

# **Co-Developing Sustainability Requirements**

Exploring client and municipal perspectives in  
housing development

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Licentiate Thesis in Real Estate and Construction Management  
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## **Abstract**

Construction has major environmental, social and economic impacts. Improving sustainability both during and after the construction process is widely discussed among a slew of practitioners, governments and researchers. Construction clients, such as housing developers, are considered key actors for change and innovation because of their position to set requirements when procuring construction projects. The process of developing project requirements has therefore mainly been studied during the construction clients' procurement process. At the same time, municipalities use their position as land owners to drive sustainable development. Land allocation agreements allow municipalities to set project-specific sustainability requirements for construction projects on municipal land. The purpose of this thesis is to explore how municipal sustainability requirements affect housing developers when planning and designing their projects.

The research is based on a single empirical case study of an urban development programme comprising multiple parallel and sequential housing construction projects. In this study, the municipality's and housing developers' perspectives are explored. The results demonstrate that the housing developers perceive several barriers to implementing municipal sustainability requirements. The three main barriers that were identified are reduced flexibility coupled with uncertainty, conflicting interests coupled with reduced autonomy and interdependencies, and a lack of trust and transparency coupled with interdependencies. The municipal sustainability requirements are initially developed by the municipality for the land allocation agreement. They are then co-developed further by the municipality and the housing developers together through negotiations before being finalised in conjunction with the developers' procurement process.

The study is focused on the period following the housing developers' signing of land allocation agreements with the municipality and before starting their procurement process. During this period, the housing developers attempt to negotiate municipal sustainability requirements that they anticipate will increase costs, risk and uncertainty and decrease the value of their final product. Negotiations between the housing developers and the municipality can be viewed as value co-creation processes stimulated by functional conflict. These findings build on three papers that are included in the thesis.

Contributions are made to literature on the role of construction clients and their perceived barriers to implementing and developing sustainable construction solutions and practices and barriers to change in general. Theoretical contributions are also made to literature on value co-creation in construction by illustrating how clients engage in

the co-creation of value with municipalities and other clients. Finally, the theoretical link between value co-creation and functional conflict is studied and developed.

**Keywords:** Sustainability requirements, housing developers, municipalities, land allocation, functional conflict, value co-creation

## Sammanfattning

Byggandet har stora miljömässiga, sociala och ekonomiska effekter. Hållbar utveckling både under och efter byggprocessen diskuteras bland representanter för industrin, politiker och forskare. Byggherrar, till exempel i rollen som bostadsutvecklare, anses vara viktiga aktörer för förändring och innovation på grund av deras position att ställa krav vid upphandling av byggprojekt. Processen för att utveckla projektkrav har därför huvudsakligen studerats under byggherrens upphandlingsprocess. Samtidigt använder kommuner sin position som markägare för att driva hållbar utveckling genom att utmana den privata sektorn. Markanvisningar gör det möjligt för kommunerna att ställa projektspecifika hållbarhetskrav för byggprojekt på kommunal mark. Syftet med denna studie är att undersöka hur kommunala hållbarhetskrav påverkar bostadsutvecklare när de planerar och utformar sina projekt.

Resultaten är baserade på en empirisk fallstudie av ett stadsutvecklingsprojekt innehållande flera parallella och sekventiella bostadsprojekt. I denna studie undersöks undersöks både kommunens och bostadsutvecklarnas perspektiv. Resultaten visar att bostadsutvecklarna uppfattar ett antal hinder för att genomföra kommunala hållbarhetskrav. De tre största hindren som identifierats är minskad flexibilitet i kombination med osäkerhet, intressekonflikter i kombination med minskad autonomi och beroende av andra aktörer och brist på förtroende och öppenhet i kombination med beroende av andra aktörer. De kommunala hållbarhetskraven utvecklas initialt av kommunen för markanvisningsavtalen. De utvecklas sedan vidare av kommunen och bostadsutvecklarna tillsammans genom förhandlingar. Slutligen konkretiseras de i samband med bostadsutvecklarnas upphandlingsprocess.

Studien fokuserar på perioden från att bostadsutvecklarna tecknat markanvisningsavtal med kommunen men innan deras upphandling av entreprenörer påbörjats. Under denna period försöker bostadsutvecklarna förhandla ner de kommunala hållbarhetskrav som de förutser kommer öka deras kostnader, risk och osäkerhet samt minska värdet på deras slutprodukt. Förhandlingarna mellan bostadsutvecklarna och kommunen kan ses som värdesamskapande processer drivna av funktionella konflikter. Dessa resultat bygger på tre artiklar som ingår i avhandlingen.

Bidrag görs till litteraturen om byggherrens roll och dess upplevda hinder för att implementera och utveckla hållbara lösningar och praxis och hinder för förändring. Teoretiska bidrag görs också till litteraturen om värdesamskapande inom bygg genom att illustrera hur byggherrar har värdesamskapande processer tillsammans med kommuner och andra byggherrar. Slutligen studeras och utvecklas den teoretiska kopplingen mellan värdesamskapande och funktionell konflikt.



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Melissa Candel

Stockholm, April 2020





## List of appended papers

### **Paper A: Housing Developers' Perceived Barriers to Implementing Municipal Sustainability Requirements**

Candel, M. (2020)

Working paper

An earlier version of this paper is peer-reviewed and published as a conference paper:

Candel, M. and Karrbom Gustavsson, T. (2019), Governed by Municipal Land Allocations: Implications for Housing Developers, *10th Nordic Conference on Construction Economics and Organization, 2019*, Vol. 2, pp. 147 – 153.

### **Paper B: Beyond National Building Regulations: Exploring public-private negotiations over sustainability requirements**

Candel, M., Karrbom Gustavsson, T. and Eriksson, P. E. (2019) Beyond National Building Regulations: Exploring Public-Private Negotiations Over Sustainability Requirements In: Gorse, C and Neilson, C J (Eds) *Proceedings of the 35th Annual ARCOM Conference, 2-4 September 2019*, Leeds, UK, Association of Researchers in Construction Management, 740-749.

The idea for the paper and the collection of empirical material were done by Candel. All of the authors helped to analyse the material. The paper was then written by Candel and edited by all three authors. This paper is peer-reviewed and published as a conference paper.

### **Paper C: Early Requirements Capture: A study of Value Co-Creation for Sustainability in Construction**

Candel, M., Karrbom Gustavsson, T. and Eriksson, P-E. (2020)

Under review for possible publication in *Construction Management and Economics*

This paper is developed from Paper B.

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## Abbreviations

<b>LA</b>	Land allocation
<b>SC</b>	Sustainable construction
<b>SRS</b>	Stockholm Royal Seaport



# 1. Introduction

## 1.1. Background

The challenge of improving sustainability in the built environment is currently high on the agenda for both practitioners and academics. The construction industry is one of the main contributors to environmental degradation and the depletion of natural resources. Construction activities are a major source of pollution and waste and buildings account for a large percentage of the world's energy consumption (UNEP, 2017; Darko, et al., 2017; Loosemore and Perry, 2019). On the other hand, construction can have major social and economic benefits for society (Darko, et al., 2017). Sustainability in urban development and construction is often tackled by introducing new government regulations, although for cities in developed countries change generated by new regulations is slow (van der Heijden, 2014; 2). Slow progress and rapid urbanisation in cities has led many local authorities to address sustainability in urban development.

Municipalities are important actors with many possibilities to initiate and govern a sustainable transition (Holm, et al., 2011), although previous research also raises doubts of their capacity to lead change (Smedby, 2016; Tambach and Visscher, 2012). Nevertheless, local authorities govern sustainability in urban development in a variety of ways. Many municipalities find that their positions as land owners provide alternatives for governing construction projects (Smedby and Quitzau, 2016). Land ownership enables municipalities to regulate local development and stimulate sustainable innovation by setting sustainability requirements on housing developers' construction projects that exceed current legislation (Caesar, 2016; Smedby and Quitzau, 2016; Smedby 2016).

Construction clients, such as housing developers, have on the other hand been considered key actors for change and innovation within the construction management literature for over two decades (e.g. Nam and Tatum, 1997; Kulatunga, 2011; Loosemore, 2015; Havenvid, et al., 2016). Much research has explored the construction client's role because of their position to formulate specifications and requirements when procuring construction projects (Hartmann, et al., 2008; Havenvid, et al., 2016). Introducing novel requirements is considered one of the main ways in which construction clients can stimulate innovation (Blayse and Manley, 2004; Havenvid, et al., 2016). Despite the power that construction clients have as a result of their position, they face numerous barriers to sustainable construction (SC) (Häkkinen and Belloni, 2011) and change in general (Vennström and Eriksson, 2010).

## 1.2. Problem discussion

Previous literature in the construction management field often assumes that project requirements are developed and set by construction clients. The process of developing project requirements before they can be set in procurement contracts includes identifying them, negotiating them with project stakeholders and formulating them. This process is typically studied during the client's procurement process, and sometimes throughout later stages of the construction process as requirements can continue to emerge and change (e.g. Green, 1996; Othman, et al., 2004; Thomson, 2011). However, as a result of public governance, municipalities are involved in the process of developing project-specific requirements prior to the client's procurement process in construction projects on municipal land. Municipalities use land allocation (LA) to govern construction projects and advance sustainable development, which has previously been explored in research on local sustainability governance (Bulkeley and Kern, 2006; Smedby, 2016; Smedby and Quitzau, 2016).

LA refers to the practice of selling municipal land to developers (Caesar, 2016), which are construction clients that develop buildings on land that they procure. Irrespective of whether land is acquired through a municipality or in another way, projects are mainly implemented by private developers (ibid). In LA agreements municipalities are able to set requirements on the construction projects before construction procurement that go beyond the national building regulations (Caesar, 2016; Smedby and Quitzau 2016; Smedby, 2016). Sustainability requirements that are set in municipal LA agreements, which will from here on simply be referred to as municipal sustainability requirements, are not set in stone. Municipal requirements are subject to modifications until a development right has been finalized (Caesar, 2016). Developers are thereby able to negotiate modifications to, or the removal of, municipal sustainability requirements while they design their projects, conduct pre-studies and prepare for procurement. Municipal requirements are thereby first developed by the municipality and set in the LA agreement, and then co-developed further by the municipality and developers together before construction procurement.

