

## 2 Partnering in construction as governance tool

Chapter 2 presents a literature review on the concepts of governance and partnering in construction. Because the thesis consists of papers on a specific topic that have been written independently of one another, such a general literature review was not appropriate in those papers. This chapter was updated at the end of the research, to include the most recent and most elaborated insights that were collected during the research.

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### § 2.1 Introduction

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Climate change can no longer be ignored. It is globally recognised that the evidence for climate change is unequivocal (IPCC, 2014) and action needs to be taken to address its negative consequences (UNFCCC, 2011). The challenge of stimulating this action is taken up by this thesis - albeit at the level of individual buildings rather than at the global level - by engaging the construction sector in the implementation of adaptation measures in the social housing stock. To achieve this, the research fields of climate change adaptation, governance and partnering in construction are brought together. The effects of climate change in the Netherlands were briefly explained in the introduction and will be further elaborated in Chapter 3.

Climate change adaptations have different characteristics from other adaptation measures relating to, for example, energy-efficiency. For the latter, the requirements for dwellings are generic. They have been established on the basis of theory and standardised values that are similar for dwellings throughout the country. For example, the thermal resistance of the outer wall of every new dwelling should be  $3.5 \text{ m}^2 \text{ K/W}$  (MinIKR, 2014). Measures for climate change adaptations, however, depend on conditions in the local environment (Pinkse and Kolk, 2012), which necessitates knowledge of the local situation so that the right measures are chosen. This not only requires a process that includes built environment professionals, but also local policymakers and the scientific community (Bosher and Dainty, 2011). To date, the scientific community has played a very important role in this because of the relative newness of the topic, and because knowledge is constantly evolving. According to Stone (2012), much information on the impact of climate change in cities is still unknown or difficult to retrieve at the national level, since it is only known locally. This

presupposes that in the coming years there will be a constant influx of information into the construction process in order to make the building stock more resilient. Apart from 'top-down' information from scientific research carried out at a local, regional or national level, knowledge can also be actively retrieved from people living in a neighbourhood, using a 'grassroots community based approach' (Bosher, 2012). The involvement of local stakeholders can create a window of opportunity to implement measures, especially if people have already experienced the negative impact of climate change, for example when there has been occurred flooding after heavy rainfall. In many cases, action is only taken after extreme events have occurred (Amundsen *et al.*, 2010). From all perspectives, an integrated process without the traditional barriers between parties and/or phases will enhance the free flow of knowledge between stakeholders (Bosher and Dainty, 2011).

This chapter aims to provide a theoretical basis for the notion that the construction process can serve as a useful governance tool. To do this, three types of governance will be explored: hierarchic, market and network governance. These three types represent how the government has interacted with society in the past - and continues to interact with society - in order to resolve societal problems. The adoption of climate change adaptation measures can be considered as just such a societal problem. In the following section, a number of governance tools are described that are based on these types of governance. The tools focus on taking the desired action, rather than on the relationship between state and society. Next, 'partnering' in the construction sector will be explored - a term that describes the collaboration process between clients, such as Dutch housing associations and the construction sector, which may be suited to increasing the adoption of climate change adaptation measures. To conclude, the theoretical fields of governance and partnering will be combined. By matching the partnering approach with the types of governance and placing it in the framework of governance tools, this thesis shows how the approach could be a valuable tool with which to increase the adoption of climate change adaptation measures by Dutch housing associations.

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## § 2.2 Methodology

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A literature review was carried out on the subjects of governance and partnering in construction. The narrative review (Peat, 2002; Grant and Booth, 2009) included mainly peer reviewed articles, reports and books with the aim to reveal knowledge generated in previous research, to avoid duplication of work and identifying research gaps. This type of literature review has no specific criteria for the inclusion or exclusion of sources, contrary to systemic reviews. Although the narrative review

method is criticised by Hofmann et al. (2011) for being ‘not reproducible’ and ‘not transparent on e.g. the criteria for selecting studies and the methodology used for combining their results and drawing conclusions from these’, it was considered appropriate for the purpose of creating a starting point for the research and setting boundaries within which the research for this thesis would be carried out. In addition, climate change as a subject of research can be characterised as a ‘wicked problem’, meaning that it has no single solution and it is difficult to consider it ‘solved’, and it is even questionable whether it can be solved at all. Solutions are classified as good or bad rather than true or false (Rittel and Webber, 1973). This means that as many options as possible must be explored to arrive at the best solution.

