. The latter was indicated to facilitate a relationship in the realisation phase of the project, as information rounds provide the opportunity to get a feeling of a tendering party and its intrinsic motivation.

During the realisation phase, collaboration is perceived to be essential for realising a good project. It appears that achieving sustainability in a construction project remains challenging during the realisation phase. Contingencies could hamper the implementation of certain aspects of the initial design. In order to be able to still achieve the presumed sustainability, collaboration enables joint decision making and joint action to deal with contingencies or occurring problems. Even more, what was observed in both case A and C, is that both parties were able to challenge each other and not to take the initial ideas for granted. There was a working relationship established, in which continuous optimisations were stimulated by the involved parties. Because deviating from an initial plan, for the benefit of sustainability, entails risk, collaboration has appeared to be of importance for performing optimisations.

Collaboration can be present in joint decision making and jointly designing new solutions in mutual agreement.

5.5.3. **The role of risk taking**

Risk taking is in the initiation phase mainly expressed as opening up to unfamiliar design solutions, similar to flexibility. Taking the risk to formulate a high sustainability ambition, provide the way to realising a sustainable project. Especially when sustainability includes an innovation or new technologies, the implementation of these technologies could entail the risk of misalignment or insufficiency. The preparation phase is an essential phase for achieving sustainability by using MEAT criteria. A risk averse attitude in the preparation phase could decrease the initial sustainability ambition. So the acceptable risk that uncertainty or unpredictability will be increased, should be
taken prior to the tender phase. This maintains and facilitates the achievement of a sustainability ambition. As clients are never willing to take much risks, and especially because public clients cannot take big risks, a risk controlling measurement could be included by the use of a back-up option in the contract. A back-up option provides the client and the contractor with the opportunity to step back from the innovation and implement a safer option. On a less practical level, it could make both parties less anxious about designing a sustainable project.

The tender phase is not characterised as a phase in which risks are taken, regarding the perspective of a client. This is because the tender procedure is subject to the rules of the Public Procurement Act and the level playing field. However, a tenderer should be taking a risk in accordance with the MEAT criteria in the tender documents. If the risk averse attitude from the contractor influences his tender offer, the sustainability level of his offer might be limited. Of course, a risk taking attitude should in the first place be stimulated by the client via the MEAT criteria.

During the realisation phase, continuous optimisation is an expression of risk taking, as optimisations regard deviations from the contract or innovative solutions. It is thus similar to flexibility, also in the realisation phase, for risk taking could play a role in optimising the sustainability promise.

5.6. Implications of the MEAT procedure for achieving sustainability

5.6.1. Implications of a financial construction to a sustainable MEAT offer

Sustainability requires financial resources, often more than conventional solutions (Ahn, Pearce, Wang, & Wang, 2013; Munyasya & Chileshe, 2018). These financial resources should be provided by a client who procures a sustainable project. Flexibility is thus not only needed as an attitude towards new solutions, but financial flexibility is another prerequisite.

The formerly described financial constructions show a deviating approach from the regular follow up of a MEAT tender. Both financial constructions enabled the continuity of flexibility after the contract was awarded. Despite the similar roles that relational governance played in both cases A and C, further remarks have to be made about the role of the financial construction compared to the regular MEAT procedure. Therefore, the implications of the financial constructions that were presented in paragraph 4.4.1 will be described in the following paragraph.

5.6.2. Implications of MEAT mechanism to relational governance

Flexibility is needed for realising an ambition such as sustainability by using MEAT criteria. When a client uses MEAT criteria in order to achieve his sustainability ambition, it implies that a client wishes to provide design freedom to the market. MEAT criteria offer a way to include flexibility and risk taking in the tender.

However, the moment that this sustainable tender bid is assessed, the total price offer is discounted by the sustainability offer. This automatically fixes the budget for sustainability measurements and the according risks, which also limits the opportunity to be flexible during the realisation phase. A subsequent implication, is that risk taking is limited too. Financial resources are needed for taking risks, as the contractor should be able to control or bear the risks he takes. However, these financial resources are limited, because of the fixed price for sustainability measurements.
Collaboration can more easily be safeguarded within the achievement of MEAT offers. Yet, when collaboration is present, but there is no possibility for flexibility, realising optimisations or adaptations becomes nearly impossible. This can be seen as the paradox of MEAT criteria for realising innovative or unclear ambitions like sustainability.

5.7. The role of relational governance in achieving sustainability, facilitated by a shared ambition

This chapter discussed many aspects that were found in the three cases that have played a role in achieving sustainability. All three cases tell a lot about achieving sustainability, and it is clear that more factors than only relational governance play a role. This starts with an intrinsic ambition of the project team involved.

Intrinsic ambition

Sustainability is, because of its unclear, risky, unpredictable and constantly evolving character, in the need of a flexible, risk taking and collaborative attitude of the involved parties. However, something else was found that can be perceived as the fundament for achieving sustainability. This is the intrinsic ambition of the parties involved. If the goal is to achieve sustainability, the presence of intrinsic ambition through the whole process is essential. Therefore, achieving a sustainable project starts with the composition of the project team and the inclusion of motivated project leaders. This research has shown that the presence of intrinsic ambition can enable the establishment of a relational approach between the involved parties.

Acknowledging the challenge of sustainability

Achieving sustainability in infrastructure these days is still a challenge. This is something that should be acknowledged by the project team before sustainability is incorporated in the contract preparations. The challenge of sustainability requires effort and various expertise through the whole process. If that is recognized, measurements could be taken to organize the project in such a way that various expertise could be involved and that there is room for this challenge.

Formulating a bold statement

The first strategy that could contribute to defining the right conditions to achieve sustainability, is to formulate a bold mission statement in the initiation phase. This has shown to function as a clear guideline through the whole process. It is not necessary to fully specify the definition of this statement at the start of the project, but it should meet the following requirements: 1) It should be clear what the objective of the end-result regarding sustainability will be, 2) it should have a profiling value, 2) it needs to leave definition and demarcation to a later stage in the project and 4) it should be playing a role in all project phases.

By giving this mission statement a profiling value, it gives more weight to the ambition, which could work as an incentive to put more effort in achieving the goal. Examples of bold mission statements could be found in cases A and C: ‘realising the most sustainable street of the city’ or ‘manufacturing a bridge deck of a 100% bio-based
material’. The exact definition can be left to further completion by for example discussions with the market, desk research into technologies or example project and brainstorm sessions with experts and stakeholders. By making this statement workable over all phases of the project, it enables the involved parties to keep focus on the goal. It should thus be formulated as an end-result to be achieved with the final delivery.

Not only can a mission statement function to provide guidance through the whole process, it can also work as a connecting factor. Cases A and C showed that all parties that got involved in the project, committed to this clear and bold ambition that was formulated. This resulted in the establishment of relational elements like flexibility, collaboration and risk taking.

Involving the market for a good tender preparation

In the preparation phase, the mission statement must steer to a good tender preparation. First of all, it is important that the ambition from the initiation phase is still present in the preparation phase. Because it takes courage to release control and predictability, the project team should be led by motivation instead of risk aversity. This could be enabled by the mission statement.

As sustainability requires various expertise, it requires the client to incorporate sustainability in the contract and the procedure before the tender starts. When an UAV-GC contract is procured and a client wishes to leave certain choices to the market, knowledge is required about the specific expertise that the market can deliver and that the market cannot deliver. Therefore, collaboration in the form of an investigation of the market’s potential is necessary to prepare a good tender procedure and a good contract. In a good tender, the MEAT criteria enable optimal usage of the market’s potential to submit their best sustainability offer. This investigation can be done by collaborative mechanisms like an early market involvement.

Focus on sustainability

One should be careful when incorporating sustainability in the MEAT criteria, that it will not conflict with other MEAT criteria, so that the trade-off has to be made and the risk occurs that sustainability will not be achieved. Conflicting criteria could be life cycle costs or aesthetics. Therefore, it is recommended to focus the MEAT criteria almost fully on the sustainability goal. This could potentially provide the room to include financial flexibility that will be needed in the realisation phase.

Including financial flexibility

Sustainability requires a flexible attitude. Whereas this could be present in the MEAT criteria by providing design freedom to the market, it becomes subject to a price discount as a result of the MEAT procedure. In order to sustain a flexible attitude towards the design during the realisation phase, financial flexibility needs to be provided by the client. Financial flexibility offers two benefits to the project. First of all, it provides the financial space for performing optimisations when the possibility arises for dealing with contingencies. Secondly, offering financial flexibility shows willingness of the client to the contractor.
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This could be done by offering a separate budget for sustainability measurements that is not included in the MEAT assessment.

*Face-to-face communication to continue the ambition*

While the tender phase is subject to the rules of the Public Procurement Act, it appears that the opportunity for face-to-face communication is much valued. Individual information rounds or dialogues could contribute to the alignment of criteria and tender offer, which is beneficial for the continuation of the sustainability ambition. This is because oral explanation is often very clarifying to a written proposal. Also, this form of communication enables both parties to understand each other’s motivation.

For a client, being flexible towards the rules of the Public Procurement Act is difficult, because it could lead to accusation of false competition. The procedure that might follow, involves high costs, a project delay and it might lead to the tender procedure being announced invalid. Therefore, it is understandable that clients are anxious about being flexible, collaborative and informal during this phase. However, these cases have shown that they could be organised in a more informal way. By providing clear boundaries of what can and what cannot be discussed, it is easier to have discussions within those boundaries. Moreover, if the weight of interfirm communication possibilities is shifted to an earlier phase, the parties can become more acquainted with each other’s wishes and ideas.