Municipal sustainability requirements challenge the private sector to innovate and adopt new sustainable solutions and practices. They also allow municipalities to develop requirements that can later be adopted as new policies and building regulations. As expectations of local sustainability governance increase it is likely that municipalities will continue to utilize their position as land owners to regulate and promote sustainability in the building sector, even if their ability to actually change mainstream construction practices is questioned (Smedby, 2016; Tambach and Visscher, 2012). As municipalities in Sweden increase their efforts to make urban development more sustainable with requirements in LA agreements, the implications this has for developers and their projects becomes a relevant point of inquiry.



The land development process and the construction process are more entwined in practice than the construction management literature makes them out to be. Local sustainability governance literature explores public land development practices as a governance mechanism for driving sustainability in the construction of new buildings. However, there appears to be a lack of research that takes the developers' perspective to explore how these processes affect each other. One exception is a study by Olander and Landin (2008) where they investigate housing developers' perceptions of the planning process in Sweden, which is mainly controlled by a municipality's traditions rather than a common set of regulations. They found that housing developers perceive the planning process for the development of new housing to be uncertain, unfair and costly as a result of its long and uncertain time-scale (Olander and Landin, 2008). To understand early decisions made by developers, the social, political, economic and technical forces that shaped them must be considered (Cherns and Bryant, 1984). Municipal sustainability requirements will affect and shape these forces in different ways and must therefore be considered in order to understand developers' early decision-making in construction projects on municipal land.

### **1.3. Research purpose**

Municipalities use sustainability requirements in LA agreements as a form of public governance. As a result, an understanding of building conditions and desired building specifications and requirements begin to take shape prior to developers' procurement processes.

*The purpose of this research is to explore how municipal sustainability requirements affect housing developers when planning and designing their projects.*

This thesis is based on a case study of one stage in an urban development programme. The urban development programme is initiated and governed by Stockholm municipality. The residential apartment buildings constructed here are built by private housing developers that buy the land from the municipality. All twelve housing developers in this stage of the programme are building apartment buildings for private housing cooperatives. In this thesis, the term 'housing developer' is used to refer to a 'construction client' that builds residential buildings to sell.

The municipality is able to govern the construction projects and place high requirements on sustainability that necessitate innovation through LA agreements. During the early planning phases of the construction projects some of these requirements are challenged by the housing developers and negotiated. The study is carried out during the early phases of the construction projects, after a LA agreement has been signed and before construction procurement commences. The implementation and development of municipal sustainability requirements is studied from both the

housing developers' and municipality's perspectives. The unit of analysis is the interactions and relations between these organisational actors and their impacts on the construction process. All three pillars of sustainability (social, environmental and economic) are considered, although the focus here is on what the practitioners in this particular case deem to be related to sustainability. In other words, I have let the practitioners that are studied define what aspects of their work relate to sustainability.

The first part of the study explores how municipal sustainability requirements are used to govern construction projects and the implications of this from the housing developers' perspective. Here the scope of inquiry does not extend to the developers' project managers' interpretation of their entire project context, but is limited to those aspects that directly related to sustainability requirements. The second and third parts of the study explore the process of co-developing municipal sustainability requirements further through negotiations between the municipality and housing developers.

#### **1.4. Thesis outline**

The thesis starts with an introductory chapter that presents the background, problem and research purpose. The introduction is followed by an overview of previous research on construction clients, the process of developing project requirements, clients' perceived barriers to SC and innovation in large and complex projects and programmes. This section provides a frame of reference for the study and a more extensive description of the empirical context. After the previous research, theoretical concepts and frameworks used to understand and analyse the case are introduced. The research methodology is then presented in the following chapter where methodological choices are explained, alongside their justifications, and the research process is described. This is followed by a summary of the appended papers. A discussion based on the results from the appended papers is then presented in the next chapter. The thesis is concluded with a discussion on theoretical contributions, practical and policy implications and suggestions for future research.

## 2. Previous research

### 2.1. The role of construction clients

Development is generally considered to be a complex and risky business (Brown, 2015). The construction industry is project-based with a typically narrow focus on the individual project, and uncertainty and interdependencies between actors makes each construction project a highly complex endeavour (Dubois and Gadde, 2002a). Construction projects are hierarchically structured temporary organizations, with the purpose of completing a specific task within a specified time and budget. They are embedded in the more permanent network that is the construction industry, which is generally considered a decentralized, fragmented and loosely coupled system with weak structures for learning between actors and projects (ibid).

While Dubois and Gadde (2002a) argue that each construction project is unique and has neither a history nor a future, others argue that historical and institutional contexts are crucial for understanding projects (Engwall, 2003; Kadefors, 1995). Engwall, (2003) and Kadefors (1995) also argue that construction projects are less unique than most of the literature will have us believe since there are many standard practices and routines, norms and traditions found in the construction industry. Kadefors (1995) presents several reasons why the construction industry is so heavily institutionalized, such as coordinating between actors, handling uncertainty and increasing efficiency. These institutions are also part of the reason the construction industry is generally considered conservative and opposed to change (ibid).

However, previous literature considers construction clients to be in a key position to stimulate innovation and drive change (e.g. Nam and Tatum, 1997; Kulatunga, 2011; Loosemore, 2015). They are “the reason that the [construction] industry exists” (Boyd and Chinyio, 2006; 1) since they finance and initiate construction projects. In the Swedish Planning and Building Act (SFS 2010:900) construction clients are defined as: “The one who carries out or assigns others to carry out design, construction, demolition or groundworks for their own account”. Construction clients, which include both public and private organisations, can be categorised according to their main purpose for taking on a construction project. Developers are construction clients that build to sell while long-term clients construct buildings that they intend to own. This thesis is specifically focused on housing developers, which denotes construction clients that finance and develop residential buildings to sell to private housing cooperatives. The term ‘client’ will from here on refer to construction clients in a more general sense when the type of client is not explicitly defined as a housing developer.

Clients consider their most important responsibilities to be planning, designing, financing, implementing and defining their projects (Kometa, et al., 1995). They govern construction projects through procurement by formulating project specifications and requirements (Eriksson, 2008; Hartmann, et al., 2008; Havenvid, et al., 2016). Procurement is central in clients' governance of their construction projects (Eriksson, 2008). It also enables clients to incorporate sustainability requirements in their projects (Varnäs, et al., 2009; Petersen and Kadefors, 2016) and is considered to be crucial for improving sustainability beyond the individual organization in the whole supply chain (Meehan and Bryde, 2011).

Different actors in construction tend to follow logics that align with their interests (Kadefors, 1995). For clients this will generally be that of return on investment since their biggest concern appears to be 'value for money' (Boyd and Chinyio, 2006). Construction procurement is thereby largely driven by cost. On the other hand, previous studies have found that client values go beyond the traditional measures of time, cost and quality (Aliakbarlou, et al., 2018). Aliakbarlou, et al. (2018; 1018) call for a shift in focus from "traditional result-oriented criteria to both result- and non-result-oriented criteria". While discussions about clients typically refer to them as one unitary actor, it is important to keep in mind that they are organisations containing stakeholders that have different needs, previous experiences and ways of perceiving the construction process (Boyd and Chinyio, 2006). In order to understand the client's role in construction projects, social, political, technical and economic forces in their organisation, as well as their historical context, must be considered (Cherns and Bryant, 1984).

## **2.2. Developing project requirements in construction**

Developing and communicating project requirements is an important part of the construction client's procurement process and is typically included or addressed as a part of the client's briefing process during procurement (Othman, et al., 2004). A project brief is a formal document used to communicate the client's needs and objectives and are considered important for achieving client satisfaction (ibid). Vennström (2008) found that clients struggle to formulate their requirements during the early phase of the construction project and thereby have a tendency to transfer much of this work to external consultants and project managers. Thomson (2011) found that client requirements can also continue to emerge throughout the construction project, typically as a result of conflicting viewpoints among client stakeholders. Changing the project brief can negatively affect cost, time and quality, but Othman, et al. (2004; 257) found that it also "enabled client organisations [to] achieve their expectations and enhance the performance of their projects". Karrbom Gustavsson and Hallin (2015) also argue that because clients' understanding of the project and stakeholders' goals and ambitions

develop over time during the project, it is not possible to be completely informed at the front-end of projects.

Another aspect to consider here is the client organisations. They are not single unitary entities with common goals, interests and needs (Cherns and Bryant, 1984; Green, 1996; Newcombe, 2003; Boyd and Chinyio, 2006). Since project objectives develop and change over time Green (1996) argues that it is important to seek a common understanding of them. Hellgren and Stjernberg (1995) describe the design process in major construction projects as a political process where negotiations take place between actors. They propose that the main objective of this process is to formulate visions that capture different interests.

The project management field is considered to lack knowledge on the ‘fuzzy’ front-end of projects (Edkins, et al., 2013). The front-end of construction projects tends to follow the same order “from feasibility studies, project definition, design, negotiation and pre-contract stages” leading up to procurement (Barlow, 2000; 974). Edkins, et al. (2013) define the front-end as the strategic shaping of the project with the possibility to put the project on hold or to cancel it completely. Edkins, et al. (2013; 82) claim that the front-end of projects “is where there is the greatest chance of errors and faults becoming built-in, or value being enhanced”. Kolltveit and Grønhaug (2004) also argue that for large and complex projects there is potential for increasing value during the execution of early phases where project uncertainty is high. They reason that uncertainty implies that there is both upside and downside risk.

### **2.3. Barriers to sustainable construction perceived by clients**

Clients’ understanding of SC has been identified as a major barrier for its development (Häkkinen and Belloni, 2011). The development of SC is determined by clients’ demand for, and willingness to adopt, new SC solutions and practices (ibid). Developing and adopting new SC solutions and practices requires change. Construction clients’ perceived barriers to change can be divided into attitudinal, industrial and institutional barriers (Vennström and Eriksson, 2010). In their study, Vennström and Eriksson (2010) found that attitudinal and industrial barriers were the most critical barriers for clients to influence the construction process.