Firstly, a concise overview of the main types of governance will be given, as derived from the literature on public administration. Throughout this thesis, a type of governance is understood as the organisation of actors in a hierarchic, market or network governance setting (Barbazza and Tello, 2014). Then, a list of governance tools will be presented that have been derived from the literature on environmental governance and climate change mitigation. Tools have the ability to create specific relationships between actors (Barbazza and Tello, 2014). Since the tools for implementing changes were derived from literature with a different focus than climate change adaptation, for each tool an explanation is given on how it could be applicable to the adoption of climate change adaptations in social housing. In governance literature, notions as ‘governance strategies’ and ‘governance arrangements’ are common as well, but this thesis will use the notion ‘governance tool’ to describe a singular approach to create the relationship between the actors. Should there be a combination of tools, then reference is made to ‘strategies’.

To classify the integrated construction processes of the front-runners as studied in this thesis, a literature review was carried out. Based on this review, it was concluded that ‘partnering’ corresponds most closely to the collaboration of Dutch housing associations with their partners in the construction sector. In section 2.6, the literature review on partnering is elaborated.

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## § 2.3 Governance

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‘Governance’ has its origins in public administration (Meuleman, 2008: p 1). Over the years, several scholars (e.g. Rhodes, 1997; Lowndes and Skelcher, 1998; Stoker, 1998; Mayntz, 2004) have formulated definitions, and this inspired Meuleman (2008) to propose the following definition; “Governance is the totality of interactions, in which government, other public bodies, private sector and civil society participate, aiming

at solving societal problems or creating societal opportunities.” The scope of the definition, including “any kind of interactions”, allows governance to be treated as an overarching notion while the type of interaction within the framework is indicated by the sub-categories of hierarchic, network or market. This provides the possibility to explore the entire field of work of housing associations while implementing climate change adaptations for their dwellings. Moreover, under Meuleman’s definition, no actor has a central position, although the final effect of governance is clear: “solving societal problems or creating societal opportunities”. For this thesis, the final result is adapting dwellings to make them less vulnerable to climate change and improve the quality of life of tenants. This definition includes many elements that match the perception of governance as used in this thesis, although this thesis proposes to add an instrumental element to it. In fact, interactions do not happen of their own accord; they are caused to happen on purpose, by means of tools. Governance is therefore re-defined as: the totality of interactions between government, other public bodies, private sector and civil society, deliberately established using tools, aiming at solving societal problems or creating societal opportunities.

Three major types of governance can be distinguished that have characterised the interactions between the government and societal institutions - namely: hierarchic, market and network governance. These types are explored in the following sections.

### § 2.3.1 Hierarchic governance

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The field of hierarchic governance is characterised by the strong role of the government in a ‘command-and-control’ setting (Jordan *et al.*, 2003) and the presence of regulatory processes (Pahl-Wostl *et al.*, 2009). This type of governance is associated with notions such as authority, task division, coercion (Meuleman, 2008). Hierarchic governance was the predominant form of Western public administration in the period after World War II. It became successful because of its efficiency, standardization and delivery of universal services to society and therewith improving the quality of life of many citizens (Keast *et al.*, 2006). The best way to achieve this was by using a strict regime of clear rules, which ensured that everyone knew what to do (Meuleman, 2008). As such, the government interacts with societal autonomy in a unilateral way: orders are passed down from the government to society.

Hierarchic governance contains some inherent barriers to sustained success. The regulatory framework is fairly rigid, so it is difficult to adapt to changing circumstances in society and introducing new regulations is subject to high transaction costs (Pahl-Wostl, 2009). This becomes problematic when addressing problems caused by multiple actors that cannot be solved by one actor or the government alone

(Driessen and Vermeulen, 1995) or if the problems are 'wicked', meaning that it is not possible to draw a line between right or wrong (Van Bueren, 2009). Furthermore, hierarchic governance can be perceived as limiting and can lead to feelings of a lack of freedom (Fischer *et al.*, 2011). It also stifles innovation because it predefines the desired outcomes of a process and does not encourage actors to engage with societal objectives (Van Bueren, 2009). These difficulties gave rise to the emergence of new types of governance, of which market governance was the first to mature.