*Optimisations in collaboration*

In the realisation phase, the establishment of a collaborative environment could provide the conditions for achieving the sustainability ambition. This research showed that optimisations to sustainability were only performed in mutual agreement and joint action, if both parties keep a critical attitude towards the project and show the willingness to keep improving. This could be supported by the initial embracement of the challenge that sustainability imposes. Therefore, the involvement of the client during the realisation phase is necessary to optimise the project towards the ambition of the mission statement.
6. Conclusion

This research addresses the use of MEAT criteria in order to achieve sustainability ambitions in infrastructure projects. From the current trend in public construction projects to include sustainability in the award criteria as a strategy to procure more sustainable infrastructure, questions arise about the effectiveness of this method. Alignment between sustainability ambitions, MEAT criteria, MEAT offer and delivery is not always achieved.

A relational perspective is proposed to address this problem statement. This resulted in the following research question:

“How can relational governance play a role when using MEAT criteria to achieve sustainability, ranging from the ambition to the delivery of a construction project?”

By imposing four sub questions, this research was structured into four main chapters: the theoretical exploration (chapter 2), the methodology (chapter 3), the case results and analysis (chapter 4) and the discussion (chapter 5).

6.1. Answers to the sub questions

6.1.1. Sub question 1: “Where in the construction process in which MEAT criteria are used, could relational governance play a role?”

As a result of an investigation of the body of literature regarding relational governance and collaborative contracting, four pillars of relational governance were identified. These were allocated as the fundaments for achieving a relationship that is built upon collaboration.

1. Flexibility; to facilitate acting according to a project’s objective, joint problem solving and conflict harmonisation.
2. Solidarity; to facilitate acting according to a project’s objective, relationship maintenance, conflict harmonisation, and prevention of misuse of bargaining positions.
3. Information exchange; to facilitate joint planning and joint problem solving and harmonisation of conflict.
4. Mutuality; to facilitate shared responsibilities and collaboration.

The regular process in which a MEAT offer is discounted and translated into contract requirements, offers little room for flexibility in the realisation phase. Therefore, it is argued that relational governance could play a role in the early stages of a project to have its impact on the later stages.
6.1.2. Sub question 2: “How can the role of relational governance in the construction process for achieving sustainability via MEAT criteria be assessed?”

A qualitative research approach can provide the required knowledge to assess the role of relational governance in the construction process. Case studies offer the possibilities to gain insights in the dynamics of a phenomenon in its context. By performing multiple case studies on three different cases, the findings from the different cases can be compared in order to be able to say something about the generalisability of the research.

By using document analysis and interviews, the development of the sustainability ambitions, to MEAT criteria, a MEAT offer and the final delivery can be mapped out. The process is compared per phase, considering the initiation, preparation, tender and realisation.

Interviews with key actors in the regarded process are performed. These are, per case, an involved actors from the client, an involved actor from the advisory firm and an involved actor from the contractor. The semi-structured interviews are divided into two parts. The first part acquires knowledge about the objective factors that led to the development of sustainability. The second part of the interview presents the seven elements of relational governance and their opposites, in order to investigate the presence of the relational elements through the process. These are:

a. Flexibility - Rigidity
b. Collaboration - Control
c. Risk taking - Risk avoiding
d. Risk sharing - Risk transfer
e. Information sharing - Information withholding
f. Informality - Formality
g. Trust - Mistrust

Each element is asked to be linked to an example in which this is expressed. This provides the researcher with insight in specific actions or events. These expressions are compared to the findings of the first part of the interviews. Similarities between the objective factors and the expressions of relational elements, are appointed to be elements that play a role in the achievement of sustainability.

A second description of the cases focuses on the deviation from contractual governance. This outlines how the MEAT offer in relation to the fixed price, is managed.

6.1.3. Sub question 3: “Which elements of relational governance play a role in the construction process using MEAT criteria in achieving sustainability?”

From the case studies, it appears that three elements of relational governance play a role in the construction process. These are flexibility, collaboration and risk taking, which are as follows present in the separate phases:

1. Initiation
   - Formulating bold statements as an expression of risk taking
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- Investigating opportunities, including the market's potential, in a diverging approach as an expression of collaboration and flexibility

2. Preparation
- Design freedom to the market as an expression of flexibility and risk taking
- Involvement of the market as an expression of collaboration.

3. Tender
- Face-to-face communication as expressions of flexibility, collaboration, information sharing and informality;
- The aim to find partners with a shared ambition as expression of collaboration, risk sharing and risk taking.

4. Realisation
- The project’s objective is leading in design choices, design optimisations, contract adaptations and role allocation as expressions of collaboration, flexibility and informality;
- Joint decision making as an expression of risk sharing, collaboration and information sharing.

Informality, risk sharing and information sharing appear to be present in the cases, but not clearly linked to be playing a role in achieving sustainability. The validation step confirmed the role of these elements, although it was suggested to include the role of intrinsic ambition.

6.1.4. Sub question 4: “What are the implications of the elements of relational governance that play a role in the construction process using MEAT criteria for achieving sustainability?”

The three elements of relational governance that play a role in the construction process using MEAT criteria for achieving sustainability are flexibility, risk sharing and collaboration. Various expressions were found, allocated to the different phases in which they play a role. A prerequisite for the presence of relational governance is that there is an intrinsic ambition of the people involved in the project team to achieve sustainability.

First of all, risk sharing is ascribed to flexibility, because flexibility allows the application of unfamiliar or new solutions, which entail risks.

Flexibility is defined as the attitude to be receptive for unconventional solutions that have a positive impact on sustainability. Also it is regarded as the provision of design freedom to the market. During the realisation, flexibility is the possibility to make adaptations in the contract for the benefit of sustainability.

Collaboration is, in the initiation and preparation phase described as the attitude of the client towards interaction with the market and gaining knowledge. During the tender phase, collaboration is also considered as the interaction and communication with the market. Collaboration in the realisation phase is described as joint action and risk sharing.
6.1.5. Research Question: “How can relational governance play a role when using MEAT criteria to achieve sustainability, ranging from the ambition to the delivery of a construction project?”

The previously answered sub questions serve as a structure to answer the main question to this research. Flexibility, risk taking and collaboration play a role in the construction process that uses MEAT criteria to achieve sustainability. However, this should be supported by intrinsic ambition of the project team, as this appeared to be the facilitating factor for establishing a relational approach. While relational governance could play a role in the initiation, preparation and tender phase to compose well aligned MEAT criteria and MEAT offers, the current MEAT procedure limits sustainability in the realisation phase. Therefore, it is recommended to include a different financial structure in the realisation phase, in order to provide financial flexibility.

Relational governance thrives by the presence of intrinsic ambition of the key actors involved. Bringing projects to a successful end, involves an important human factor. Risk taking and flexibility can contribute to achieving sustainability by supporting the formulation of a bold ambition statement about sustainability. Acknowledgement of the challenge that sustainability entails, provides the grounds for achieving the mission statement. Flexibility, risk taking and collaboration play a role here. Flexibility and risk taking can play a role in providing the opportunity to open up to new or unconventional solutions and to provide design freedom to the market. Collaboration between client and market could provide the knowledge that is needed to compose the right MEAT criteria in which the expectations of the client are aligned with the market’s potential.

During the realisation phase, collaboration is needed to jointly perform optimisations in order to achieve the mission statement. The flexibility that is inevitably required in the realisation phase, is limited by the MEAT procedure. Therefore it is recommended to practitioners to include a different contractual mechanism after the tender phase, that enables continuous optimisations and dealing with contingencies according to the benefit of sustainability by flexibility and risk taking.

Flexibility and risk taking during the realisation phase are being limited by the contractual implications of MEAT procurement. MEAT procurement entails a paradox because flexibility and value creation is the purpose of MEAT criteria in the tender phase. Yet, by setting a discount on a MEAT offer, a value proposition, the flexibility is limited to the fixed budget during the realisation phase.

If no adapted structure is implemented in the realisation phase to safeguard flexibility, due to the limiting MEAT discount, flexibility and risk taking will not be facilitated. This could impede the achievement of sustainability by using MEAT criteria.

The general shortcoming of MEAT criteria is that the offered quality in the tender procedure becomes subject to the discounted price during the realisation phase. This limits the opportunities for quality.

Especially for sustainability this is the case, because this procedure asks from tenderers to put more effort in the inclusion of sustainability in their offer. The increased amount of effort should be continued during the realisation phase, for the implications of sustainability are not yet completely predictable or familiar. Moreover, sustainability is
in a fast state of development. Better opportunities can present themselves and contingencies that effect the sustainable offer, can occur. Thus, sustainability requires continuous monitoring during the realisation phase.

Therefore, if a client wishes to enhance sustainability a project, flexibility should be facilitated in the realisation phase. If this will not be provided, tenderers are tempted to offer a safe, risk averse design in the tender, as tender bids are always subject to a cost-benefit analysis.

When both client and contractor collaborate during the realisation phase, the environment for delivering the sustainability offer can be facilitated by continuously looking for optimisations and decision making based on the sustainability goal. Continuous optimisations and decision making for the benefit of sustainability require the contractual flexibility to make adjustments to the initial design. Flexibility also addresses the willingness that is needed to take the risk of adapting the design for the purpose of implementing a more sustainable opportunity.

6.2. Limitations to this research

6.2.1. Limitations to the literature review

Although having put a lot of effort in investigating the literature about relational governance, the fundaments that were described, were retrieved from old studies, that even go 40 years back. Another body of literature was consulted to substantiate this older view with a more recent view on relational and collaborative contracting. Yet, deviations were found.