*Attitudinal barriers* include “short-term focus, adversarial attitudes, lack of ethics and morality and focus on projects instead of processes” (Vennström and Eriksson, 2010; 132). As a result of operating in a project-based industry, clients tend to have a short-term focus on costs and productivity, which hinders learning and innovation (Gann and Salter, 2000; Gann, 2001; Dubois and Gadde, 2002a; Häkkinen and Belloni, 2011). Construction clients generally perceive innovation as risky and not profitable enough to implement in their projects (Ivory, 2005; Häkkinen and Belloni, 2011; Loosemore,

2015), especially in large and complex projects (Davies, et al., 2014). Their fear of increased costs therefore constitutes a major barrier for SC (Williams and Dair, 2007; Osmani and O'Reilly, 2009; Zainul Abidin, et al., 2013; Opoku and Ahmed, 2014; Shen, et al., 2017). In addition to this, previous literature identifies clients' concerns regarding the reliability of new technologies as another major barrier for SC (Williams and Dair, 2007; Osmani and O'Reilly, 2009). Lastly, clients seem to lack a sense of urgency due to a lack of customer demand and regulations (Osmani and O'Reilly, 2009; Zainul Abidin, et al., 2013). Clients are however more likely to consider SC solutions for buildings that they plan to operate themselves, such as new offices, because they recognize long-term benefits like lower energy and maintenance costs (Zainul Abidin, et al., 2013).

Vennström and Eriksson (2010; 129) have defined *industrial barriers* as “external obstacles derived from the organization’s industrial environment”, such as competitive pressures. For construction clients, these include the “traditional organization of the construction process, conservative industry culture, industry structure and traditional production processes” (Vennström and Eriksson, 2010; 132). Established industry practices act as barriers to change in construction since deviations from them are strongly resisted (Kadefors, 1995). Construction projects are traditionally carried out by firms in temporary coalitions, which makes coordination between actors a major challenge (Barlow, 2000). Innovations in the construction industry are usually implemented in projects, as opposed to firms, and therefore typically involve complex negotiations with the other actors in the project (Winch, 1998; Harty, 2008).

A major industrial barrier for SC, specifically perceived by housing developers, is the way that risks and costs are distributed among actors. Previous studies question the extent of benefits for developers (e.g. Deng and Wu, 2014; Circo, 2008; van Bueren and Primeus, 2002). For example, it is difficult for developers to predict, and thereby profit from, lower long-term operational and maintenance costs for the end user (van Bueren and Primeus, 2002; Circo, 2008). Furthermore, they lack sufficient information on the costs of implementing different types of sustainable solutions since these can differ greatly between projects (Osmani and O'Reilly, 2009). Although savings accrued throughout a buildings life cycle might outweigh higher up-front costs during construction (Circo, 2008), developers are more concerned with development costs when making investment decisions (van Bueren and Primeus, 2002).

Developers perceive a lack of customer demand for sustainable buildings as a major barrier, since this means implementing SC will not increase the value of their final product (Häkkinen and Belloni, 2011; Zainul Abidin, et al., 2013). However, Osmani and O'Reilly (2009) found that this is not the case for developers operating in niche markets. Zainul Abidin, et al. (2013) also found that a lack of technical skills and difficulties in procuring green products locally hinders developers from adopting new technologies

from their local industry. Williams and Dair (2007) also found that developers are sometimes forced to prioritise between sustainability objectives since they are often in conflict with each other.

Institutions are socially constructed cultural rules. They “represent power relations and control systems” that shape the way people perceive and act within their environment (Kadefors, 1995; 399). *Institutional barriers* perceived by construction clients include government regulations, formal standardized contracts and traditional procurement systems (Vennström and Eriksson, 2010). Kadefors (1995) argues that the tendering system drives the standardization of tasks in construction because this allows clients to predict their costs based on previous projects and standard price lists. Häkkinen and Belloni (2011; 241) found that for SC it is a “lack of steering or the wrong type of steering” that acts as a barrier. For example, clients perceive a lack of support and methods for creating objectives for SC and turning these objectives into requirements for procurement (ibid). Government policies and regulations are on the other hand often discussed as one of the main drivers and enablers for SC (Zainul Abidin, et al., 2013; Olanipekun, et al., 2016).

## **2.4. Innovation in large and complex projects and programmes**

According to Söderlund (2004) research on projects can be categorized along two dimensions. Research on projects either has a single- or multi-project focus, and either a single or multi-firm focus (ibid). The case presented in this study is of an urban development programme that contains multiple construction projects, which can be considered as a multi-firm and multi-project environment. This kind of research is generally interested in the “interrelationships between projects and their environments” (Söderlund, 2004; 661). Pellegrinelli (1997; 142) defines a programme as a grouping of existing or new projects that “are managed in a coordinated way, either to achieve a common goal, or to extract benefits which would otherwise not be realised if they were managed independently”. In previous research, programmes are often considered as one large project, meaning they are seen as inter-firm project environments (Söderlund, 2004). For example, megaprojects can usually also be considered large, complex and expensive programmes (e.g. Davies, et al., 2014).

There is a growing stream of literature on innovation in large and complex projects and programmes. For example, Gil, et al. (2012) investigate the adoption of technology in large infrastructure projects. They conclude that the adoption of new technologies depends on assessments of predicted profitability and absorptive capacity, and that these decisions are the result of conflicts and negotiations. The absorptive capacity and expected profitability that each stakeholder has at the start of a project will also change throughout the project as a result of education and negotiations (Gil, et al., 2012; 462). As a means of improving the possibilities for adopting a certain technology, those that

advocate for its adoption attempt to educate the other actors (ibid). Gil, et al. (2012) also find that perceived risk, undeveloped standards and politics play a big role. In another study of London's Crossrail project, Davies, et al. (2014) stress the benefits of innovation because innovation in large and complex projects is generally associated with increases costs and uncertainty, and is therefore avoided in most cases. They do however also call for research to address challenges associated with innovation in large and complex projects.

A common way to categorize innovations is to distinguish between product and process innovations (Hullova, et al., 2016). *Product innovations* are defined as “new products or services introduced to meet an external user or market need” and *process innovations* are “new elements introduced into an organization's product or service operations... to produce a product or render a service” (Damanpour and Gopalakrishnan, 2001; 47-48).



### 3. Theoretical concepts and frameworks

#### 3.1. Modes of governing change at the local level

In previous studies, Bulkeley and Kern's (2006) modes of governing change at the local level are often referenced (see e.g. Smedby and Quitzau, 2016; Tambach and Visscher, 2012). These modes of governing include governing by authority, governing by provision, governing by enabling and self-governing (Bulkeley and Kern, 2006) and comprise a local authority's capacity to facilitate change (Smedby and Quitzau, 2006). *Governing by authority* refers to the use of regulations, requirements and sanctions (Bulkeley and Kern, 2006). *Governing by enabling* denotes local governments' capacity to use argument, persuasion and incentives to encourage, facilitate and coordinate change (ibid). Lastly, *governing by provision* refers to resources and services that are provided in order to change practices (ibid). This typology is used here to investigate how the municipality governs the housing developers' construction projects. The last mode of governing is disregarded since the municipality's capacity to govern itself is not of interest. Smedby and Quitzau (2016) applied this typology to study municipalities and found that enabling modes of governing complement traditional modes of governing by authority because they create different types of incentives for developers and facilitate learning.

#### 3.2. Value co-creation

Project management has traditionally used the iron triangle (cost, time and quality) to measure success, resulting in an output-focused research tradition. These rational and normative views on projects have received much criticism from the critical project management literature (Hodgson and Cicmil, 2006). In response, there have been several calls for research that re-conceptualises projects and programmes as value creation processes for multiple stakeholders (Winter and Szczepanek, 2008; Chang, et al., 2013). The concept of value co-creation stems from the service-dominant logic approach (Vargo and Lusch, 2004; Chang, et al., 2013; Smyth, et al., 2018). According to the service-dominant logic, value is created by "services rendered by the product and services together" (Liu, et al., 2014; 120).

In projects, value propositions are first co-created by stakeholders at the front-end through decisions, seen as events and processes, and value is not realized until after the project is completed (Smyth, et al., 2018). In large projects, the value that can be co-created and realised after the project's completion is determined at the front-end (Smyth, et al., 2018). In the construction management literature, previous studies have

explored value co-creation processes between construction clients and upstream suppliers (e.g. Liu, et al., 2014; Eriksson, et al., 2016). Liu, et al., (2014) describe the project manager's role in construction projects as attempting to capture and communicate the stakeholders' continuously emerging understanding of what they want in order to develop feasible solutions, and plans for their implementation, that everyone can agree on (Liu, et al., 2014). Stakeholder management is considered important for construction clients to be able to resolve conflicts in their projects and co-create additional value (ibid).

Mills and Razmdoost (2016) argue that project relationships also have destructive characteristics and criticises previous studies in the field for only focusing on the positive characteristics of co-creation. Projects have been found to exhibit both value co-creation and value co-destruction (Mills and Razmdoost, 2016; Smyth, et al., 2018). Value co-destruction can be the result of conflicts between project actors, although conflicts can be both functional and dysfunctional. There is however a general lack of theoretical development on the link between value co-creation and conflicts (Mele, 2011).

### **3.3. Conflict as a functional and dysfunctional phenomenon**

Conflicts go through different stages. Pondy's (1967) model of a 'conflict episode' has shaped the process perspective on conflicts into a dominant paradigm (Lewicki, et al., 1992). This classic model includes five stages; the latent conflict, the perceived conflict, the felt conflict, the manifest conflict and conflict aftermath (Pondy, 1967). Conflict is also a perceptual phenomenon, meaning "interpretations from both sides in the dyad" are important (Vaaland and Håkansson, 2003; 137). Conflicts can also be considered as both a functional and dysfunctional phenomenon. They are typically perceived as problems that should be removed, but can also be considered "as a resource and tool for improvement" (Vaaland and Håkansson, 2003; 127). The concept of functional/constructive conflicts has been applied and developed in a number of different fields (e.g. Pondy, 1967, Deutsch, 1973; Gemünden, 1985; Pascale, 1990; Vaaland and Håkansson, 2003).

In the context of projects, dysfunctional conflicts can increase costs and delays and have negative effects on business relationships (Vaaland and Håkansson, 2003). On the other hand, functional conflict in projects is seen as an important source of creativity and innovation which increases the value of business relationships (Vaaland and Håkansson, 2003; Mele, 2011). Mele (2011) found that constructive conflict resolution in projects strengthen relationships between stakeholders while destructive conflict resolution weakens them. Vaaland and Håkansson (2003) also found that inter-organizational conflicts that are connected to formal governance mechanisms in

complex projects are more likely to be dysfunctional, while conflicts that are connected to informal governance mechanisms are more likely to be functional.