### § 2.3.2 Market governance

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In the 1980s, market governance came to occupy a position as an alternative to the rigid hierarchic type of governance. In that period, the role of national governments moved towards becoming more service-oriented (Meuleman, 2008). Market governance focuses on applying private-sector principles such as efficiency, effectiveness and economy (Keast *et al.*, 2006). In Public Administration, this type of governance is metaphorically referred to as 'market' governance, describing a situation where the relationship between public agencies and their customers is based on self-interest, just as happens in a 'real' marketplace (Denhardt and Denhardt, 2000). In a 'perfect' market environment, transactions are based on competition and there is no long-term human or social contact between buyers and sellers (Hirschman, 1982). There is no space for bargaining or negotiation (Hirschman, 1982), and price is the medium that creates an equilibrium between supply and demand (Buitelaar and De Kam, 2009). Market governance encompasses business-oriented areas such as competition, customer-orientation, privatisation, deregulation, decentralisation and performance contracting (Keast *et al.*, 2006; Meuleman, 2008). This type of governance leaves more freedom to enterprises and citizens to decide on what they think is best to do. The government can support the market parties by providing information and can stimulate the market to adopt certain behaviour by providing subsidies (Van Bueren, 2009). But in the end, the enterprises and citizens decide for themselves.

Over time, it turned out that the principles of market governance were undermining the quality of service that the government is expected to deliver. For example, decentralisation resulted in specialised service agencies from the government which had to compete for funding with other agencies from that same government, ultimately leading to greater fragmentation within the government sector (Keast *et al.* 2006). Moreover, the inherent values of public administration, namely those attached to public interest and social cohesion, also came under pressure as citizens had to compete with each other for services (Keast *et al.* 2006).

### § 2.3.3 Network governance

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Both the hierarchic and market forms of governance proved their effectiveness, but at the same time each was associated with certain problems (De Carvalho, 1998). The understanding of the limits of both types of governance formed a basis for the emergence of a third type of governance in the 1990s: network governance. Network governance is associated with themes such as relationships, trust, cooperation and mutual benefits (Meuleman, 2008). It is characterised by the involvement of a number of societal actors, such as governments, organisations and institutions working together in initiatives, projects and programmes, aiming to support the public decision-making process or influence private actors (Pattberg, 2010). As such, this type of governance provides an answer to a changing society in which individuals have become more independent and empowered and the position of the state has become less critical (Buitelaar and De Kam, 2009; Wilson and Termeer, 2011).

Under network governance, actors participate in the decision-making process. This gives them the possibility to defend the solution that suits them best, and implicitly enlists their support for the policy (Van Bueren, 2009). This support reduces the likelihood of unexpected resistance and therefore reduces uncertainties in the policy-making process (Pahl-Wostl, 2009). Moreover, networks are flexible in terms of the roles that actors can take on: depending on the project, they may sometimes assume more power or responsibility and sometimes less (Pahl-Wostl, 2009). In addition, network governance allows for a contribution to policy development that aims at resolving local issues (Keast *et al.*, 2006), the level at which climate change adaptation occurs as well (Klein *et al.*, 2005).

However, depending on the closeness of the relationships between the members, networks can become rigid and slow to respond (Duit and Galaz, 2008) and they can also become isolated entities poorly integrated with the rest of industry (Jones *et al.*, 1997). Since no actor has absolute power, the legitimacy of the network and its decisions may be disputed and accountability issues may arise as a result (Pahl-Wostl, 2009). Network governance may also reduce efficiency because the participatory process involves many resources and organisations (Provan and Kenis, 2007) and collecting, recording and communicating all the available information among all partners is time-consuming and maybe even impossible (Graafland and Nijhof, 2007).

## § 2.4 Governance tools

Based on the types of governance explored in the previous section, many tools have been developed by policymakers to enhance the way that changes are made to the built environment. In this section, a number of these tools are explored and analysed. These tools are already available and can be used to increase the implementation of climate change adaptations in social housing. Originally, these tools were not designed for the implementation of climate change adaptation measures, but this study provides a description of how they could be applied for that purpose.