The literature about MEAT procedures is very limited and most research regards the effectiveness of the awarding mechanisms, or literature about procuring value, considered Best Value Procurement. Therefore, the description of the MEAT procedure comes mainly from practitioner guides.

6.2.2. Limitations to the research method

The method of this research focuses on the role that relational governance plays in achieving sustainability. While contractual governance was considered to always be present, no attention was given to the role that contractual governance had played in achieving sustainability in the cases. This could lead to a bias in the results.

The categorisation of the MEAT criteria (process/product based, sustainability category, qualitative/quantitative) was not considered in the analysis of the results. Therefore nothing can be said about the effect that this has on the alignment of ambitions and delivery.

By imposing the elements of relational governance with their contradiction, an attempt was made to open up the discussion and make people consider both sides. However, an implicit effect could have been that people were tempted to answer the socially desirable.

The previous limitation could be a limitation of the whole interview approach, as quite sensitive information about trust and relationships was asked. This could have been a reason for people to not be completely honest.
6.2.3. Limitations to the cases

Some remarks can be made to the cases that were studied. First of all, a mistake was made in recording the interview of the contract manager from the client in case A, so the data of the interview were not available. Although the interview did not provide many additional insights, there is a missing point of view here. Secondly, in case C, the producer was not reached for an interview, which leads to another missing viewpoint.

Case B was performed between 2013 and 2015, which was at first considered to be in a sufficient time frame. However, during the interviews, the researcher realised that the obligation for using MEAT criteria just got into force in 2013 and experience with MEAT was lacking. Secondly, the need for sustainability has grown significantly in the past few years, compared to 2013.

Another limitation to this case is that there were two project teams from the side of the client, who did not communicate well together. And because only one person was interviewed from the client’s side, the other viewpoint is missing.

6.2.4. Limitations to the results

Although the relational elements were defined in the literature chapter and shortly explained in the interviews, they could still be subject to interpretation, which makes generalisability of the results difficult.

The results are not only applicable to sustainability, but they apply to the procurement of uncertain or innovative solutions in integrated contracts in general.

6.3. Recommendations

6.3.1. Recommendations to practitioners

The use of MEAT criteria offers a way to include the addition of sustainable value to an infrastructure project. However, it is mainly in the initiation and preparation phase that this mechanism offers the opportunity to include flexibility in the tender documents. Therefore an additional mechanism should be included to provide the financial flexibility to take risks and improve the sustainability during the realisation. This could be done in the form of a separate budget for sustainability, or by having a separate steering group that monitors sustainability only and that can communicate between client and contractor. Another option is for example to sign a declaration of intent, to mutually address sustainability during the process and to put available the resources that are needed to achieve sustainability.

The most important however, is to find people that are intrinsically motivated to implement sustainability in a project and to have this ambition continued in the process. Then, the challenge that sustainability entails, should be acknowledged by the project team, before sustainability is incorporated in the contract preparations.

A strategy that could contribute to defining the right conditions to achieve sustainability, is to formulate a bold mission statement in the initiation phase that sets a clear sustainable end-result to be achieved.
6.3.2. Recommendations for further research

- It appears that the role of ambition is very important when it regards the achievement of sustainability, especially when sustainability is not completely fixed in a final design. Ambition is a human factor that is hard to steer on. A recommendation is done to study how to continue and transfer a sustainability ambition to different phases.

- The insights in the categorisation of sustainable MEAT criteria were not included in this project. It might be relevant to see what the effectiveness is of the way in which sustainability is asked in MEAT criteria;

- In the past years, integrated contracts were the rule. However, recently, the negative implications of integrated contracts have been put forward and it has led to a change in the construction sector regarding the type of contracts used. The researcher recommends to do research to how sustainability can be incorporated in a more relational contract form, like a Design team.

- Because MEAT criteria and sustainability are subject to financial limitations, it is recommended to do further research into the financial implications of procuring sustainable infrastructure by using MEAT criteria.

- As ambition appears to be an important factor, it is recommended for further research to look into the feasibility of assessing on ambition in MEAT criteria?
7. Reflection

One year and only a few days ago, I finished my last exam for my masters, and I started with last thing that was left to do, before I could graduate. Whilst knowing that it would become a struggle, I was fully prepared, and able to finish my graduation thesis within six months. At least, so I thought.

Because mentally my graduation work had started already months earlier. The fear that I would not have my old roommates around to support me, was taken away by finding three incredibly sweet and fun new roommates. The other fear was a bigger hurdle. Despite the fact that I already had taken almost seven years of education, I was very insecure about my scientific researching capabilities and I wondered if my field of interest was relevant enough for a technical master education. Luckily, most of those insecurities were taken away by a few months of reflection. And I thought to be ready.

I have always been someone who is very enthusiastic and trustful at the start of something new, even when I know that it can become a though journey. Nothing less happened when I started at Witteveen+Bos with preparing my research proposal about sustainable MEAT criteria. The amount of papers I collected, the scope I wanted to include and the amount of ideas I created were enormous. When I look back, it is funny to see the different directions I headed to back then. Especially when preparing my kick-off meeting, I had to do something that I would definitely not consider a talent of mine: making choices. After the kick-off meeting, I thought I would be able to finish my thesis within five months, because I had a clear view of what I was about to research. However, keeping my focus during the literature study, was very challenging for me. I got lost in the amount of research that was done and found everything to be of importance, but no single paper provided me with an answer. I do not even know what answer I was looking for, but it came forth from the fear to be missing scientific support. It was only a few weeks before I had to submit my draft final version, that my dad convinced me that research is always subject to some extent of interpretation. If I would do research in the future, I would first look outside the boundaries of my scope, in order to better understand the relation of my research topic with other bodies of knowledge. This would probably make it easier to interpret my topic instead of trying to understand it from within its boundaries.

I genuinely enjoyed the interviews I conducted with clients, consultants and contractors. By getting familiar with the practical implications of my topic, the interest in my own research increased. Performing these interviews taught me that something that I used to consider as not-important, I may consider a skill. It appeared quite easy to get people to talk about the project and more sensitive aspects.

What I experienced quite often in the past year, is that I do not like to ask for help when I do not know what type of help I need. It feels like wasting people’s time with irrelevant, unspecified questions. This also made me
hesitate about sending incomplete draft versions of chapters to the committee. Even during the last weeks of my thesis completion, I almost never asked for help. It took me a lot of courage to ask a friend to read my report. And eventually, it turns out to be very helpful, especially when it is not perfect yet.

Therefore, I do regret that I have not taken enough advantage of the expertise that was present at Witteveen+Bos. Luckily, I did enjoy a lot of conversations about topics other than my research with the people at Witteveen+Bos, and it definitely made this process less lonely. I also experienced that at times that I was in doubt, it worked very well to just speak it out loud to someone. This forced me to formulate my problem clearly, which enabled me to understand my problem and make a choice myself.

I have to mention the outbreak of Covid-19 a few weeks prior to submitting my green-light version. Honestly, the timing was perfect for me. It allowed me to only focus on my thesis, get enough sleep and not skip work-outs. It also taught me that I am very well capable of focussing on one thing, as long as it regards something that I consider important.

Finishing my thesis within six months, failed successfully. I cannot say that it would have been better, would I have finished it in October 2019, or December 2019. Yes, there would have been a lot of things I could have done in the months after, without the restrictions of an intelligent lockdown and social distancing. It would have saved my parents money, it would have saved stress. And even now, it is far from perfect. Looking back, I was ready. Not to finish my master thesis in six months, but to take the time I needed, to deliver something that I can be proud of, to experience the process more carefully, to get to know a lot of inspiring and kind people and to gain a true interest in this topic.
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## 9. Appendices

### Appendix A- Sustainability

<table>
<thead>
<tr>
<th>SHORTCOMINGS</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment</td>
<td>1. Fragmentation of forests and other ecosystems</td>
</tr>
<tr>
<td></td>
<td>2. Destruction of vegetation and habitats</td>
</tr>
<tr>
<td></td>
<td>3. Changed water flows</td>
</tr>
<tr>
<td></td>
<td>4. Erosion</td>
</tr>
<tr>
<td></td>
<td>5. Access to invasive species and humans</td>
</tr>
<tr>
<td>Materials and resources</td>
<td>6. Air emissions</td>
</tr>
<tr>
<td></td>
<td>7. Soil degradation</td>
</tr>
<tr>
<td></td>
<td>8. Resource depletion</td>
</tr>
<tr>
<td>Stormwater management</td>
<td>9. Complicated water absorption in soil, leading to flooding and erosion</td>
</tr>
<tr>
<td></td>
<td>10. Polluted runoff (due to roads)</td>
</tr>
<tr>
<td>Energy and environment control</td>
<td>11. Noise, vibration, lightning and visual disturbance lead to affected wildlife and biodiversity</td>
</tr>
<tr>
<td></td>
<td>12. Roads open up previously inaccessible areas to human traffic</td>
</tr>
</tbody>
</table>

*Table 12: Shortcomings of traditional infrastructure (Bassi et al., 2017)*

<table>
<thead>
<tr>
<th>IMPACT CATEGORY</th>
<th>DESCRIPTION OF CATEGORY</th>
<th>IMPACT ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>Environmental pressures by GHG emissions, leading to temperature changes in the atmosphere and thus to climate change</td>
<td>Human health, Natural environment</td>
</tr>
<tr>
<td>Photochemical ozone creation</td>
<td>Radiation from the sun and chemical substances lead to incomplete combustion of fossil fuels</td>
<td>Human health, Natural Environment</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>Ozone-depleting substances like CFC’s and halons cause stratospheric ozone depletion, reducing the potential to hold back harmful radiation</td>
<td>Human Health, Natural Environment</td>
</tr>
<tr>
<td>PM, Respiratory emissions</td>
<td>Emissions of particulate matter and secondary particles as a by-product of fossil fuels combustion, being harmful to health</td>
<td>Human Health</td>
</tr>
<tr>
<td>Ecotoxicity</td>
<td>Persistent chemical substances that cannot be degraded by natural systems and have toxic effects</td>
<td>Human Health, Natural Environment</td>
</tr>
</tbody>
</table>
### Ionising Radiation
Caused by human or natural sources, like nuclear power plants or space radiation, can be derived from inhalation, food and water