Conflict can here be compared to the concept of power. Power can be considered as both an oppressive and productive force, in the sense that it produces the conditions for reproducing or changing social structures (Jørgensen and Philips, 2002). Concepts like conflict and power often have many negative connotations, but here they are considered as integral to all social processes. Furthermore, based on the ontological position that our assumptions about the world are often contradictory because these contradictions are inherent in the actual social structures that we study (Laclau and Bhaskar, 2010); conflicts and negotiations could be considered as inherent aspects of projects.



## 4. Method

### 4.1. Research questions

Three research questions were formulated based on the previous literature and theory. These questions are designed to fulfil the research purpose *to explore how municipal sustainability requirements affect housing developers when planning and designing their projects*. The use of municipal sustainability requirements as a form of public governance over construction projects lacks any considerable recognition in the construction management literature. Since theory on its implications for housing developers' construction process is nascent, it was not possible to predict what issues and themes would emerge. The research questions presented here are therefore mainly open-ended 'how and why' questions (Edmondson and McManus, 2007).

Previous research has found that housing developers perceive several attitudinal, industrial and institutional barriers to SC and change in general, which are presented in section 2.3.. However, it is uncertain how these barriers affect housing developers' implementation of municipal sustainability requirements, as well as what other barriers they perceive to implementing them. This is addressed by the first research question.

*RQ1: What barriers to implementing municipal sustainability requirements are perceived by housing developers?*

To be able to answer RQ1, it is first necessary to form an understanding of how municipalities use LAs to govern construction projects. Bulkeley and Kern's (2006) modes of governing change at the local level, presented in section 3.1., are applied as a theoretical framework for this purpose. The housing developers' perceived barriers to implementing municipal sustainability requirements are then explored. A general grouping of identified barriers are presented in Paper A while papers B and C explore housing developers' perceived challenges for specific municipal sustainability requirements. All three papers therefore address the first research question.

The first part of the study (Paper A) revealed that housing developers do not passively accept and implement the municipality's project-specific sustainability requirements into their projects. In contrast they actively oppose certain requirements from LA agreements. The second research question addresses the type of requirements that housing developers attempt to change or remove through negotiations with the municipality and their reasoning behind this response.

*RQ2: How and why are project-specific sustainability requirements negotiated between municipalities and housing developers prior to procurement?*

To answer RQ2, the requirements are examined in terms of their required innovation efforts. Product and process innovations (see section 2.4.) that housing developers believe will be necessary are investigated to gain an understanding of how these requirements stand out and why they are considered problematic enough to oppose. This is presented in Paper B, along with a description of how two municipal sustainability requirements were negotiated and a discussion on how this process is connected to the procurement process.

A conceptualization of early requirement negotiations is proposed in the last part of the study. A process of co-developing requirements through negotiations takes place before procurement in construction projects with municipal sustainability requirements. These negotiations arise as a result of conflicting interests. If these conflicts are functional (see section 3.3.), the joint effort to co-develop the project-specific sustainability requirements could be seen as a value co-creation process (see section 3.2.). The theoretical connection between these two concepts is addressed by the last research question.

*RQ3: How do municipalities and housing developers co-create value through negotiations over project-specific sustainability requirements?*

To answer RQ3, the two negotiations previously studied are analysed as value co-creation processes (Paper C).

## **4.2. Research design**

A single case study of Stockholm Royal Seaport (hereafter called SRS) (described in section 4.3) is used to develop in-depth context-dependent knowledge (Flyvbjerg, 2006) to answer the research questions presented in the previous section. SRS could be considered as an extreme case in regards to the municipality's extensive sustainability program. Each stage in the programme contains a different set of municipal sustainability requirements, which range from green outdoor spaces to new solutions for water and sewer systems. The housing developers also consider their projects in SRS to stand out because of the large number of high requirements on sustainability. Extreme cases "activate more actors and more basic mechanisms" and are therefore suitable for generating a lot of information about a phenomenon and find the deeper rooted sources of problems (Flyvbjerg, 2006; 13). Single case studies are used to gain in-depth knowledge of their dynamics and demonstrate how constructs operate in social contexts (Dyer and Wilkins, 1991).

My inquiry has largely been explorative and empirically driven. The focus throughout the collection of empirical material has been on developing an in-depth understanding of the case in question (Stake, 1995). As the research progressed it became evident that municipal sustainability requirements played a big part in shaping the housing developers' projects. The municipal sustainability requirements could be considered integral to understanding the housing developers' sustainability related work in SRS, but they are not addressed in the construction management literature. My interest in this topic could be said to be the result of unexpected findings which then led me to question assumptions found in the literature on the development of requirements (Edmondson and McManus 2007; 1162). Explorative research, where the researcher follow emerging themes and issues, is considered appropriate for topics where theory is nascent (Edmondson and McManus, 2007).

The overall research approach in this study was abductive. An abductive approach to case study research means that the "theoretical framework, empirical fieldwork, and case analysis evolve simultaneously" (Dubois and Gadde, 2002b; 554). By collecting and analysing empirical material iteratively the researcher remains flexible enough to pursue new lines of inquiry that emerge, and abandon less promising ones (Edmondson and McManus, 2007). This research approach is appropriate when the objective is to create new knowledge, as opposed to confirming existing theory, and is advocated for single case studies (Dubois and Gadde, 2002b), as well as for multiple case studies (Eisenhardt, 1989).

The case study can be broken down to three parts (Figure 1), each resulting in one of the appended papers. In the first part of the study (Paper A), the housing developers' perceived barriers to implementing municipal sustainability requirements were explored. The ways in which municipal sustainability requirements are used to govern the construction projects in SRS were also investigated here. In the second part of the study (Paper B), negotiations over two municipal sustainability requirements were explored. The focus here was on investigating why the housing developers chose to oppose these two requirements and some early reflections are made on the implications these negotiations have on the housing developers' procurement process. In the last part of the study (Paper C) these negotiations were then analysed using value co-creation and conflict theory and implications for literature on project requirements are developed further.

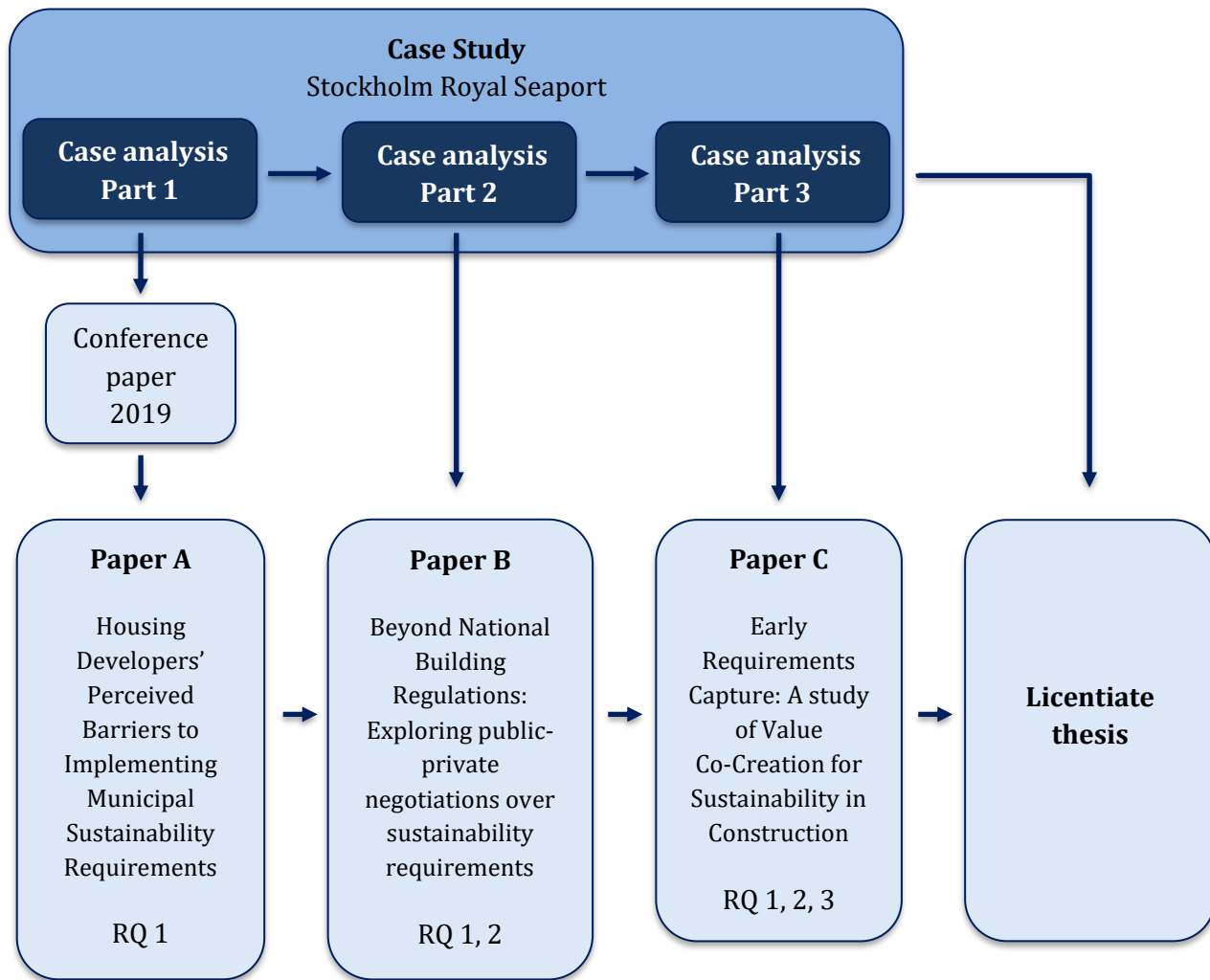


Figure 1: The research process

### 4.3. Stockholm Royal Seaport

SRS is one of the largest ongoing urban development programmes in Europe. The construction of new residential buildings commenced in 2011 and around 12 000 new dwellings are planned to be built in the district by 2030 (Stockholm Stad, 2017). The programme was initiated and is governed by Stockholm municipality. The municipality's ambition in SRS is to develop knowledge of sustainable practices and solutions for urban development and construction (Stockholm Stad, 2017). SRS was chosen as the empirical case due to the municipality's high requirements on sustainability and their ambition to challenge the housing developers to develop new innovative solutions in order to drive the improvement of construction practices. The municipality uses LA agreements to place project-specific sustainability requirements



on the housing developers' construction projects. Previous research raises several political and ethical concerns regarding public land development practices (e.g. Valtonen, et al., 2018), but this is not something that is addressed in the study presented here.