For the sake of clarity, the governance tools are grouped into four main categories based on the division of tools presented by De Monchaux and Schuster (1997). Even though they group the tools against the background of built heritage, which is a completely different research field to climate change adaptations, the framework itself is useful because it provides a logical subdivision of the levels of state intervention into social autonomy.

The main categories are: information and communication tools, incentives, division of property rights, and regulation tools. They also present a fifth category: ownership and operation, where the government 'might choose to implement policy through direct provision, in this case by owning and operating (...) resources' (De Monchaux and Schuster, 1997). This category is not used in this thesis, because it is unlikely that a situation of ownership would occur in the case of climate adaptations in social housing, since one of the institutional functions of the housing associations is to manage and maintain their dwellings.

### § 2.4.1 Information and communication

The first category is information and communication tools. De Monchaux and Schuster (1997) describe these as tools with which to 'collect and distribute information intended to influence the actions of others'. With information tools, the employees of housing associations can be provided with the knowledge they need to take action more easily, because they know that improvements can be made. The tools in this category are:

**National TV campaigns:** Information is transmitted by television, providing easy-to-access knowledge on the effects of climate change and possible solutions that could be undertaken by citizens and/or institutions (Murphy *et al.*, 2012).

**Demonstration projects:** A dwelling that has successfully been adapted to accommodate the effects of climate change, which can be visited by those responsible for or participating in climate change adaptation projects (SEV, 2011).

**Road shows:** A (governmental) advisory body visits housing associations and provides information on the effects of climate change in the areas where housing associations own property. Successful examples of adaptation can also be shown (SEV, 2011).

**Online tools:** Websites providing information on, or simulations of the effects of climate change in a certain area (Murphy *et al.*, 2012; [www.3di.nu](http://www.3di.nu)).

**Educational programmes:** Programmes intended to educate the employees of housing associations on the subject of climate change adaptations (Schuster, 1997).

**Communities of practice:** A group of housing associations joins forces and searches for solutions on the implementation of climate change adaptations (SEV, 2011).

**Deliberation:** The opportunity to share opinions on a particular subject has been shown to affect the initial opinion of individuals when confronted with it. They become less sceptical and are more open to governance structures that are not completely government-based (Hobson and Niemeyer, 2011). A deliberation session on climate change could be organised by the housing association to provide feedback from their tenants and other stakeholders.

**Tailored advice:** Information provided by a specialist advisory body that knows the exact effects of climate change in a certain area and provides advice on how to adapt a dwelling, taking into account the characteristics of the dwelling such as size, age, orientation etc. (Murphy *et al.*, 2012).

**Performance certificates:** All existing dwellings in the European Union are required to have an energy performance certificate (EP, 2002). A similar framework could be put in place for climate change adaptation measures. In a competitive environment these certificates are a proof of quality, showing how one dwelling compares to another. Additionally, the certificates can be combined with a financial incentive, to encourage action.

## § 2.4.2 Property rights

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The second group, property rights, is described as follows: ‘the state can establish, allocate and enforce the property rights of individual parties as these affect the (...) resources’. This kind of tool focuses on shared or split ownership or use of a property, as applies in some way or another in leasing, mortgaging and easement (Costonis, 1997). Tools in this category include the following:

**Long lease:** In the long lease system, the municipality is the owner of the land, while the premises are the property of a private entity or an individual. Municipalities use this system to control the development of the city and prevent speculation. Moreover, it generates a stable income over the long term (Gerber *et al.*, 2011). For climate change adaptation, a municipality might assume responsibility for maintaining a green area

owned by a housing association. The municipality assures that the green space retains its function as rain water infiltration area by ensuring that it is not covered with an impermeable surface such as tiles or tarmac. In this way, the sewage system will not suffer from overloading in the event of heavy rain and it does not need to be changed.