**Human Health**

**Natural Environment**

<table>
<thead>
<tr>
<th>Acidification</th>
<th>Caused by acid chemical substances and can damage water bodies, fish stocks, soils and forests</th>
<th>Natural environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eutrophication</td>
<td>Caused by excessive amounts of nutrients reach ecosystems through for example fertilisers or sewage. This leads to amongst others algae blooms in waters</td>
<td>Natural Environment</td>
</tr>
<tr>
<td>Human toxicity</td>
<td>Emissions of toxic chemicals and substances that impact human health</td>
<td>Human health</td>
</tr>
<tr>
<td>Abiotic resource depletion</td>
<td>Reduction in available stocks of fossil fuels, metal ores and other minerals, leading to shortage of raw material and price increase</td>
<td>Natural resources</td>
</tr>
<tr>
<td>Water scarcity</td>
<td>This happens when the amount of fresh water extraction exceeds the extent of renewal in the same water body. This leads to water shortage or droughts</td>
<td>Natural resources</td>
</tr>
<tr>
<td>Land use competition</td>
<td>As a result of multiple and growing demands for land for food production, feed, biofuels and biomaterials, land-use competition increases. This will meet the limited stock of available land</td>
<td>Natural resources</td>
</tr>
<tr>
<td>Loss of fertile land</td>
<td>Soil erosion due to too intensive land use, leads to loss of fertile land</td>
<td>Natural resources</td>
</tr>
</tbody>
</table>

*Table 13: Main environmental impact categories (Miedzinski et al., 2013)*

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>SUSTAINABILITY CRITERIA</th>
</tr>
</thead>
</table>
| Climate and Natural disasters | 1. Project design for low GHG emissions  
2. Assessment of climate risks and project-resilient design  
3. Project design and systems optimization for disaster risk management  
4. Durability, flexibility, and recovery of design elements and technological systems |
| Pollution | 5. Project design and systems optimization to minimize air pollutant emissions  
6. Project design and systems optimization to minimize water contamination  
7. Project design and systems optimization to minimize soil and other pollution |
| Preservation of the Natural Environment | 8. Environmental assessment of project impacts  
9. Project design for maximum ecological connectivity  
10. Preserve natural areas, areas with high ecological values, and farmlands  
11. Project design and technology to minimize invasive species  
12. Project design and technology to optimize soils management |
<table>
<thead>
<tr>
<th>Efficient Use of Resources</th>
<th>13. Efficient use of water resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14. Material use and recycling</td>
</tr>
<tr>
<td></td>
<td>15. Project design to minimize energy consumption and maximize use of renewables</td>
</tr>
<tr>
<td></td>
<td>16. Waste management and recycling</td>
</tr>
<tr>
<td></td>
<td>17. Hazardous materials</td>
</tr>
</tbody>
</table>

*Table 14: Design principles of sustainable infrastructure (What Is Sustainable Infrastructure: A Framework to Guide Sustainability Across the Project Cycle, 2018)*
## Appendix B - Document analysis

<table>
<thead>
<tr>
<th>PHASE</th>
<th>DOCUMENT</th>
<th>OUTPUT</th>
<th>EXPLANATION</th>
</tr>
</thead>
</table>
| Initiation phase | - Ambition document/project objectives  
|               | -(if available) Results from market consultations     | Steps that were taken to formulate ambitions                           | What actions were performed in order to formulate a sustainability ambition? |
|               |                                                      | Actors that were involved in formulating ambitions                      | Which actors were involved early in the project, who’s wishes were taken into consideration? |
|               |                                                      | The sustainability ambitions                                            | - Sustainability category  
|               |                                                      |                                                                       | - Process/product based  
|               |                                                      |                                                                       | - Responsibility allocation  
|               |                                                      |                                                                       | - Qualitative/quantitative  
|               |                                                      |                                                                       | - Vague/concrete  
|               |                                                      | Ideas from the market that were used in the sustainability ambitions    | Did the market deliver any valuable input for the client? |
| Preparation phase | - Tender document  
|                  | - Demand specifications  
|                  | - Contract draft                                                   | MEAT criteria                                                            | - Weight  
|                  |                                                      |                                                                       | - Sustainability category  
|                  |                                                      |                                                                       | - Process/product  
|                  |                                                      |                                                                       | - Qualitative/quantitative  
|                  |                                                      |                                                                       | - Amount of design freedom  
|                  |                                                      | Alignment between ambitions and criteria                               | Do the criteria serve the ambition? |
|                  |                                                      | Distinction between MEAT criteria and sustainability requirements in product/process | How were the sustainability ambitions divided over requirements and award criteria? |
|                  |                                                      | Risk allocation                                                        | Is there any specific risk allocation regarding the MEAT offer or sustainability? |
|                  |                                                      | Elaboration on sustainability ambitions                                | Do the tender documents elaborate on sustainability ambitions? |
| Tender phase | - (if available) Tender bid                          | MEAT offer                                                              | - Qualitative/quantitative  
|               |                                                      |                                                                       | - Sustainability category  
|               |                                                      |                                                                       | - Process/product  
|               |                                                      |                                                                       | - Amount of flexibility  
<p>|               |                                                      | Alignment between criteria and offer                                   | Does the offer align with the criteria? Do they serve the same goal? |
|               |                                                      | Amount of specification in the promise                                  | Is it a very detailed MEAT offer, or is there room for flexibility? |</p>
<table>
<thead>
<tr>
<th>Realisation phase</th>
<th>- (if available) Contractual management plan</th>
<th>Relationship between control and collaboration</th>
<th>How will the client ensure delivery of the contract?</th>
</tr>
</thead>
</table>
Appendix C - Interview protocol

Start
- First of all, I would like to thank you for your time to help me with my research.
- Do you mind if I record this interview? It will be treated with confidentiality and you will receive a copy of the transcript for assessment.

Introduction

Interviewer
- Name, student Construction Management & Engineering
- Graduating at Witteveen+Bos on sustainable MEAT offers

Interviewee
- Name and function within the firm
- Name of the firm
- Role in the project

Objective of the research
With the current trends in infrastructure on sustainability and sustainable development, the use of sustainable MEAT criteria is quite popular in a lot of projects. For my research, I study the process regarding sustainable MEAT criteria in order to understand how its sustainable effect could be improved. Therefore I look into four key moments in the procurement and construction processes in which sustainable MEAT criteria are used. And I assess the relationships between them.

Definitions
Sustainability: a set of constraints on the four major activities regulating the scale of the human economic subsystem: the use of renewable and non-renewable sources on the source side, and pollution and waste assimilation on the sink side.

Sustainable development: to meet the needs of the present without compromising the ability of future generations to meet their own needs

Trust: the expectation that you can rely on an actor fulfilling his obligations, behaving predictable and acting and negotiating in fairly whenever the occasion for opportunistic behaviour is present.

Interview approach
I want to assess the process from the initiation phase to the realisation phase. This has been divided into respectively the initiation, preparation, procurement and realisation. Per phase, a specific state in the development of MEAT criteria can be indicated. These are: sustainability ambitions, sustainable MEAT criteria, sustainable MEAT offer and delivery of the sustainable MEAT offer.

For the first part of the interview, I have composed several specific questions to get an insight in how, according to you, the process considering sustainable MEAT criteria has been designed.
The second part of the interview focuses on aspects of relational governance in the process. We will discuss several contradictions per project phase.

**Case specific questions**

*Whenever unique steps, events or choices come forward from the desk research that seem to be relevant for the sustainable MEAT criteria, like for example the use of a Construction Team, market consultations or major changes in the project team, then this will be added to the first interview part.*

**Part 1. General questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which major changes in actors have taken place during the project?</td>
<td>Insight in how individuals or the interface between certain phases and persons influence the safeguarding of sustainability ambitions.</td>
</tr>
</tbody>
</table>

**Initiation phase - Sustainability ambitions**

Questions for the client and advisory firm

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What was the initial approach regarding sustainability in this project?</td>
<td>Insight in the initial ambition of the client (in consultation with the engineering firm) and how this has been defined and what expectations there are regarding sustainability.</td>
</tr>
<tr>
<td>2. What was the influence of the risk analysis on formulating the sustainability ambitions?</td>
<td>The extent to which risks limit or stimulate sustainability ambitions.</td>
</tr>
<tr>
<td>3. What was the end result of this phase regarding sustainability ambitions?</td>
<td>Insight in how the ambitions were formulated.</td>
</tr>
</tbody>
</table>

**Preparation phase - Sustainable MEAT criteria**

Questions for the client and advisory firm

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How did the sustainable MEAT criteria arise from the former sustainable ambitions?</td>
<td>Insight in which procedure has been followed to translate ambitions to criteria. Insight in which factors have deterministic in taking certain ambitions to the next phase and others not. Furthermore gaining insight in how the attitude towards sustainability ambitions change.</td>
</tr>
<tr>
<td>2. What was the end result of this phase, regarding MEAT criteria?</td>
<td>Insight in how the criteria were formulated.</td>
</tr>
</tbody>
</table>
### Procurement phase - Sustainable MEAT offer