The district is located next to an international port near the city centre in an old industrial area. Working close to the ports operations with tight inner city building conditions creates several complexities for the construction processes. On the other hand, SRS is located in an attractive and sought after area of the city, giving the programme considerable publicity. The municipality is therefore able to put high prices on the land and use the programme to promote their vision for sustainability. Although the municipality is referred to as a unitary organisation there are notable differences in the perspectives of practitioners from different organisational units. The publicity and sustainable profile of SRS also allows the housing developers to use their projects to improve their corporate image.

In SRS the work is divided up into stages. Each stage consists of several construction projects carried out by public and private housing developers and infrastructure projects carried out by the municipality. Residential buildings are constructed next to each other with shared infrastructure, such as roads, and facilities, such as garages and courtyards, making the housing developers interdependent of each other. The specific stage that was studied (Stage X), which I consider to be my unit of observation, consists of twelve construction projects carried out by different private sector housing developers. These developers vary in size and experience and are all developing buildings that they intend to sell after completion, although some housing developers also carry out other types of construction projects. Two had little to no experience of building in Stockholm, while two had experience of building in Stockholm but not in SRS and the rest had experience from building in previous stages in SRS. Each stage also has its own set of sustainability requirements, compiled in a sustainability program. The sustainability program for Stage X includes requirements on green outdoor spaces, energy, recycling systems, water and sewer systems, transport, environmental certifications, sustainable living and business and digital infrastructure (Stockholm Stad, 2015a).

Relationships between the actors in Stage X are complex and multi-dimensional. From the housing developers' perspective, the municipality can be considered a supplier of developable land. However, the municipality also has a monopoly on planning in the city and owns a large portion of developable land, meaning they hold more power over the housing developers than in a typical buyer-supplier relationship. Relationships between housing developers are characterised both by their need to compete and collaborate, because they are building next to each other in tight inner-city conditions and have shared facilities.

The case study took place after the housing developers had been allocated land and before development rights had been finalised and construction procurement could begin (Figure 2). During this time the housing developers and municipality work together in what has been described as an inter-dependency based relationship (Caesar, 2016). The housing developers are allocated land during the land development process, which typically precedes the construction process (Valtonen, et al., 2018). The municipality does this to gain the housing developers insight during the land development process, and to give them the opportunity to voice their concerns early on.

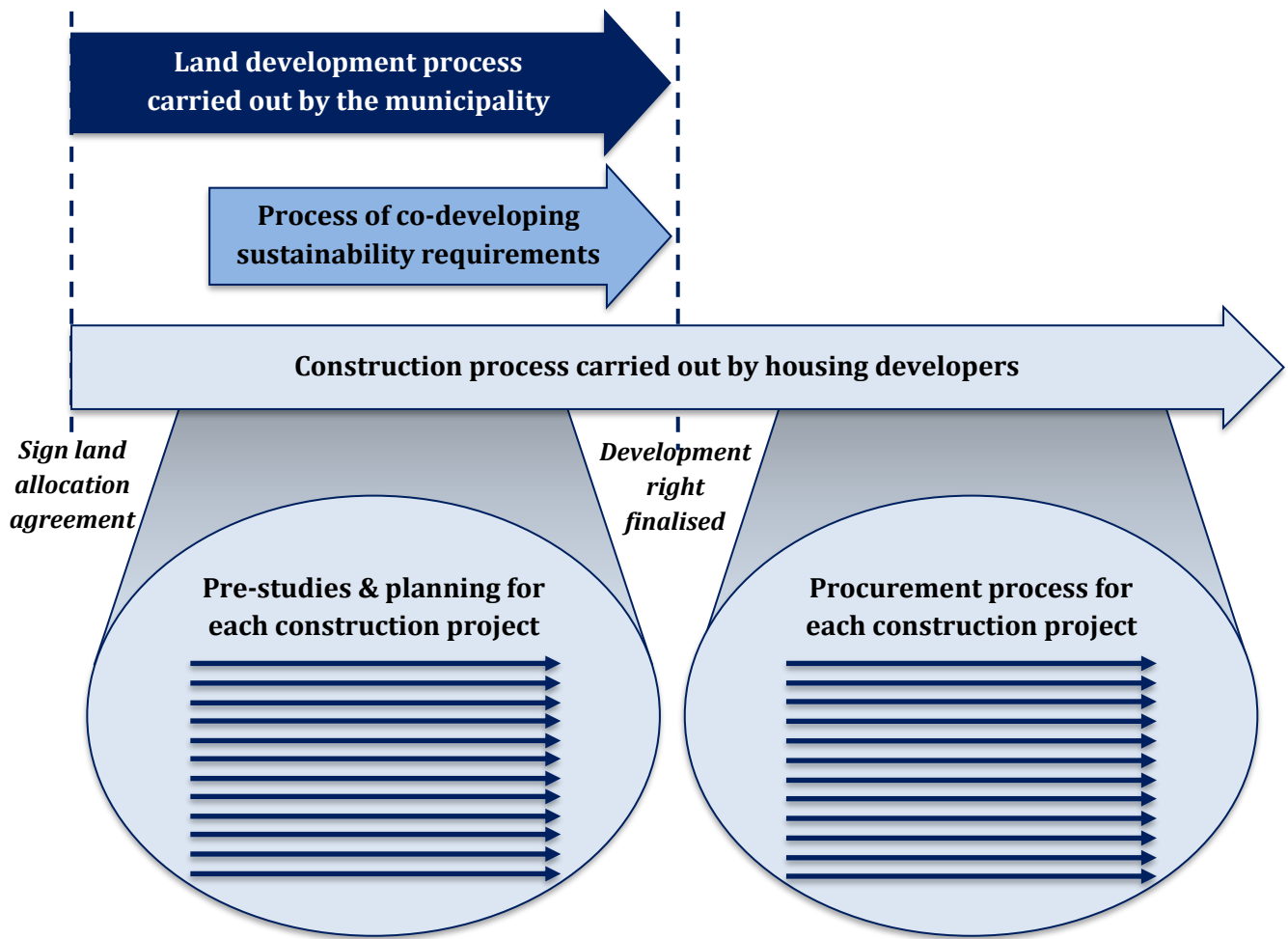


Figure 2: The process of co-developing sustainability requirements during construction and land development processes in Stage X.

## 4.4. Collection of empirical material

### 4.4.1. Semi-structured Interviews

Empirical material was mainly gathered using semi-structured interviews. Interviews are suitable for gathering “rich, detailed, and evocative” material on phenomenon that has not been studied a lot before (Edmondson and McManus, 2007; 1162). Semi-structured interviews were conducted to ensure that a number of topics were covered while still allowing for flexibility to discuss new topics that emerged. Purposive sampling was used when selecting interviewees. Interviews were conducted with project managers from the housing developers in Stage X. In order to gain the municipality’s perspective, interviews with three programme managers from the City Planning office were also conducted. A sustainability strategist, a consultant and a contract lawyer from the municipality were interviewed as well because they were also involved in the process of developing requirements. The interviews were conducted between March 2018 and May 2019 and were all between 1 and 2 hours in duration.

Throughout the study I attempted to capture the project managers’ lived experiences by focusing the interviews on “praxis, on context-dependent judgement, on situational ethics and on reflexivity which enables social actors to see how power actually functions in context” (Cicmil, et al., 2006; 684). One interview guide was developed for the interviews with housing developers and another for the interviews with representatives from the municipality (see Appendix A). These interview guides were modified and adapted as the empirical fieldwork and case analysis progressed. Each interview was recorded, transcribed and coded differently in NVivo for each part of the study.

*Table 1: Summary of interviews*

No.	Respondent	Title	Organisation	Date
1	A	Project manager	Housing developer	2018-03-13
2	B	Project manager	Housing developer	2018-03-15
3	C	Project manager	Housing developer	2018-04-26
4	D	Project manager	Housing developer	2018-04-26
5	E	Project manager	Housing developer	2018-05-31
6	F	Project manager	Housing developer	2018-06-07
7	G and H	Project manager	Housing developer	2018-09-26
8	I	Project manager	Housing developer	2018-10-23

9	J	Project manager	Housing developer	2018-10-25
10	K	Project manager	Municipality (City Planning Office)	2018-11-01
11	L and M	Sustainability strategist Municipal consultant	Municipality (Development Administration)	2018-12-03
12	N	Project manager	Municipality (City Planning Office)	2019-02-19
13	O	Contract lawyer	Municipality	2019-03-19
14	P	Project manager	Municipality (City Planning Office)	2019-03-20
15	Q	Project manager (involved in planning shared facilities between two housing developers)	Construction consultant	2019-04-08
16	R	Project manager	Commercial building developer	2019-05-03
17	S	Project manager	Housing developer	2019-05-09
18	K and N	Project manager	Municipality (City Planning Office)	2019-09-10

#### 4.4.2. Non-participant observations

Empirical material was also collected using non-participant observations from meetings, competence seminars and forums. Observations are also suitable for gathering “rich, detailed, and evocative” material on phenomenon that has not been studied a lot before (Edmondson and McManus 2007; 1162). The material consists of handwritten notes and is used to complement material gathered from the interviews. The meetings, competence seminar and forum were all organized by the municipality for the housing developers. They provided good opportunities to see interactions between the housing developers and the municipality. The competence seminars were offered to the housing developers, as well as their architects and consultants when relevant, to help them develop knowledge about various SC practices and technologies. The forums were offered to the housing developers following some of the competence seminars to help them meet suppliers for the various technologies that they would need.

#### 4.4.3. Documents

To gain more contextual knowledge of SRS and its history, several documents were studied. These included the sustainability program for the urban development programme (Stockholm, 2017), the action plan containing the sustainability requirements which was included in the LA agreement (Stockholm Stad, 2015a), the municipality's policy for LAs (Stockholm Stad, 2015b), notes from meetings and formal correspondence between the developers and the municipality. The documents were used to gain a better understanding of the urban development programme and its structure, the sustainability program in Stage X and the municipality's publicly stated ambitions for SRS. They also supported my understanding of LA practices in Stockholm.

### 4.5. Case analysis

Empirical material was collected and analysed iteratively. This constitutes an abductive approach to research (Dubois and Gadde, 2002b), as discussed in section 4.2. All parts of the study are based on the same empirical fieldwork, but for each part of the study the process of analysing the empirical material is different. These different parts of the case analysis are described in the following sections.