**Social sales:** In recent years, housing associations have sold dwellings to their tenants at reduced prices. These reductions are possible because the sale contract comes with conditions for split ownership of building and plot. For example, in a 'koopgarant' contract, the housing association sells the dwelling, but the plot remains the legal property of the housing association. The housing association guarantees that it will buy back the dwelling when the owner wants to sell it. This is guaranteed because the plot remains in the hands of the housing association. The dwelling is bought for the current market price, but any profit or loss between the time when the housing association sells the house and the time it buys the house back are shared (Zijlstra, 2011). The housing associations could include climate change adaptations as one of the conditions in the contract, especially in order to maintain the quality of the dwelling. Because the housing associations are obliged to buy back the dwelling in the future, it is important for them that the dwelling remains rentable or sellable.

**Self-organisation:** In some cities in the Netherlands, citizens are formally in charge of maintaining green areas that are owned by the municipality. This situation came about when the municipality proposed building on a particular green area but citizens protested against this. The green space was retained but the citizens were made responsible for maintaining it (Boonstra *et al.*, 2014). A similar situation could occur if a municipality wants to pave a certain area (to reduce maintenance costs or prevent people from hiding there). In the summer, the paved area would heat up, undermining the quality of life of the people living nearby. These people might convince the municipality to retain the green space provided they assume formal responsibility for its maintenance and safety, since they are the ones benefitting the most from it.

### § 2.4.3 Incentives

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According to De Monchaux and Schuster (1997), the governance tools in the third group, based on incentives, are 'designed to bring the actions of other actors (...) in line with a desired policy'. They focus on the activities undertaken by housing associations. If they do the right thing, they will be rewarded. Incentives can be based on economics or simply have a social background, based on the image that housing associations have among their stakeholders. In the latter case, the governance tools are concentrated in the societal autonomy section, without much state intervention. The category of incentives includes the following tools:

**Subsidies:** Money to incentivise the implementation of climate change adaptations (Murphy *et al.*, 2012).

**Green loans/mortgages:** Money that can be borrowed at low interest rates, on the condition that it is used to invest in climate change adaptation measures (Murphy *et al.*, 2012).

**Tax incentives:** To stimulate investment in adaptation measures, the government can reduce the VAT rate, or allow tax deductions to make the investment financially more attractive (Murphy *et al.*, 2012).

**Contests:** In a contest, housing associations compete with one another to show who has applied the best adaptation measures. An independent jury assesses the quality of the proposals (SEV, 2011).

**Social:** Corporate Responsibility: To demonstrate to their stakeholders that they are committed to the comfort and well-being of their tenants, housing associations can apply climate change adaptation measures proactively (CEC, 2001).

**Voluntary and negotiated agreements and covenants:** The local or national government can draw up agreements or covenants with housing associations that require both parties to take steps to implement climate change adaptation measures. Two main types of agreements can be distinguished, voluntary and negotiated, the former being less binding than the latter (Bressers *et al.*, 2009).

**Benchmarks:** A benchmark compares housing associations to one another on the basis of unified parameters. The benchmark rates the performance of housing associations. Regarding climate change adaptation, a benchmark could be developed relating to the resilience of the housing association to climate change (Aedes, 2014).

#### § 2.4.4 Regulation

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The fourth group is regulation. De Monchaux and Schuster (1997) explain that ‘the state might choose to regulate the actions of other actors, particularly those private individuals or institutional entities that own and occupy (...) resources’. Laws and regulations can be imposed on housing associations. Directly related to the system of regulation are enforcement measures, which may include fines that have to be paid if the requirements on a certain topic are not met, for example. Regulation tools include the following:

**Building Code – new construction:** In this document, the national government prescribes the basic quality requirements of a new building. It can include requirements regarding climate change adaptation (MinIKR, 2014).

**Building Code – renovation:** The basic quality requirements for new construction projects as laid down in the Building code also apply in the case of major refurbishment works, so this is also an opportunity to enforce the implementation of climate change adaptation measures (MinIKR, 2014).

**Enforcement of quality – existing stock:** The government can order changes to existing buildings if these have shortcomings that threaten the safety or health of their inhabitants (Van Leeuwen *et al.*, 2014). Theoretically it is possible that climate

change will lead to unsafe situations for citizens, and measures to mitigate these effects are required. This could occur when a building becomes unstable after flooding, if raw sewage flows out of the sewage systems during a flooding event, or if interiors frequently overheat during heat waves.