**Questions for the client and advisory firm**

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight/Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What were your expectations about the sustainability opportunities regarding the winning tender proposal and its MEAT offer?</td>
<td>Gain insight in how specifying or defining sustainability opportunities- and promises (realistic view, risks, mistrust) changes the ambition of the client.</td>
</tr>
<tr>
<td>2. Did the sustainable MEAT offer of the contractor align with your sustainability ambitions? Does that have an influence on the amount of trust have in a contractor’s expertise and willingness regarding sustainability?</td>
<td>The influence of alignment of promise and ambitions on the amount of trust in a contractor.</td>
</tr>
<tr>
<td>3. What was the end result of this phase, regarding the sustainability offer?</td>
<td>Insight in what the tender offered and the alignment with the criteria.</td>
</tr>
</tbody>
</table>

**Questions for the contractor**

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight/Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How did the MEAT offer arise from the sustainable MEAT criteria?</td>
<td>Insight in the interpretation of the criteria and the attitude of the contractor regarding sustainability. The amount of attention that has been given to sustainability.</td>
</tr>
<tr>
<td>2. How has the design freedom that these MEAT criteria provide been experienced?</td>
<td>Get insight in the freedom that is offered to contractors and how that changes their attitude towards sustainability in the project and the sustainability ambition of the client.</td>
</tr>
</tbody>
</table>

### Realisation phase - Delivery of the sustainable MEAT offer

**Questions for the client and advisory firm**

<table>
<thead>
<tr>
<th>Question</th>
<th>Insight/Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In which way has compliance with the sustainable MEAT criteria been safeguarded?</td>
<td>Insight in the mechanisms: collaboration or control? Is the focus on the preservation of ambitions or steering on agreements?</td>
</tr>
<tr>
<td>2. How have contingencies during the realisation, that had an effect on the execution of sustainable MEAT offers, been handled?</td>
<td>Insight in the extent to which the client was involved and the trust that was present towards the contractor. Is the client aware of what happens in the process of the contractor?</td>
</tr>
<tr>
<td>3. What is your opinion regarding the sustainable end result of the project?</td>
<td>Do ambitions match the delivery?</td>
</tr>
</tbody>
</table>
Questions for the contractor

<table>
<thead>
<tr>
<th>1. In which way did you steer upon safeguarding the sustainable MEAT offer?</th>
<th>Get insight in the procedure or mechanisms that are applied in order to safeguard sustainability promises</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. How have contingencies during the realisation, that had an effect on the execution of sustainable MEAT offers, been handled?</td>
<td>Which contingencies in a process have an influence on the sustainable MEAT offer? How is this being communicated and solved? Is there communication with the client, transparency or withholding of information? To what extent is flexibility present in these situations?</td>
</tr>
<tr>
<td>3. What is your opinion regarding sustainability in this project?</td>
<td>Does the promise match the delivery?</td>
</tr>
</tbody>
</table>

How would you compare the alignment between the following steps?

| Insight in how the different phases and according translation steps are related. Are they aligned or misaligned? |
|---|---|
| *This question will most certainly be answered by the former questions. If not, then this question will be asked for clarity.* |

**Part 2. Process**

- We consider the former process again. I have a few contradictions that I will present to you one by one. Per contradiction I am curious to your reaction on this regarding each individual phase in the project.

- Why do you experience this? What makes you recognize this phase as …? *Get insight in how people perceive these concepts*

- Could you specify which moment/events/activities or other factors are underlying to this?

<table>
<thead>
<tr>
<th>Information sharing</th>
<th>Information withholding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>Detailed agreements/rigidity</td>
</tr>
<tr>
<td>Taking risks</td>
<td>Avoiding risks</td>
</tr>
<tr>
<td>Sharing risks</td>
<td>Transfer risks</td>
</tr>
<tr>
<td>Informality</td>
<td>Formality</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Control</td>
</tr>
<tr>
<td>Trust</td>
<td>Mistrust</td>
</tr>
</tbody>
</table>
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Closure
- Is there anything left that you want to share about this project or this interview?
- I want to thank you once again for your time and your openness. The information will be treated with confidentiality and I will send you a copy of the final results.
Appendix D - Relational elements per case

The table presents the factors that the interviewees indicated as contributions to the development of sustainability in the first column. The third column of the first rows (“quotation: expression of relational element”) substantiate the indication of the relational element in the second column ["present relational elements (interview part 2)"].

The second part of the table shows in the second column ("implicit relational elements") the elements that the researcher found to be implicitly present in the contributing factors. These are also substantiated by quotes from the interviews in the third column.

Not all factors are linked to a relational element, this is because these factors could not be allocated to relational governance.

### Relational elements - Case A

#### INITIATION

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABILITY AMBITIONS (interview part 1)</th>
<th>PRESENT RELATIONAL ELEMENTS (interview part 2)</th>
<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
<th>QUOTATION NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Client does not feel the need for control by progress proceedings, because there is mutual trust.</td>
<td>Collaboration</td>
<td>“Maar dat zij dus eigenlijk op een gegeven moment tegen mij zeiden: […], stop nou met die tweewekelijke voortgangsrapportage, want we geloven het wel.”</td>
<td>A.1</td>
</tr>
<tr>
<td>2. Project leader aboard of client that had a feeling with sustainability</td>
<td></td>
<td>“De oude projectleider had veel meer met duurzaamheid”</td>
<td>A.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPLICIT RELATIONAL ELEMENTS</th>
<th>QUOTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Client goes in open discussion with the market to gather input for contract preparations</td>
<td>Flexibility</td>
</tr>
<tr>
<td>4. Client has the courage to show ambition, which reduces the predictability</td>
<td>Collaboration</td>
</tr>
</tbody>
</table>
## Preparation

<table>
<thead>
<tr>
<th>Factors that Contributed to the Formulation of Sustainable Meat Criteria (Interview Part 1)</th>
<th>Present Relational Elements (Interview Part 2)</th>
<th>Quotation: Expression of Relational Element</th>
<th>Quotation NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Market consultations and early market involvement</td>
<td>Informality</td>
<td>“Terwijl in de voorbereidingsfase je een marktverkenningsgesprek kan voeren dat wat informeler is”</td>
<td>A.5</td>
</tr>
<tr>
<td>2. Contract manager from the municipality was willing to integrate the sustainability measurements into the contract.</td>
<td>Collaboration</td>
<td>“Komt er iemand met 120 maatregelen naar me toe. Zit je als contractman echt niet op te wachten. Maar toen kwam ik wel. Daar hebben we samen echt onze weg in gevonden. Wat moet er in EMVI, wat moet er in de minimumeis?”</td>
<td>A.6</td>
</tr>
<tr>
<td>3. Looking for innovative solutions and technologies that had already proven their usability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Design freedom in the materialisation.</td>
<td>Flexibility</td>
<td>“Materialisatie daar kon je inderdaad, daar stonden ze eigenlijk open om mee te doen dat wat nodig is om de maximale duurzaamheidsambities te bewerkstelligen”</td>
<td>A.7</td>
</tr>
<tr>
<td>5. Feedback from contractors in market consultation leads to adaptation of the weight of the MEAT score.</td>
<td>Collaboration</td>
<td>“En uiteindelijk heeft dat na intern overleg bij de gemeente ertoe geleid dat ze zeiden we kunnen niet het beheer volledig achterwege laten omdat beheer het project uiteindelijk moet overnemen, maar ze hebben de verdeling van de EMVI waarde daarna afgestemd”</td>
<td>A.8</td>
</tr>
<tr>
<td>6. Technical solutions with a low ECI value could have a negative impact on the aesthetics</td>
<td>Risk taking</td>
<td>“We willen een zo laag mogelijke milieu impact. Daar was een aparte EMVI voor. Alleen het gevaar is dat ze echt met iets innovatiefs gaan komen wat een heel lage milieu impact heeft maar wat heel lelijk is”</td>
<td>A.9</td>
</tr>
<tr>
<td>7. Sustainable MEAT criteria could conflict with each other</td>
<td>Risk taking</td>
<td>“LCC was een EMVI en LCA was een EMVI. En die kunnen elkaar heel goed bijten […] We hebben het risico genomen”</td>
<td>A.10</td>
</tr>
</tbody>
</table>

### Implicit Relational Elements

<table>
<thead>
<tr>
<th>Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Materialisatie daar kon je inderdaad, daar stonden ze eigenlijk open om mee te doen dat wat nodig is om de maximale duurzaamheidsambities te bewerkstelligen”</td>
</tr>
<tr>
<td>“En uiteindelijk heeft dat na intern overleg bij de gemeente ertoe geleid dat ze zeiden we kunnen niet het beheer volledig achterwege laten omdat beheer het project uiteindelijk moet overnemen, maar ze hebben de verdeling van de EMVI waarde daarna afgestemd”</td>
</tr>
<tr>
<td>“We willen een zo laag mogelijke milieu impact. Daar was een aparte EMVI voor. Alleen het gevaar is dat ze echt met iets innovatiefs gaan komen wat een heel lage milieu impact heeft maar wat heel lelijk is”</td>
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<tr>
<td>“LCC was een EMVI en LCA was een EMVI. En die kunnen elkaar heel goed bijten […] We hebben het risico genomen”</td>
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<tr>
<td>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF MEAT OFFER (Interview part 1)</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1. Information rounds</td>
</tr>
<tr>
<td>2. A contractor that reflects the culture</td>
</tr>
<tr>
<td>3. Assessment on ECI score stimulates the application of innovative technologies</td>
</tr>
<tr>
<td>4. Performing an analysis to determine the focus of the materialisation for the ECI</td>
</tr>
<tr>
<td>5. Stimulating and using the creative thinking process of the engineers to come to innovative solutions</td>
</tr>
<tr>
<td>6. Choice for material that suits the sustainability instead of providing work for the contractor or fitting the initial aesthetic design</td>
</tr>
<tr>
<td>7. Contractor was flexible because of his ambition</td>
</tr>
<tr>
<td>8. Possibility for multiple dialogues during tender</td>
</tr>
</tbody>
</table>
### REALISATION