#### 4.5.1. Part 1

In the first part of the study the transcribed interviews and field notes from observations were coded in NVivo using Bulkeley and Kern's (2006) typology for governing change at the local level (see section 3.1.). This was done in order to investigate how the municipality used different modes of governing in Stage X. The implications that these various modes of governing had for the housing developers were then explored. The housing developers were found to experience a variety of challenges as a result of the municipal sustainability requirements. The housing developers' perceived barriers to implementing municipal sustainability requirements were analysed using previously identified barriers to SC perceived by construction clients (see section 2.3.). The previously identified barriers were used to gain a better understanding of the challenges observed in Stage X before they were compared to each other.

#### 4.5.2. Part 2

For the second part of the study the empirical material from interviews and observations was categorized according to major ongoing negotiations over municipal sustainability requirements. Two of these negotiations stood out as especially challenging from both the housing developers' and municipality's perspectives and were therefore investigated further. The way that the negotiations emerged and evolved was studied from both the housing developers' and the municipality's perspective in order to gain a full picture of the process. The housing developers' perceived challenges and problems with these

requirements were explored further to understand why they chose to oppose them. This revealed that the requirements were each expected to necessitate several different product and process innovations (see section 2.4.). The expected or anticipated innovation efforts were analysed using the concepts of product and process innovation to provide a better understanding of the work that the requirements would entail for the housing developers. The housing developers' perceived challenges and problems with the two requirements could then be discussed in relation to the implications that they would have for their projects.

#### 4.5.3. Part 3

In the last part of the study I began searching for theoretical constructs that could help me describe and explain this process of negotiating municipal sustainability requirements prior to the housing developers' procurement process. This first involved familiarising myself with conflict theories. I found that the paradigm that views conflict as phenomenon that can be both functional and dysfunctional (see section 3.3.) aligns well with my ontological stances and helped me analyse the negotiations as conflict episodes. Sometime during this process the value co-creation literature also caught my attention, which led to the identification of possible areas for theoretical development. The negotiations were therefore conceptualised as a value co-creation/destruction process (see section 3.2.).

### 4.6. Research quality

For qualitative research, research quality is typically assessed according to criteria such as rigor, trustworthiness, credibility and transferability (Golafshani, 2003). The goal here, as it is for most qualitative studies, has been to conduct an in-depth study of a specific case in order to "provide a rich, contextualized understanding of human experience" (Polit and Beck, 2010; 1452). Using a single case study allowed me to collect in-depth descriptive material of the phenomenon and the context. This made it possible to provide rich descriptions supported by illustrative quotes in all of the papers. Providing rich descriptions improves *transferability* by making it easier for other researchers to understand the context and judge how the findings can be transferred to other contexts (Guba, 1981; Dyer and Wilkins, 1991). Rich descriptions of context and phenomenon makes it possible to write better stories that help other researchers recognise dynamics from other contexts (Dyer and Wilkins, 1991). In the last part of the study, negotiations in Stage X are also generalized to a theory (Polit and Beck, 2010).

The empirical material was gathered using different methods. The triangulation of sources in the case study allowed me to assess consistency in emerging patterns (Guba, 1981). Furthermore, triangulation allowed me to identify inconsistencies and differences between sources. Any differences that appeared were investigated further in

order to gain a better understanding of them and find possible explanations, which improves the *credibility* of findings (ibid). As is arguably the case for all research, the findings will contain some bias from me as a researcher. Given the subjective nature of qualitative research, it is important for researchers to be reflexive (Alvesson and Sköldbberg, 2018). Throughout the research process I therefore tried to improve my awareness of and reflect over how my background, interests and views affected the collection and interpretation of empirical material. Several seminars and conferences were also used to receive feedback on the findings in each paper from other researchers.

All of the empirical material and the process of analysing it was carefully documented. Interviews were recorded and transcribed and notes were taken during observations. Quotes from the interviews were used in all of the papers to provide examples and illustrate how the empirical material had been interpreted. However, some parts of the empirical material from interviews could not be presented as quotes in the papers due to ethical considerations. Since the findings are based on a single case study of Stage X, which consists of a relatively small group of actors, it could in some instances be easy to figure out the identity of interviewees. Certain details or examples that might risk the anonymity of interviewees contribute to the overall findings but are not presented in the papers in order to avoid any negative implications of actors finding out who said what.





## 5. Summary of papers

### 5.1. Paper A: Housing Developers' Perceived Barriers to Implementing Municipal Sustainability Requirements

Paper A explores public sustainability governance in construction projects on municipal land and its implications for housing developers. Using their position as land owners, municipalities govern private construction projects through LA agreements with sustainability requirements that exceed building regulations (Caesar, 2016; Smedby and Quitzau, 2016; Smedby, 2016). However, it is the housing developers' responsibility to implement the municipality's sustainability requirements. Due to their position to set specifications and formulate requirements during procurement, construction clients are considered to play an important role in the process of implementing innovation ((Nam and Tatum, 1997; Gann and Salter, 2000; Blayse and Manley, 2004; Kulatunga, et al., 2011) and SC practices in construction projects (Häkkinen and Belloni, 2011). The way that municipal sustainability requirements affect housing developers therefore warrants further investigation. The purpose of this paper is to explore housing developers' perceived barriers to implementing municipal sustainability requirements.

Municipal sustainability governance is explored in the case study of the urban development programme Stockholm Royal Seaport and analysed using Bulkeley and Kern's (2006) modes of governing change at the local level. Housing developers perceived barriers to implementing municipal sustainability requirements are then explored in relation to previously identified barriers to SC and change.

The findings show that municipalities use modes of governing by authority, enabling and provision to put pressure on housing developers to develop and implement SC solutions and practices in their projects. Findings also illustrate how housing developers' attitudinal, industrial and institutional barriers to change and SC, identified in previous research, affect their implementation of municipal sustainability requirements. Three barriers to implementing municipal sustainability requirements that are perceived by housing developers were identified. These include reduced flexibility coupled with uncertainty, conflicting interests coupled with reduced autonomy and interdependencies, and a lack of trust and transparency coupled with interdependencies.

Contributions are made to literature on clients' perceived barriers to SC and change. The study provides an example of how a public authority's governance of change affects construction clients' perceived barriers to change. The paper has implications for

municipalities that use requirements in LA agreements to govern sustainable development since it identifies obstacles for perceived by housing developers that constrain the extent of the municipality's influence. For housing developers the paper provides some insight on the types of barriers they can expect when implementing municipal sustainability requirements.

## **5.2. Paper B: Beyond National Building Regulations: Exploring public-private negotiations over sustainability requirements**

Municipalities in Sweden use LA agreements to place sustainability requirements on construction projects that go beyond the national building regulations (Caesar, 2016; Smedby and Quitzau, 2016; Smedby, 2016). This is done to advance sustainable construction practices by challenging the private sector to innovate. Negotiations over some of these requirements set by the municipality emerge before the housing developers' procurement process begins. Paper B explores these negotiations over project specific requirements for construction projects on municipal land. In order to gain an understanding of how and why they emerge, the reasons why housing developers contend certain project specific requirements set by a municipality are first investigated. The process of negotiating those requirements is then described.

Emerging negotiations over two different project specific sustainability requirements set by the municipality were followed in the case study of the urban development programme Stockholm Royal Seaport. An understanding of these requirements is first developed in terms of expected innovation efforts. The innovation efforts that the housing developers anticipate will be necessary in order to meet the municipality's requirements are investigated using the concepts of product and process innovation, as defined by Damanpour and Gopalakrishnan (2001).

The findings show that the housing developers contend requirements that they anticipate will lead to increased costs, greater risks and uncertainty and a decrease in the value of their final product. Meeting these requirements will entail both product and process innovations, which contribute to the housing developers' anticipation of increased costs and risk. The housing developers drive negotiations with the municipality in order to have the requirements that they find especially problematic either modified or removed. These findings support previous studies where construction clients have been found to act as barriers to innovations since they consider them unprofitable and risky (Ivory, 2005). These construction projects also challenge the view of construction clients as having the key role in driving innovation in construction projects.

Contributions are made to literature on the client's role by illustrating how certain project specific sustainability requirements for construction projects on municipal land are negotiated between the municipalities and housing developers before procurement takes place. Since the development of requirements is usually considered as part of the clients' procurement process, this raises the question 'when does procurement actually begin?'

For housing developers, this means that they should be prepared to implement some requirements that might increase their costs, increase risk and decrease the value of their final product when acquiring LA agreements for similar projects. Some requirements can be modified or removed through negotiations with municipalities, although the outcome of these negotiations are uncertain. Similarly, municipalities should consider how their requirements could affect the costs, risks and value of the housing developers' projects and be prepared to negotiate requirements that are considered particularly problematic.

### **5.3. Paper C: Early Requirements Capture: A study of Value Co-Creation for Sustainability in Construction**

Paper C continues to explore negotiations between municipalities and housing developers over project specific requirements but shifts the focus to the role that these negotiations play in the housing developers' process of capturing requirements. The purpose of this paper is to conceptualize negotiations over project specific requirements as a value co-creation process. Value co-creation provides a conceptual framework used to explain how and why different stakeholders are involved in the process of capturing project-specific sustainability requirements.

The two negotiations explored in Paper B are further investigated in the case study of the urban development programme Stockholm Royal Seaport. The negotiations were conceptualised as value co-creation processes. In addition to this, the concepts of functional and dysfunctional conflict were used to gain an understanding of and describe the role that clashing interests between actors play in this process.

The findings revealed that negotiations over requirements are rooted in conflicting interests between the municipality and housing developers over desired value propositions. When managed successfully, these conflicts became a source of creativity for finding new solutions and developing the requirements to increase potential value generation (Vaaland and Håkansson, 2003; Mele, 2011). The findings illustrate how project stakeholders with different interests and goals must first construct a common understanding of project objectives (Green, 1996; Newcombe, 2003). Developing project objectives is therefore a process that takes time (Karrbom Gustavsson and

Hallin, 2015). This also means that trade-offs must sometimes be made between those desired values that are in conflict with each other and raises the question of how value in sustainable urban development should be envisioned.

