6 The role of the architect using integrated contracts for social housing renovation projects

Explanatory note

Previous research papers focused on analysing the implementation of integrated project delivery methods for social housing renovation projects. The focus was mainly on the demand side, the social housing organisation. However, in the second research paper (Chapter 4) the implication for all actors involved in the renovation process has been analysed and it is concluded that the bigger process changes compared to traditional Design-Bid-Build approaches occur during the design phase. It has been also highlighted in the first research paper (Chapter 3) that the role of the professional in charge of the design phase, the architect, could considerably change when integrated project delivery methods are used instead of Design-Bid-Build. That is why the following research paper focusses on the role changes of the architect, as a way of looking at the process from the demand side. As indicated in the thesis conclusions, the analysis of the supply side as a whole and of its individual members when using integrated contracts, is a topic for further research.

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Abstract

The use of integrated contracts in the Dutch construction sector has increased in recent years. Integrated contracts presume facilitating a much more effective process than traditional delivery methods, saving money and time, as well as improving quality. Formally this type of contracts was only used for large and complex infrastructure projects and new buildings. In the last five years, however, they have been used also in the social housing sector for renovation projects, and have led to positive project outcomes. In this kind of projects, the supply-side actors work together in a team formed by an architect, consultants and construction companies; commonly referred to as a consortium. Currently, there is a lack of knowledge about the formal and informal links between the members of a consortium and their specific roles. This research helps to understand the tendering procedures and organisational typologies of consortia working with integrated contracts and especially the inherent changes in the role of the architect, e.g. type and amount of work, and relations with the client and consortium members. The study is based on a series of interviews with architects working with integrated contracts in social

housing renovation projects. The findings indicate that in the majority of these projects, the architect is contracted by the main contractor rather than by the social housing organisation. The new contractual relationship has no significant effect on the relationship of the architect with the social housing organisation and improves the relationship of the architect with the main contractor, consultants and advisors, and other specialist contractors involved. The architect switches from the role of designer to that of technical and aesthetic advisor, compared to traditional Design-Bid-Build projects.

Keywords: architect role; construction procurement; integrated contracts; renovation; social housing.

§ 6.1 Introduction

In the Dutch construction sector, the concept of 'integrated contracts' refers to contracts that include both design and construction work in a single contract, but they can also include maintenance, finance and/or operation (Chao-Duivis & Wamelink, 2013). This definition is based on the approach used by Name and Tatum (1992), who used the term integration to mean "integration between design and construction". The same approach has been used by several other authors when researching the performance of Design-Build projects in relation to the degree of integration (e.g. Anumba and Evbuomwan, 1997; Cheng & Tsai, 2007; Elvin, 2010; Mollaoglu-Korkmaz et al., 2013; Pocock, 1996). In recent years, another dimension has been added to the concept of integration - namely the formal share of risk and rewards among the actors involved in the construction process. This is the case in Project Alliances and Integrated Project Delivery contracts that include a multiparty agreement to specify the share of risks and rewards between the actors involved (El Asmar et al., 2013; Lahdenperä, 2012). Such a multiparty agreement is not part of the definition of integrated contracts in this paper.

One of the main characteristics of integrated contracts is that the companies in charge of the construction process, and in some cases also maintenance and operation, are involved in the project from the beginning of the design phase. This allows them to participate in design decisions and to contribute their practical knowledge at this early stage. Integrated contracts are generally assumed to result in lower costs, better performance and lower risks as a result of a collaborative environment and output specifications (Akintoye et al., 2005; Blayse & Manley, 2004; Leiringer, 2006; Korkmaz et al., 2010; Molenaar et al., 1999). The use of integrated contracts in the Dutch construction sector has become more frequent in recent years, totalling 8.9% of all public construction contracts published on the main Dutch tender database in 2011 (www.aanbestedingskalender.nl) (Hardeman, 2012).

Initially, this type of contract was only used in the Netherlands for large and complex projects (Boes & Dorée, 2008), but in the last five years they have also been used in the social housing sector for new construction and renovation (Hal et al., 2011; Savanović et al., 2012). In fact, the use of these contracts in renovation gained particular momentum in 2008, when the shared goal of the national government and social housing organisations (SHOs) to reduce the energy consumption of their housing stock led to the 'Covenant for energy savings'. This covenant specifies the goal of upgrading the whole of the Netherlands' social housing building stock to an 'average' Energy Performance Certificate (EPC) rating of 'B'. In the Netherlands, social housing accounted for 32% of the total national dwelling stock in 2008 (Pittini & Laino, 2011). Since 1995, social housing organisations in the Netherlands have been autonomous self-financing organisations (Ronald & Dol, 2011). As such, they are not required to comply with public procurement rules.