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABLE DELIVERY (Interview part 1)</th>
<th>PRESENT RELATIONAL ELEMENTS (Interview part 2)</th>
<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
<th>QUOTATION NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous optimisations</td>
<td>Flexibility, Collaboration, Risk taking</td>
<td>“En daar kwamen ze echt met nieuwe gave oplossingen” “constant op zoek gaan naar betere oplossingen” “…echt gaan samenwerken doordat zij het zelf als een kans zagen voor zichzelf ook” “Dat vind ik echt een voorbeeld van samenwerking. In het belang van ons, in het belang van de opdrachtgever, dat was echt heel positief” “maar daarmee namen ze wel een risicootje, want ze geven de gemeente nu garantie op een weg waarvan ze ook niet precies weten hoe die er over tien jaar bij ligt.”</td>
<td>A.19, A.20, A.21, A.22, A.23</td>
</tr>
<tr>
<td>2. A contractor that reflects the culture</td>
<td>Flexibility</td>
<td>“Dus ze zaten er zelf ook heel flexibel in en zij zeiden ook dit is voor ons ook een voorbeeldproject wij gaan hiermee shinen. En daarmee kwamen ze in een fantastische modus, een fantastische cultuur.”</td>
<td>A.24</td>
</tr>
<tr>
<td>3. Assessment on ECI score stimulates the application of innovative technologies</td>
<td>Risk taking, Risk sharing</td>
<td>“Absoluut, en ook het feit dat de MKI waarde dermate werd beloond en triggert je ook om daarin te investeren” “…ik vind dat het projectteam echt zijn nek heeft uitgestoken om bepaalde innovatieve ideeën naar de achterban naar de beheerders verantwoord te krijgen. Dus dat vind ik delen van risico’s.”</td>
<td>A.25, A.26</td>
</tr>
<tr>
<td>4. Adapting the design according to the sustainability goal</td>
<td>Flexibility</td>
<td>“Dus ik denk dat er allemaal verbeterpunten in het project zijn doorgevoerd ten aanzien van duurzaamheid. Dat het niet eens op dezelfde lijn is gebleven maar dat het gewoon echt optimalisaties zijn geweest.”</td>
<td>A.27</td>
</tr>
<tr>
<td></td>
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<tr>
<td>---</td>
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<td></td>
</tr>
<tr>
<td>5.</td>
<td>Mutually looking for the best solution</td>
<td>Collaboration</td>
<td>“Maar ik denk dat in dit contract was juist de samenwerking met de aannemer heel belangrijk om met elkaar tot de beste oplossing te komen” A.28</td>
</tr>
<tr>
<td>6.</td>
<td>Design team culture of working together</td>
<td>Collaboration</td>
<td>Maar wij hebben een UAV-GC contract gedaan met een bouwteamcultuur. Waarin je samen bouwt aan iets wat hier al bedacht is wat je doorbouwt. A.29</td>
</tr>
<tr>
<td>7.</td>
<td>Mutually deciding upon adaptations to the contract</td>
<td>Collaboration</td>
<td>“En in overleg met de opdrachtgever hebben we dan gekeken, wat doen we wel, wat doen we niet” “En ik vind, op het moment dat je onvoorziene omstandigheden tegenkomt, moet je daar in gezamenlijkheid ook kijken van wat is nou de invloed op het project, op kosten en ook ten aanzien van je MKI beloft[...] het is heel lastig om te zeggen van nou luister, dat is de verantwoordelijkheid van een van de partijen.” A.30 A.31</td>
</tr>
<tr>
<td>8.</td>
<td>Integrated design sessions between client and contractor</td>
<td>Collaboration</td>
<td>“Dus we hebben heel veel ook integrale ontwerpsessies gehad met Dura Vermeer.” A.32</td>
</tr>
<tr>
<td>9.</td>
<td>Good ambiance between the parties</td>
<td>Informality</td>
<td>“Maar voor de relatie was het wel duurzaam. Dat was wel tof. Ja, en we hebben gewoon vaak genoeg even een biertje gedronken met elkaar, er werd veel gelachen in de keet. Ja, het was gewoon een hele losse lijne sfeer om in te werken met elkaar. Dus echt heel informeel” A.33</td>
</tr>
</tbody>
</table>
### RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

**Relational elements - Case B**

#### INITIATION

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABILITY AMBITIONS (Interview part 1)</th>
<th>PRESENT RELATIONAL ELEMENTS (Interview part 2)</th>
<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
<th>QUOTATION NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No explicit sustainability ambition from the Province</td>
<td>Rigidity</td>
<td>“…voorbereiding, initiatief, dat we heel erg rigide zijn geweest ten aanzien van de esthetische vormgeving. De esthetiek, dat die wel heel belangrijk was.”</td>
<td>B.1</td>
</tr>
</tbody>
</table>

#### PREPARATION

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABLE MEAT CRITERIA (Interview part 1)</th>
<th>PRESENT RELATIONAL ELEMENTS (Interview part 2)</th>
<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Sustainability is a detail, political seller</td>
<td>Rigidity Risk aversion</td>
<td>“En ja je ziet het ook wel bij Midden bij de EMVI criteria door het helemaal vast te klikken en niet de ruimte op te zoeken, zie je meer de rigiditeit en niet de flexibiliteit” “Ja, de rol van beheer en onderhoud zie je heel sterk hè. Als je het vrijlaat: ja wat krijg ik dan? Nee, ik wil precies dit want dan weet ik tenminste zeker dat het goedkomt. Dus als je ruimte laat, dat is eng want dan krijg ik allemaal gekke oplossingen.”</td>
<td>B.2 B.3</td>
</tr>
<tr>
<td>2. Wish for a simple MEAT assessment on sustainability and preventing hindrance</td>
<td>Risk sharing Risk taking</td>
<td>“De taakstelling gooiide best wel wat roet in het eten. Dus wij zijn al bij wijze van spreken al op de stoel van de aannemer gaan zitten om een aantal optimalisaties af te prijzen. Waarvan we niet wisten of de aannemer ze ook waar zou kunnen maken.” “Dus er is op zich wel over gesproken en dingen afgekaderd. Na diverse gesprekken was men ook wel, was toch wel duidelijk van je kan niet alles bij de markt neerleggen. Juist door een bepaalde risico naar je toe te trekken of af te bakenen, krijg je betere aanbiedingen of voorkom je dat bepaalde partijen afhaken.”</td>
<td>B.4 B.5</td>
</tr>
</tbody>
</table>
### TENDER

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABLE MEAT OFFER (Interview part 1)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Filling in the blanks reduces the distinctive character of MEAT criteria</td>
<td>Rigidity</td>
<td>“maar uiteindelijk was de laagste prijs doorslaggevend want er zat geen onderscheidend vermogen in”</td>
<td>B.6</td>
</tr>
<tr>
<td>2. The chances for opportunities are reduced by the offered solution in the MEAT criteria</td>
<td>Rigidity</td>
<td>“Ja, als je, als deze zeg maar abstracter waren omschreven, wel specifiek maar niet in die zeven punten, dan hadden we meer vrijheid gehad en dan was het misschien wel qua duurzaamheid een beter product geworden.”</td>
<td>B.7</td>
</tr>
<tr>
<td>3. Investigation of soil streams was made by contractor to fit it in the MEAT criteria</td>
<td>Risk aversion</td>
<td>“Ja, we hebben altijd de max gezocht, maar wel met de vraag, kunnen we het realiseren? En is het ook, kostentechnisch interessant? Want als dat niet zo is, dan moet je misschien een stapje lager, of misschien geen duurzaamheid aanbieden? Ja, het is wel een kosten-baten verhaal.”</td>
<td>B.8</td>
</tr>
<tr>
<td>4. Choices were mainly based upon economical perspective</td>
<td>Risk aversion</td>
<td>“Dus eigenlijk zijn we afgestapt van de gekozen duurzaamheidsaspecten, qua grondverzet. Waar we wel met de provincie gekeken van wat is nou de topp-eis die die duurzaamheids-eis hebben gerealiseerd? Eigenlijk is het dus beperking van transport over lokale wegen. Nou, en daar hebben we een heel plan en ook met interne bouwwegen rondom ons project, dus niet openbare weg, hebben we toch daar voorzieningen in getroffen om toch die overlast te beperken.”</td>
<td>B.9</td>
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### REALISATION

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1. The need for another solution arose, which was designed with the objective to minimize the traffic hindrance only.</td>
<td>Flexibility</td>
<td>“Dus eigenlijk zijn we afgestapt van de gekozen duurzaamheidsaspecten, qua grondverzet. Waar we wel met de provincie gekeken van wat is nou de topp-eis die die duurzaamheids-eis hebben gerealiseerd? Eigenlijk is het dus beperking van transport over lokale wegen. Nou, en daar hebben we een heel plan en ook met interne bouwwegen rondom ons project, dus niet openbare weg, hebben we toch daar voorzieningen in getroffen om toch die overlast te beperken.”</td>
<td>B.10</td>
</tr>
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### Relational elements - Case C