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## § 2.5 General evaluation of tools

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Although all these governance tools have their advantages, many are currently less feasible in relation to the implementation of climate change adaptation measures by housing associations. For example, the outcome of tools based on information provision are very difficult to measure (Murphy *et al.*, 2012). What is more, cognitive dissonance (Festinger, 1962) can easily occur, by which is meant in this thesis that people tend to hear what they want to hear and ignore the warnings of the impacts of climate change. The disadvantage of subsidies is that the desired behaviour (the implementation of adaptation measures) is caused directly by the incentive (Maller and Horne, 2011), so if the incentive stops, so will the desired behaviour (Murphy *et al.*, 2011). Political incentives though, could be feasible, for instance if housing associations and municipalities sign a covenant (Bressers *et al.*, 2009) in which they agree to apply adaptation measures. Both parties have long-term shared interests, so they are willing to take action to help and reward each other.

The development of regulatory governance instruments is not consistent with the trend of deregulation in construction (Commission Dekker, 2008). Regulatory tools are associated with the risk that the building design will aim to fulfil minimum requirements and no more. This means that there is no margin for error during the construction phase or in the usage phase. A study in the Netherlands in 2007 showed that such a 'minimalistic building' can result in serious losses in quality. Compliance was investigated in 108 dwellings with the EPC (Energy Performance Coefficient), an instrument that indicates the energy performance. In 25% of the cases the EPC calculations were incorrect, even though they had been (or were supposed to be) verified in order to be awarded a building permit. In addition, the performance of the finished dwellings was unsatisfactory in 47% of cases (Kuindersma and Ruiters, 2007).

Moreover, as climate change is surrounded by uncertainty (Willows and Connell, 2003), setting clear rules, enforcing them, and the financial implications of those rules, makes the category of regulatory tools less likely as a starting point. In addition, the establishment of a new regulatory institution would involve high transaction costs (Pahl-Wostl, 2009).

This means that new tools need to be found to widen the palette of available tools and existing tools have to be combined to increase the adoption of climate change adaptation measures. After all, there is no single 'perfect' tool that will solve all the problems at once (CEC, 2009; Murphy *et al.*, 2012).

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## § 2.6 Partnering

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The construction process and the networks described in the network governance literature have in common that, according to Jones *et al.* (1997) both involve "... a select, persistent, and structured set of autonomous firms (as well as non-profit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard exchanges. These contracts are socially – not legally – binding" (p. 914). According to Jones *et al.* (1997), four conditions need to be met for network governance to be feasible. The first condition is that demand is uncertain, which in the construction sector is caused by inherent fragmentation within the sector. Secondly, the buildings delivered by the sector are highly customised products assembled by people specifically skilled for that task. Thirdly, in order to complete a building, many specialist activities need to be carried out by workers over a limited period of time. Finally, the work is carried out by many workers simultaneously at a single location, leading to frequent contact between the workers.

The construction process that is currently followed, on the basis of detailed project descriptions and selections of the lowest bidder (Van de Rijt and Santema, 2013), is frequently criticised for not always delivering modern standards of quality and having high failure costs (Egan, 1998; Chao-Duivis and Wamelink, 2013). To enhance quality in construction projects, it is often suggested that construction firms cooperate in such a way that there are no company boundaries to limit the free flow of knowledge and experience (Blayse and Manley, 2004; Dulaimi *et al.*, 2002; Egan, 1998). A partnering approach is one of these forms of collaboration (Hughes *et al.*, 2012). Throughout this thesis, the definition of a partnering approach is used as developed by the Construction Industry Institute (CII, 1991) is used: "A long-term commitment by two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organization boundaries. The relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost-effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services."

In the construction sector, 'partnering' is the most widely used term to describe collaborative project delivery method (Jacobsson and Roth, 2014). Other methods are relational contracting, project partnering, strategic alliances, project alliances, programme alliances, integrated project delivery and early contractor involvement (Chen and Manley, 2014; Jacobsson and Roth, 2014; Lahdenperä, 2012). What the methods have in common is that contracts between the construction parties and the client are not transactional, but relational, being based on trust and the equal division of risks and benefits (Lahdenperä, 2012).

According to Kim et al. (2010), the following factors are vital to a successful partnering approach: leadership, commitment, coordination, trust, communication, conflict resolution techniques and partner capabilities.