Contributions are made to literature on the client's role by illustrating how the process of capturing project specific requirements begins before procurement commences and can be conceptualized as a value co-creation process. Since negotiations between the housing developers and the municipality emerge as a result of requirements that the housing developers perceive as problematic enough to actively contend, this co-creation process is stimulated by functional conflict. Theoretical contributions are made to the co-creation literature within the construction management field where value co-creation processes between construction clients and upstream suppliers have previously been explored (Liu, et al., 2014; Eriksson, et al., 2016). This paper illustrates that value co-creation processes also take place between clients that have neighbouring construction projects and between construction clients and municipalities. Furthermore, the theoretical link between value co-creation and conflict is developed.

The study has several implications for practitioners and for policy. Requirements in LA agreements can be used as a form of public governance to create functional conflict in order to co-create sustainable value. Municipalities should however be prepared to negotiate requirements that have a high risk of increasing costs, increasing risk and decreasing value for housing developers. Since it is not always possible to change the municipality's requirements and find win-win solutions, the housing developers' analysis of their business cases must consider both the municipality's price of land and the sustainability requirements.

## 6. Discussion

### 6.1. Housing developers' perceived barriers to implementing municipal sustainability requirements

Findings from all three papers are used to answer the first research question: *What barriers to implementing municipal sustainability requirements are perceived by housing developers?* The municipality uses LA agreements to place project-specific sustainability requirements on the housing developers' construction projects, which could be interpreted as governing by authority (Bulkeley and Kern, 2006). These requirements go beyond the current building regulations and are expected to require both product and process innovations. The requirements put pressure on developers in terms of increased risk and uncertainty and are expected to increase their costs. The housing developers have a short-term focus on the individual project (Vennström and Eriksson, 2010; Häkkinen and Belloni, 2011). Increased costs are therefore perceived as a major barrier to implementing these sustainability requirements in their projects (Williams and Dair, 2007; Osmani and O'Reilly, 2009; Zainul Abidin, et al., 2013; Opoku and Ahmed, 2014; Shen, et al., 2017). The housing developers' project managers are continuously assessing whether or not their project is economically and commercially viable (Edkins, et al., 2013).

The municipality's requirements *reduce flexibility* for the housing developers', which becomes a major barrier in combination with uncertain and changing perceptions of the building conditions. With many high requirements on sustainability, the housing developers struggled to adapt their design and production solutions to fit unforeseen costs into their budgets. A perceived lack of customer demand for some of the technologies the housing developers are forced to implement is a major concern, since they are not considered to increase the value of their final product (Häkkinen and Belloni, 2011; Zainul Abidin, et al., 2013). This became particularly evident when the housing market began to decline. During the time of the study it became evident that several municipal sustainability requirements are in conflict with each other, meaning the housing developers might not be able to priorities and achieve all of them (Williams and Dair, 2007). Some of the municipal sustainability requirements were also in direct conflict with building regulations, which means that the housing developers are legally unable to implement them in their projects.

The housing developers' relationship with the municipality also limits their flexibility. They are compelled to deliver successful projects in SRS, despite the additional challenges, due to the prospects of getting more desirable LA agreements in the future.

For this reason they mainly choose to question or oppose the municipality together so that no single housing developer can be considered as especially difficult to work with. Findings from all three papers illustrate how the housing developers make important decisions regarding their solutions when planning and designing their projects before procurement. Decision-making during this project phase is largely dependent on the LA agreement and the housing developer's relationship with the municipality (Caesar, 2016), and will influence their design and production solutions and consequent their procurement strategies. This is largely overlooked in previous literature on client procurement strategies when discussing clients' abilities to govern their projects (e.g. Eriksson, et al., 2017).

*Conflicting interests*, coupled with reduced autonomy and interdependencies, became another major barrier for implementing municipal sustainability requirements. The housing developers question the benefits and value of the requirements, but are unable to remove or change them without first persuading the other housing developers and the municipality. The housing developers actively oppose requirements on new solutions that they consider risky in regards to costs and value for money (Ivory, 2005; Häkkinen and Belloni, 2011; Gil, et al., 2012; Loosemore, 2015). Negotiations emerge between the housing developers and the municipality over the requirements, as well as between the housing developers over solutions they are forced to collaborate on. The process of implementing innovations in these projects therefore involves complex negotiations (Winch, 1998; Harty, 2008). Conflicting interests make these negotiations complex and thereby lengthy.

*Lack of trust and transparency*, coupled with interdependencies, make up the final major barrier for implementing municipal sustainability requirements. The housing developers are competitors and expect the others to act in their own best interest. They are also forced to collaborate over shared facilities, such as shared garages. When many housing developers are forced to collaborate over one solution, conflicts emerge which lead to complex and lengthy negotiations. When the housing developers are dependent on each other but lack trust, they choose to depend on contracts to minimize risks. Finally, a lack of transparency from the municipality increases uncertainty for the housing developers. When the municipality is slow to provide responses to issues that have been raised the housing developers base their perception of project conditions on rumours. This creates confusion and uncertainty.

## **6.2. How and why sustainability requirements are negotiated before procurement**

Findings from papers 2 and 3 are used to answer the second research question: *How and why are project-specific sustainability requirements negotiated between*

*municipalities and housing developers prior to procurement?* Studying the ‘fuzzy’ front-end of the construction projects in Stage X proved to be a critical point where structure and agency are actively being negotiated and the role of power is especially prominent to the outside observer. Housing developers oppose requirements in LA agreements that they expect will require both product and process innovations and which are perceived to increase their costs, increase risk and decrease the value of their final product, which supports findings in previous research (e.g. Ivory, 2005; Häkkinen and Belloni, 2011; Gil, et al., 2012; Loosemore, 2015). They are attempting to negotiate these requirements to control which requirements from the LA agreements will be implemented in their projects in order to control costs and minimize risk. The developers assume that these requirements are negotiable since they have been designed by the municipality and go beyond the national building regulations, but this is not always the case. The municipality’s project managers are not aware of which requirements are negotiable either, which begs the question: ‘what requirements in LA agreements are actually negotiable, and which actors have this information?’

Negotiations over municipal sustainability requirements are complex and dynamic. They emerge as a result of conflicting interests, develop over time and involve several housing developers and the municipality. The developers are reluctant to oppose the municipality’s requirements on their own, because by building and maintaining a good relationship with the municipality they hope to receive desirable LA agreements in the future. They therefore choose to form coalitions and oppose the municipality together, which is similar to Hellgren and Stjernberg’s (1995) findings. They do this in order to ensure that nobody can be singled out by the municipality as difficult to work with. The interdependency-based relationship developers have with the municipality can therefore act as a barrier in some cases, since not all developers will be able to get their concerns heard. When the housing developers are negotiating requirements that force many of them to collaborate over one solution, conflicting interests between developers also become apparent. The developers are involved in the programme for different strategic reasons and therefore have different goals (ibid). In these cases negotiations are particularly complex since the housing developers are negotiating both amongst themselves and with the municipality.

Since the housing developers do not have full control over the requirements that are implemented in their projects, the findings support calls for pluralistic views of client organisations that also consider project stakeholders (Green, 1996; Newcombe, 2003). The findings illustrate how project stakeholders with different interests and goals must first construct a common understanding of the project objectives (Green, 1996; Newcombe, 2003), which are developed in the project over time (Karrbom Gustavsson and Hallin, 2015). The housing developers’ planning and design processes prior to procurement can be viewed as a political process where actors attempt to get their goals

accepted by the other actors, which supports findings from Hellgren and Stjernberg's (1995) study.

The municipality's requirements and authority challenge the power typically associated with the role of construction clients' and their procurement process (e.g. Nam and Tatum, 1997; Hartmann, et al., 2008; Varnäs, et al., 2009; Havenvid, et al., 2016; Eriksson, et al., 2017). As a result of public governance through municipal LA agreements, sustainability requirements are negotiated and established prior to the housing developers' procurement process. Previous literature problematizes traditional views on requirements capture by demonstrating that client requirements can continue emerging and evolving after the briefing process throughout the construction project (e.g. Othman, et al., 2004; Thomson, 2011). Findings from papers 2 and 3 demonstrate that the process of developing project requirements can also take place prior to the construction clients' procurement process. This raises the question: 'When does procurement actually begin?'

### **6.3. Early requirement negotiations as value co-creation processes stimulated by functional conflict**

Findings from Paper C are used to answer the last research question: *How do municipalities and housing developers co-create value through negotiations over project-specific sustainability requirements?* The co-development of requirements, whereby they are negotiated between housing developers and the municipality, determines the conditions that the developers procure their projects under. This co-development process thereby constrains the scope for value that can be co-created in the project, which supports previous findings (Smyth, et al., 2018). The housing developers and municipality co-develop the project-specific requirements through these negotiations, which can be interpreted as the co-creation of value propositions, since value from projects is not realised until after its completion (Smyth, et al., 2018). Project requirements are used to capture value propositions that stakeholders agree on (Liu, et al., 2014; Smyth, et al., 2018). The municipality's goal in SRS is to develop an attractive district in the city and stimulate innovation for the development of SC solutions and practices. Different functional units in the organization can however act according to different logics and have different goals. The housing developers generally consider profit as their main value outcome, which has previously been overlooked in the service-dominant logic literature (Smyth, et al., 2018). Other desired value outcomes for the housing developers include improving their corporate image and relationship with the municipality and learning about new SC solutions and practices. Since stakeholders perceive value differently (Chang, et al., 2013), co-developing project requirements entails negotiations over value propositions.



The negotiations are rooted in conflicting interests among actors which consequently results in different desired value propositions. The negotiations explored in papers 2 and 3 can be viewed as conflict episodes (Pondy, 1967). They are lengthy and complex negotiations between multiple actors and exhibit both functional and dysfunctional traits as they progress (Vaaland and Håkansson, 2003). These actors negotiate the requirements in accordance with their own goals. For the housing developers these are largely related to costs and value for money (Ivory, 2005; Häkkinen and Belloni, 2011; Gil, et al., 2012). This creates conflict which, if managed successfully, can act as a source of creativity for improvement (Vaaland and Håkansson, 2003; Mele, 2011). The different perspectives and goals of actors can be utilised to advance requirements and increase potential value in the projects. Functional conflict during the development of requirements results in the co-creation of value propositions, and dysfunctional conflict leads to the co-destruction of value (Vaaland and Håkansson, 2003; Mills and Razmdoost, 2016). This begs the question: ‘How can practitioners foster functional conflict to co-create value and manage conflicts to prevent value co-destruction?’

Findings from Paper C also raise the question of whom these actors should be creating value for. This is a major source of ambiguity in Stage X since the actors have different and sometimes conflicting perspectives on the matter. The housing developers are concerned about value for their end-user while the municipality is concerned about value for the district and the city.