#### INITIATION

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<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABILITY AMBITIONS (interview part 1)</th>
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<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Wish to realise an innovative top-of-the-bill project</td>
<td>Risk taking</td>
<td>“Ze zijn in ieder geval niet heel risicomijdend geweest, de provincie heeft wel bewust een bepaald risico willen nemen door dit in gang te durven zetten met als risico dat het niet lukt.” (C.2.1.)</td>
<td>C.1</td>
</tr>
<tr>
<td>2. Outspoken wish of the official principal to realise a civil construction in a bio-based composite</td>
<td><strong>Risk taking</strong></td>
<td>Kijk voor die hele alternatieve, dat alternatieve ontwerp, en die gewijzigde EMVI criteria, dat is volgens mij gewoon in de VtW, in de contractwijziging meegenomen.”</td>
<td>B.11</td>
</tr>
<tr>
<td>3. Investigation of the possibilities within the projects that were still to be executed led to this bridge replacement</td>
<td>Flexibility</td>
<td>“Je stuurt op de waan van de dag, minder hinder als doelstelling en kijkt dan naar het beste resultaat vanuit die doelstelling. En je gaat geen boetes geven aan de aannemer omdat hij bepaalde dingen niet kan waarmaken. Dat, zeker niet als je het hebt over samenwerking en je wil ook uiteindelijk, dat is ook een doelstelling.”</td>
<td>B.12</td>
</tr>
<tr>
<td>4. Council proposal for realising a bio-based composite bridge</td>
<td><strong>Collaboration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Risk of failure of the innovation</td>
<td>Risk taking</td>
<td>“En je hebt best een afbreukrisico dat het niet lukt.”</td>
<td>C.2</td>
</tr>
</tbody>
</table>
## RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

### PREPARATION

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</tr>
</thead>
<tbody>
<tr>
<td>1. Investigating the feasibility (market potential, technical achievability) and potential risks</td>
<td>Risk sharing</td>
<td>“We hebben samen die risicosessies gehad. Ik zou zeggen delen”</td>
<td>C.3</td>
</tr>
<tr>
<td>2. Inclusion of a fall-back option in the contract requirements</td>
<td>Risk taking</td>
<td>“Dus we hadden altijd het terugvalscenario dat je een brug in glasvezelcomposiet kon maken.”</td>
<td>C.4</td>
</tr>
<tr>
<td>3. Two separate tender procedures (constructor and producer)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4. Risk taking by official principal</td>
<td></td>
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<tr>
<td>5. Sharp division in phasing, to focus on the development of innovation first</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Looking for partners with the same ambition and technical competence instead of an executor</td>
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</tbody>
</table>

### IMPLICIT RELATIONAL ELEMENTS

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</tr>
</thead>
<tbody>
<tr>
<td>7. Intention to collaborate with the market and educational institutions</td>
<td>“Daarbij erkennen we dat wij niet de wijsheid in pacht hebben. We hebben de markt hiervoor nodig.” “... en we moeten het in samenwerking doen met het onderwijs.”</td>
</tr>
<tr>
<td>8. Putting a process instead of a design out to tender</td>
<td>“…uiteindelijk ontwerp moet je samen gaan ontwikkelen en dan wil je dus de kennis van die composiefproducent hebben en de kennis van de aannemer en de kennis van de opdrachtlager. Dus de EMVI criteria voor de producent was dus belangrijk, want het was een beheersmaatregel voor ons risico.”</td>
</tr>
</tbody>
</table>
**RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY**

**TENDER**

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Individual information rounds</td>
<td>Informality</td>
<td>“Dat was eigenlijk ook al in de aanbesteding duidelijk, in het gesprek wat daar gevoerd werd, bij de gunning, maar ook bij de, als onderdeel van de inschrijving, ja, gaf dat al een heel vertrouwd gevoel”</td>
<td>C.8</td>
</tr>
<tr>
<td>2. Looking for partners that share the ambition to achieve the same project’s objectives</td>
<td>Collaboration</td>
<td>“Dus we waren veel meer op zoek naar partners dan naar aannemers of uitvoerenden.”</td>
<td>C.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Maar die samenwerking, je wilt wel partijen, nogmaals, partijen aan je binden voor dat avontuur. Want dat is het in feite, die die wens delen en daar ook heel hard voor willen lopen om te kijken hoe ver we kunnen gaan met elkaar en wat er mogelijk is. Dus het zat veel meer op die ambitie omarmen, samenwerking, en nadenken over de procesmatige aanpak van het onderzoekstraject.”</td>
<td>C.10</td>
</tr>
<tr>
<td>3. Faith in the producer that he would be the best party to mutually realise their ambitions</td>
<td>Trust</td>
<td>“We hadden wel met deze producent het vertrouwen van nou, hier hebben we een deskundige partij aan boord die in ieder geval alles in het werk stelt om die 100% te halen”</td>
<td>C.11</td>
</tr>
</tbody>
</table>

**DESIGN**

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABLE DESIGN (Interview part 1)</th>
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<th>QUOTATION: EXPRESSION OF RELATIONAL ELEMENT</th>
<th>QUOTATION NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design choices are based on the project’s objective</td>
<td>Flexibility</td>
<td>“En als een uitkomst van de materiëlenstudie tegenviel, of hij was anders dan verwacht, dan moet je wel flexibel genoeg zijn om je ontwerp daarop aan te passen”</td>
<td>C.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Toen hebben wij gezegd, prima maak het maar in staal. Als jij dat mooier vindt en het komt de brug ten goede, dan maken we dat in staal.”</td>
<td>C.13</td>
</tr>
<tr>
<td>2. Challenging each other</td>
<td>Flexibility</td>
<td>“veel flexibiliteit van iedereen gevraagd heeft, […] We hebben gewoon uitdagingen, ook tegenlagen, gehad”</td>
<td>C.14</td>
</tr>
<tr>
<td></td>
<td>Risk taking</td>
<td>“En ook door elkaar constant te challen van hee, kan die brug niet nog een beetje langer in biocomposiet, dus van die 17 meter naar 22 meter en vervolgens, ja, kan”</td>
<td>C.15</td>
</tr>
</tbody>
</table>
### RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

**3. Bringing in the right people**

<table>
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</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>“Weet je, uiteindelijk dat je goede samenwerking hebt en vertrouwen, pakt een ieder ook zijn verantwoordelijkheid. Waardoor je normaal gesproken minder controle op elkaars hoeft uit te oefenen.” C.16</td>
</tr>
</tbody>
</table>

“… een Project Start Up begonnen, waarbij we wel heel erg gekkeken hebben naar de samenstelling van het team. Ieder zijn eigenschappen, zijn kleuren.”

**4. Allocating people to a task according to their capabilities instead of their contractual responsibility**

<table>
<thead>
<tr>
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<tr>
<td>Flexibility</td>
<td>“Daar hebben we vanuit jullie, Witteveen+Bos, is er helemaal een beschouwing op het ontwerp gemaakt van hoe circulair het is, hoe duurzaam het is. Nou dat is gewoon, en als je dan ziet dat je die krachten bundell vanuit het kennisveld van eenieder” C.18</td>
</tr>
</tbody>
</table>

“Dat we daar specifiek hadden gekkeken van hee, welke partij kan het beste een bepaald onderdeel ontwerpen?” C.19

**5. Adapting the design in order to improve sustainability**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>“En op basis daarvan hebben we een stukje, ik wil niet zeggen re-engineering, maar hebben we gekkeken naar ons ontwerp wat eronder ligt van gah, hoe duurzaam kunnen we dat maken[...], wat kunnen wij nog in het project anders doen om het wel duurzamer te maken?” C.20</td>
</tr>
</tbody>
</table>

**6. Focus on the innovation first, to prevent the design from limiting the development of the innovation**

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<thead>
<tr>
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<tbody>
<tr>
<td>Flexibility</td>
<td>“In plaats van dat je een architect los laat gaan en die komt met allemaal van die wilde gebogen ontwerpen en dat je dan nog maar eens moet gaan kijken of je het wel kan maken. Dus daar hebben we wel bewust het faseverschil in opgezocht.” C.21</td>
</tr>
</tbody>
</table>

**7. Jointly optimising the design in order to get financial support**

<table>
<thead>
<tr>
<th>IMPLICIT RELATIONAL ELEMENTS</th>
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</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>“Dus wat we hebben gedaan is dat we elkaar helemaal hebben uitgedaagd van oké, hoe kunnen we nou de hele brug dusdanig optimaliseren dat we echt met een donders goed verhaal kunnen komen om de bestuurders te verleiden akkoord te gaan met een nieuwe variant…” C.22</td>
</tr>
</tbody>
</table>

**8. Integrated design sessions**

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<tbody>
<tr>
<td>Collaboration</td>
<td>“We hebben gezamenlijke ontwerpdagen gehad, dus met de ontwerpers van de producent en van de aannemer op één locatie.” C.23</td>
</tr>
</tbody>
</table>
9. Design choices are based on the project’s objective

<table>
<thead>
<tr>
<th>FACTORS THAT CONTRIBUTED TO THE FORMULATION OF SUSTAINABILITY AMBITIONS</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td><strong>QUOTATION NR.</strong></td>
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<tr>
<td><strong>1. ‘Warm’ handover session between Design team and realisation teams</strong></td>
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10. Sharing administration within Design team

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<tr>
<td><strong>QUOTATION NR.</strong></td>
</tr>
<tr>
<td><strong>2. Introducing the realisation team to the Design team timely before the start of the execution</strong></td>
</tr>
</tbody>
</table>

11. Good relationship between the involved parties

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<td><strong>QUOTATION NR.</strong></td>
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<tr>
<td><strong>3. Bringing in the right people</strong></td>
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</table>