Parallel to the body of literature that deals with the collaborative project delivery methods mentioned above, the 'terms supply chain management' (e.g. Vrijhoef and Koskela, 2000; Bankvall et al., 2010) or 'supply chain integration' (e.g. Briscoe and Dainty, 2005) are in use. Tennant and Fernie (2013) defined these methods by distinguishing between client-led and contractor-led supply chains. In the latter, the priority is optimising the supply chain between the contractor and his sub-contractors. In a client-led supply chain, the client has an important role in managing the supply chain and in these supply chains relational project delivery methods are common practice (Tennant and Fernie, 2013). In the Dutch literature, the widely used term is 'ketenintegratie' which means supply chain integration. According to Gruis (2011), supply chain integration comprises four dimensions: the integration of all phases of the construction process and of all companies in the supply chain; continuity in the work by means of multiple projects; transparent and equal sharing of risks. Within all these dimensions, the client plays a central role, so Gruis' characterisation can be considered as client-led supply chain integration. In this thesis, which is set in the Dutch context, the term 'partnering' has been used to translate 'ketenintegratie' rather than 'client-led supply chain integration', because the broader description of partnering leaves room for several secondary approaches. These are indeed present among Dutch housing associations (Rodgers et al., 2013), although in the majority of cases a dyadic approach is taken, namely a partnership between the housing association and the general contractor (Bygballe, 2010).

The collaborative project approach is interesting not only from the point of view of efficiency and effectiveness, but also when it comes to information sharing, because of the organisational learning effect. This occurs in partnering projects because the experience and tacit knowledge gained in one project is transferred to the next because the project team stays together (Bresnen, 2009). Learning is identified as important for improving organisational performance (Wu and Chen, 2014) and it enhances competitive advantage (Jerez-Gómez et al., 2005).

For the implementation of climate change adaptations in social housing, the learning effects of the partnering approach are important because these adaptations are new to the sector and they should be considered an ongoing social learning process (Hinkel, 2011). The dissemination of solutions will occur much more easily if the parties learn from one another and the problem is analysed from a range of viewpoints.

To date, some Dutch housing associations have begun to experiment with the partnering approach in their projects (Roders *et al.*, 2013; Vrijhoef, 2011). It can be expected that others will follow, considering the expected benefits of partnering according to the CII (1991) definition. Research has also proven that an integrated approach leads to lower costs (Thompson and Sanders, 1998) and shorter lead times (Salcedo Rahola, 2015). In addition, it is reasonable to expect that the adoption of partnering by housing associations will accelerate. Their current financial situation means that they have to become more efficient and the government is forcing them to focus on their core task: providing homes for those who cannot do this on their own. The refurbishment and maintenance of dwellings could easily be outsourced from that point of view.

## § 2.7 Discussion and conclusion

Although a number of governance tools are available that could stimulate the adoption of climate change adaptations by housing associations, there are serious issues that prevent the use of many of these. The likelihood of using financial incentives and regulation is decreasing, and the effectiveness of information tools are difficult to measure. This leaves room for the development of new governance tools, in order to maintain a wide palette of tools to encourage action on climate change adaptations.

The construction process as a governance tool would be a combination between a market tool and a network tool. The market aspect relates to the knowledge of climate change adaptation that is gained by the participating construction companies, which may imply a competitive advantage for them. The network aspect is closely linked with the collaboration that is central to the partnering approach.

Networks are considered an effective type of governance to deal with climate change issues because of their capability to deal with uncertainties. The flexible structure of networks and the participation of many different actors provides a good basis for innovative solutions, because problems are perceived from various viewpoints. The construction sector has had a long and continuous relationship with housing associations. For many years, housing associations have been adapting their building stock for reasons other than climate change adaptation. These adaptations have generally been carried out by the construction sector. Existing governance tools focus largely on building owners when addressing physical adaptation measures, assuming that it is the owners who will initiate a process where they order the construction sector to implement changes. However, the construction sector is highly fragmented, which creates several obstacles to the easy adoption of new measures. The partnering approach can remove those obstacles. All in all, it is worth exploring the feasibility of using the partnering approach as a governance tool.

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