The conflicts explored here are directly connected to requirements designed to develop SC solutions and practices. Sustainable improvement requires innovative solutions that are socially, ecologically and economically viable given the unique contextual conditions of each construction project. Sustainability requirements are often in conflict with each other and in many cases it is not possible to find a solution that is completely sustainable, meaning trade-offs must be made. For this reason, Kemp, et al. (2005) argue that sustainability should not be considered as an optimal solution or state that is attainable and that it is instead more fruitful to think of sustainability as a change process consisting of incremental continuous improvements. Previous research on sustainability has largely sought win-win solutions in order to attract attention from the private sector and avoid conflicts (Bansal and Song, 2017). A traditional view on conflict as a solely dysfunctional phenomenon has thereby been adopted. Expanding sustainable improvement beyond the pursuit of win-win solutions by viewing conflict as a phenomenon that can be both functional and dysfunctional might support practitioners in tackling a wider range of sustainability related issues.

The discussion in this section raises questions regarding the roles that local authorities and housing developers play in driving the development of SC solutions and practices. By working together with conflicting interests, are they able to achieve more in terms of sustainability by fostering functional conflict than they would on their own?



## 7. Conclusions

The purpose of this research has been to *explore how municipal sustainability requirements affect housing developers when planning and designing their projects*. This was broken down into three research questions answered in the thesis. The following sections discuss the thesis theoretical contributions, practical implications for housing developers and municipalities, policy implications and finally suggestions for future research.

### 7.1. Theoretical contributions

Contributions are made to the construction management literature by illustrating how public governance through municipal sustainability requirements affects the process of developing requirements in construction projects. The case study presented in the thesis provides an empirical example of housing developers' perceived barriers to implementing sustainability requirements imposed by a municipality. These barriers are discussed in relation to previously identified barriers to SC (e.g. Häkkinen and Belloni, 2011; Zainul Abidin, et al., 2013) and attitudinal, industrial and institutional barriers to change that are typically perceived by construction clients (Vennström and Eriksson, 2010). The housing developers in SRS are faced with implementing sustainability requirements that they do not agree with. The thesis therefore also provides a better understanding of the obstacles that construction clients face when attempting to implement particularly challenging sustainability requirements in their projects.

Contributions are also made to literature on the construction client's role by illustrating that an early process of co-developing requirements takes place before procurement in construction projects on municipal land. This process challenges traditional notions of how and when requirements for construction projects are developed. It also challenges the role that construction clients play in initiating and implementing innovation and change found in previous literature (e.g. Nam and Tatum, 1997; Gann and Salter, 2000; Blayse and Manyley, 2004; Kulatunga, et al., 2011; Havenvid, 2016). In these construction projects on municipal land, housing developers attempt to control what requirements are implemented in their projects through negotiations with municipalities and other housing developers with neighbouring construction projects. These negotiations that precede procurement arise as a result of conflicting interests between actors. They determine the scope for value that can be realised in construction projects on municipal land and are therefore an important part of housing developers' planning and designing processes. As the clients do not have full control over the project

requirements their procurement is not as central in governing these construction projects as previous literature suggests (Eriksson, 2008; Hartmann, et al., 2008; Havenvid, et al., 2016).

Co-creation processes between construction clients and upstream suppliers have previously been studied (e.g. Liu, et al., 2014; Eriksson, et al., 2016). This thesis contributes to the growing stream of literature on value co-creation in the construction management literature by illustrating that construction clients also engage in value co-creation processes with municipalities and other developers. The early co-development of requirements is conceptualised as a process of co-creating value propositions between stakeholders (Smyth, et al., 2018), answering calls to re-conceptualise projects and programmes as value creation processes for multiple stakeholders (Winter and Szczepanek, 2008; Chang, et al., 2013). Furthermore, the link between value co-creation and functional conflict, and alternatively the link between co-destruction and dysfunctional conflict, is developed.

## **7.2. Practical implications for housing developers and municipalities**

The research illustrates what housing developers might expect when taking on similar projects to those studied in SRS. Housing developers face several obstacles when implementing project-specific sustainability requirements from municipal LA agreements in urban development programmes. High requirements on sustainability lead to increased costs which reduce housing developers' flexibility. Reduced flexibility becomes a major obstacle when dealing with uncertain building conditions since unexpected costs are difficult to include in the project budgets. Municipalities are however inclined to offer housing developers support in the form of provisions to help them overcome major obstacles that emerge.

Some municipal sustainability requirements, such as those that require both product and process innovations, are perceived to increase housing developers' costs, increase risk and decrease the value of their final product. Municipal requirements are, on the other hand, negotiable under some circumstances, although determining when this is the case can be difficult for housing developers. One example is municipal requirements that are not fully developed and defined in the LA agreement due to insufficient information, which can be negotiated as they are developed further. As the land development and construction processes progress the understanding of building conditions develops. New information can reveal issues with certain requirements, such as cases where requirements are in conflict with each other. This is another instance where municipalities consider modifications to their requirements. Municipal sustainability requirements are however not negotiable if they are developed as a part of larger plans for development in the city, such as transport systems.

If multiple housing developers find a particular requirement problematic they can form coalitions and initiate negotiations with the municipality together. The anonymity provided by the group allows housing developers to enter negotiations with the municipality without negatively affecting their relationship. However, if the municipality is slow to inform the housing developers and respond to their concerns the lack of transparency can result in rumours spreading amongst the developers, which generally creates confusion and uncertainty. Conflicting interests between developers or between the developers and the municipality make these negotiations difficult and time consuming, and thereby costly. Housing developers therefore need to consider which requirements are worthwhile to negotiate.

The findings also illustrate obstacles that might be met by municipalities that use sustainability requirements in LA agreements to challenge the private sector to innovate and develop sustainable construction solutions and practices. If housing developers meet too many obstacles and are unable to implement certain requirements in their projects they will attempt to renegotiate them with the municipality. For example, the findings illustrate that when many housing developers are forced to collaborate with each other over shared facilities, conflicting interests make it difficult for them to reach a consensus on one solution. Although the housing developers are collaborating they are also competitors and therefore expect the other developers to act in their own self-interest. Municipalities can therefore expect resistance from housing developers when requirements force many of them to collaborate over one solution.

Negotiations are particularly prominent when the housing market is declining since the housing developers face more challenges creating their budgets. In urban development programmes coalitions are formed between housing developers when this need arises in order to protect their relationships with the municipality. However, power is not distributed evenly amongst housing developers and as a consequence some voices are heard more than others. A better understanding of the housing developers' perspective on the process of implementing and developing municipal sustainability requirements might help municipalities improve their governance practices to make them more effective and beneficial for all actors involved.

### **7.3. Policy implications**

The research project has policy implications for municipalities that want to challenge the private sector with sustainability requirements in LA agreements that go beyond national building regulations. Housing developers form an important link between local authorities and the contractors, consultants and architects in their construction projects. They work with both the city planners and the contractors, consultants and architects in construction projects' temporary organisations to produce residential buildings. Successful implementation of requirements from LA agreements therefore

depends on the ability and willingness of the housing developers. If housing developers are strongly opposed to certain requirements they will be difficult for the municipality to enforce and some compromises will likely be made. The findings illustrate how municipalities can use LA agreements to challenge the private sector to innovate and develop SC solutions and practices, as well as the limitations of this strategy. Urban development programmes like SRS allow municipalities to test and develop new requirements before they are considered for new policies and building regulations.

#### **7.4. Suggestions for future research**

The study presented in this licentiate thesis provides several possible directions for future research and the continuation of this doctoral research project, which will be discussed here. Firstly, the exploration here is based on a single case study where requirements in municipal LAs are used as a form of public sustainability governance. Future research could therefore explore other urban development programmes and conduct more comparative studies. Furthermore, the process of implementing and developing municipal sustainability requirements is followed between the allocation of land and before the housing developers' procurement process. The development of municipal sustainability requirements could also be explored prior to the allocation of land and/or throughout more of the construction process. Following the implementation of municipal sustainability requirements to later stages of construction projects would also enable a better understanding of their impacts to be formed.

The findings indicate that the process by which housing developers acquire LA agreements influence the requirement negotiations that follow. Future research could explore the effects of formal agreements between municipalities and housing developers. Furthermore, the findings illustrate how power dynamics between these two actors play an important part in the process of developing municipal sustainability requirements when negotiations emerge. They also indicate that certain power structures found within the municipality affect this process, which could be explored further. The municipality's governance in the urban development programme studied here is dynamic. Future studies could explore how municipalities learn and adapt their governance both within and between stages in urban development programmes. The study also revealed that the role of municipalities in private construction is ambiguous and could be explored and developed further.

Finally, in order to support practitioners, future studies could investigate how functional conflicts are fostered to co-create value and dysfunctional conflicts are managed to prevent the co-destruction of value. Since this study only explored two municipal sustainability requirements in greater detail, going further in exploring how different types of municipal sustainability requirements affect actors might therefore be fruitful for practitioners.

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## 9. Appendix

### 9.1. Appendix A, Interview Guide

The order and formulation of questions and follow up questions varied between interviews, which were all held in Swedish.

#### *Background information:*

Date, time, location and name of interviewee

Interviewee's title, previous experience and role in the project

Their organisation and project history

#### *Examples of general guiding questions for all interviewees:*

- How does this project/programme compare to other projects/programmes?
- How is the project/programme progressing and what is happening now?
- How do you perceive the conditions for delivering this project/programme?
- What are currently the biggest challenges and uncertainties for you and why?
- How would you describe your goals/interests in this project/programme?
- Do the housing developers' and municipality's interests differ? If so, how?
- How would you describe the relationship between the municipality and developers in this programme?
- How do you view the use of land allocation agreements in this programme?
- How would you describe the municipality's role in the developers' projects?
- What are your thoughts on the municipality's sustainability requirements?
- Have the municipality's sustainability requirements changed/developed?
- Are there conflicting interests? If so, how are these addressed?

#### *Examples of guiding questions for housing developers:*

- How do the municipality's sustainability requirements affect your project?
- Which requirements do you find the most challenging and why?
- How do you collaborate with the other developers?
- How are you planning for procurement?

#### *Examples of guiding questions for the municipality:*

- Could you describe the municipality's work process from land allocation to signing a development right?
- How were the sustainability requirements developed before land allocation?