12. MEAT criteria from the Design team are translated into requirements in tender realisation

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<td><strong>QUOTATION NR.</strong></td>
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<tr>
<td>RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td><strong>IMPLICIT RELATIONAL ELEMENTS</strong></td>
</tr>
<tr>
<td>6. Constructor acting as client of his own colleagues</td>
</tr>
<tr>
<td>7. Mutually solving problems of one party</td>
</tr>
<tr>
<td>8. Sharing the costs of contingencies according to fairness</td>
</tr>
<tr>
<td>9. Continuing the Design team during the realisation</td>
</tr>
<tr>
<td>10. Introducing the realisation team timely before the start of the execution</td>
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</tbody>
</table>
### RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

**Relational elements - Cross-case**

#### INITIATION

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</tr>
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<tbody>
<tr>
<td>1. <strong>Flexibility</strong></td>
<td>Client goes in open discussion with the market to gather input for contract preparations A</td>
</tr>
<tr>
<td>2. <strong>Collaboration</strong></td>
<td>Client does not feel the need for control by progress proceedings, because there is mutual trust A</td>
</tr>
<tr>
<td></td>
<td>Client goes in open discussion with the market to gather input for contract preparations A</td>
</tr>
<tr>
<td>3. <strong>Risk taking</strong></td>
<td>Client has the courage to show ambition, which reduces the predictability A</td>
</tr>
<tr>
<td></td>
<td>Outspoken wish of the official principal to realise a civil construction in a bio-based composite C</td>
</tr>
<tr>
<td></td>
<td>Risk of failure of the innovation C</td>
</tr>
<tr>
<td>4. <strong>Risk sharing</strong></td>
<td></td>
</tr>
<tr>
<td>5. <strong>Information sharing</strong></td>
<td></td>
</tr>
<tr>
<td>6. <strong>Informality</strong></td>
<td></td>
</tr>
<tr>
<td>7. <strong>Trust</strong></td>
<td></td>
</tr>
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</table>

#### PREPARATION

<table>
<thead>
<tr>
<th>RELATIONAL ELEMENT</th>
<th>EXPRESSION</th>
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<tbody>
<tr>
<td>1. <strong>Flexibility</strong></td>
<td>Design freedom in materialisation A</td>
</tr>
<tr>
<td></td>
<td>Room for investigation of opportunities A, C</td>
</tr>
<tr>
<td></td>
<td>Putting a process out to tender instead of a specific design C</td>
</tr>
<tr>
<td>2. <strong>Collaboration</strong></td>
<td>Using information from market consultations A</td>
</tr>
<tr>
<td></td>
<td>Incorporating 170 sustainability measurements in the contract A</td>
</tr>
<tr>
<td></td>
<td>Incorporating the feedback of tenderers in the MEAT scoring weight A</td>
</tr>
<tr>
<td></td>
<td>Intention to collaborate with the market C</td>
</tr>
<tr>
<td>3. <strong>Risk taking</strong></td>
<td>Assessing on the ECI value instead of the aesthetics of the design A</td>
</tr>
<tr>
<td></td>
<td>Imposing conflicting sustainability criteria A</td>
</tr>
<tr>
<td></td>
<td>Inclusion of a back-up option in the contract A, C</td>
</tr>
<tr>
<td></td>
<td>Putting a process out to tender instead of a specific design C</td>
</tr>
<tr>
<td></td>
<td>Client performs upfront optimisations for the benefit of the contractor B</td>
</tr>
<tr>
<td>4. <strong>Risk sharing</strong></td>
<td>Investigating the feasibility (market potential, technical achievability) and potential risks C</td>
</tr>
<tr>
<td></td>
<td>Client performs upfront optimisations for the convenience of the contractor B</td>
</tr>
<tr>
<td>TENDER</td>
<td>RELATIONAL ELEMENT</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------</td>
</tr>
<tr>
<td>5. Information sharing</td>
<td>- Intention to collaborate with the market</td>
</tr>
<tr>
<td>6. Informality</td>
<td>- Market consultations</td>
</tr>
</tbody>
</table>

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<tr>
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<tbody>
<tr>
<td>1. Flexibility</td>
<td>- Individual information rounds</td>
</tr>
<tr>
<td></td>
<td>- Design choices contribute to the sustainability objective instead of individual goals</td>
</tr>
<tr>
<td></td>
<td>- Shared ambitions</td>
</tr>
<tr>
<td>2. Collaboration</td>
<td>- Possibility for multiple dialogues during tender phase</td>
</tr>
<tr>
<td></td>
<td>- Looking for partners that share the ambition to achieve the same project’s objectives</td>
</tr>
<tr>
<td>3. Risk taking</td>
<td>- Assessment on ECI stimulates the application of innovative technologies</td>
</tr>
<tr>
<td>4. Risk sharing</td>
<td>- Assessment on ECI can lead to unfamiliar solutions</td>
</tr>
<tr>
<td>5. Information sharing</td>
<td>- Possibility for multiple dialogues during tender phase</td>
</tr>
<tr>
<td>6. Informality</td>
<td>- Individual information rounds</td>
</tr>
<tr>
<td></td>
<td>- Individual information rounds with the character of a dialogue</td>
</tr>
</tbody>
</table>

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<tr>
<th>DESIGN/REALISATION</th>
<th>RELATIONAL ELEMENT</th>
<th>EXPRESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flexibility</td>
<td>- Continuous optimisation</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>- Adapting the design for the benefit of sustainability</td>
<td>A, C</td>
</tr>
<tr>
<td></td>
<td>- Challenging each other</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>- Allocating people to a task according to their capabilities instead of their contractual responsibility</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>- Focus on the innovation first, to prevent the design from limiting the development of the innovation</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>- The need for another solution arises, which is designed with the objective to minimize the traffic hindrance only</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>- Monitoring based on the daily issues instead of the MEAT offer</td>
<td>B</td>
</tr>
<tr>
<td>2. Collaboration</td>
<td>- Continuous optimisation</td>
<td>A</td>
</tr>
</tbody>
</table>
### RELATIONAL GOVERNANCE IN ACHIEVING SUSTAINABILITY

- ‘Warm’ handover session between Design team and realisation team | C
- Introducing the realisation team to the Design team timely before the start of the execution | C
- Collaborative culture | C
- Constructor acting as client of his own colleagues | C
- Mutually solving problems of one party | C
- Allocating people to a task according to their capabilities instead of their contractual responsibility | C
- Integrated design sessions | A, C
- Design choices based on the project’s objective | C
- Bringing in the right people | C
- Monitoring based on the daily issues instead of the MEAT offer | B

### 3. Risk taking
- Continuous optimisation | A
- Challenging each other | C

### 4. Risk sharing
- Joint decisions about contract adaptations | A
- Sharing costs of contingencies according to fairness | C

### 5. Information sharing
- ‘Warm’ handover session between Design team and realisation team | C
- Keeping the Design team involved | C
- Sharing administration | C

### 6. Informality
- Good ambiance between the parties involved | C
- Allocating people to a task according to their capabilities instead of their contractual responsibility | C
- Good relationship facilitates the investigation of opportunities | C

### 7. Trust
## Presence of ambition - Case A and C

<table>
<thead>
<tr>
<th>CASE</th>
<th>QUOTATIONS REGARDING AMBITION</th>
<th>QUOTATION NR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>“En daar zag je wel een verschil in de mindset van partijen in de aanbesteding. De ene partij zegt: het is gewoon een onnodige opgave want we weten toch dat we hierop uitkomen, en 80%, of wat zij dan ook reëel vonden. En die helemaal niet de ambitie uitspraken en uitstraalden om met ons dit vraagstuk op te pakken en de uitdaging uit te gaan.”</td>
<td>C.1.2.</td>
</tr>
<tr>
<td>C</td>
<td>“Toen we nadachten over de aanbestedingsstrategie en de contractstukken, was duidelijk, deze ambitie hebben we om biocomposiet toe te gaan passen. Dus die schrijven we gewoon op.”</td>
<td>C.1.3.</td>
</tr>
<tr>
<td>C</td>
<td>“We wilden daar zelf actief in participeren. Omdat het voor iedereen onbekend is. En als er een marktpartij uit de aanbesteding komt die een lagere ambitie heeft, dan is ons lot die lagere ambitie.”</td>
<td>C.1.4.</td>
</tr>
<tr>
<td>C</td>
<td>“In plaats van dat we zeggen van nou, die stip op de horizon die zetten wij neer en we zoeken partijen die met ons die stip willen opzoeken en we gaan kijken hoe ver we gaan komen.”</td>
<td>C.1.5.</td>
</tr>
<tr>
<td>C</td>
<td>“Ik denk dat dat aan de ambitie van de provincie perfect invulling heeft gegeven.”</td>
<td>C.1.6.</td>
</tr>
<tr>
<td>A</td>
<td>“Als […] hebben ze een hele hoge duurzaamaandsambitie en dit was een uitgelezen project om dit waar te maken. In die hoedanigheid hebben wij ook geprobeerd een steentje bij te dragen en vanuit die hoedanigheid heb ik een projectteam samengesteld om daar de juiste inschrijving uit te krijgen.”</td>
<td>A.1.1.</td>
</tr>
<tr>
<td>A</td>
<td>“En wat wel een beetje gebeurde was dat, ik liep heel erg rond van we willen dit project binnenhalen,[…] ook, we willen dit doen. Maar ik zat er ook heel erg mee te worstelen van ja, straks heb je zeg maar de duurzaamste straat gemaakt, maar dan ligt er wel een plak asfalt. Hoe kan ik dan nog lekker trots zijn dat dat de duurzaamste straat is?”</td>
<td>A.1.2.</td>
</tr>
</tbody>
</table>