In projects that make use of integrated contracts, the supply-side actors work together in a team made up of the architect, the consultants and the construction companies – commonly referred to as a consortium in the Netherlands. Currently, little is known about the role of each of the consortium members and the formal and informal relationships between them. Present literature focuses mainly on the dyadic relationship between the client and the consortium or between the client and the main contractor (Bygballe et al., 2010). Some research has been carried out in recent years into the formal and informal relationships between the members of temporary multi-organisations (TMOs) in construction, and this can be applied to the consortium structure (Blois et al., 2011; Lizarralde et al., 2011). Studies into TMOs take account of all the members involved: client, main contractor and specialised contractors. However, in the projects analysed in these studies, the architect is always treated as simply one more specialised contractor and no specific attention is given to changes in his specific role.

The few studies into integrated contracts that refer to the role of the architect have flagged up changes in this role relative to the traditional Design-Bid-Build approach. Previous research into construction projects in the Netherlands that use integrated contracts have reported that the leading role in the consortium is taken by a construction company that acts as the main contractor (Volker & Klein, 2010). The client has a contract with the main contractor and the main contractor subcontracts all the other companies involved, including the architect. In the UK, where integrated contracts are used widely, a similar contractual structure has been reported (Greenwood et al., 2008). The same contractual arrangement is described by Raisbeck (2008) who, based on the analysis of a large Design-Build project in Australia, discusses the architect's liability for project outcomes when subcontracted by the main contractor. Design liability in Design-Build contracts is also the focus of the study carried out by Chan and Yu (2005) in Hong Kong based on a survey and interviews with construction professionals representing the owner, the designers and the main contractors.

In consortia where the architect and the main contractor sit on the same side of the table, the tasks and responsibilities of each one are not always clear for the client (Sebastian, 2011). If the architect is contracted by the main contractor, the main contractor becomes the client of the architect rather than of the building owner, and as such the role of the architect as advisor to the building owner could be compromised. On the other hand, numerous comparative studies concerning the use of integrated contracts in large construction projects have reported an improvement in the cooperation between consortium members (Akintoye et al., 2005; Konchar & Sanvido, 1998; Leiringer, 2006).

In projects that employ a Design-Bid-Build approach, the architect and the construction companies only begin communicating when the design has been completely finalised and they have clearly different responsibilities with regard to the building owner. Under this set-up, in which architects and construction companies need to focus primarily on their own responsibilities, communication between them tends to be formal. In projects that use integrated contracts, the architect and construction companies sit on the same side of the table and, from the point of view of the building owner, they share related responsibilities. Moreover, they are both involved in the design phase, meaning that there is intensive communication between them during this phase. This is expected to lead to less formality in their communication (Hoezen & Volker, 2012).

Because the construction companies participate in the design phase, architects can take faster decisions regarding the viability (price and technical feasibility) of various design alternatives. Moreover, compared to a Design-Bid-Build approach there is no need for a works tender after the design has been completed. The combined effect of these two factors is that the design phase can be shortened considerably, as reported in previous research into two French social housing renovation projects (Salcedo & Straub, 2014).

In short, the use of integrated contracts may have changed the characteristics of the work performed by the architect as well as his relationship with the building owner, and with the other companies involved. The research question addressed in this paper is:

How do the role of the architects in renovation projects of social housing organisations (SHOs) making use of integrated contracts differ from their role in previous comparable Design-Bid-Build projects?

A better understanding of the changes in the role of the architect will help to oversee the future prospects for architects working in the field of housing renovation. It therefore provides useful insight for educational reform to prepare students and practising architects to make the most of the new situation.

First we will describe the research methods used. This will be followed by a presentation and discussion of our findings. Finally, in the conclusion, the main findings will be highlighted and the limitations of this research and recommendations for further research will be outlined.

§ 6.2 Research methodology

Firstly, we searched a range of websites listing innovative construction projects in order to identify social housing renovation projects using integrated contracts that had either been completed or were in their construction phase. This search included: Agentschap NL (Agency of the Dutch Ministry of Economic Affairs), Energie Sprong (a programme for innovation in construction, initiated by the Dutch Ministry of the Interior and Kingdom Relations) and Passief Bouwen (Dutch passive house organisation). We also requested the assistance of experts at several organisations in order to identify this sort of projects. These organisations included SBRCURnet (a Dutch construction knowledge network organisation), Vernieuwing Bouw (a Dutch construction renovation knowledge network organisation), Noorderberg (a firm of consultants specialising in integrating the construction supply chain), and several other experts.

In total, 21 social housing renovation projects using an integrated contract with the involvement of an architect were identified in the period 2005-2013. All the projects were tendered as Design-Build contracts and some of them included the possibility of Maintenance a posteriori. In the Netherlands, it is not mandatory for an architect to participate in a renovation project. Nevertheless, it is common practice to involve an architect when the façade is modified, because an architect is the most competent professional to present the project to the local Welstandscommissie ('Building Aesthetics Committee'), which advises the municipality on whether the design of a building suits its surroundings, in order to obtain the construction permits.

The architects involved in the renovation projects were invited to participate in the research by e-mail and by telephone. Of the 21, 13 accepted. The participating architects were interviewed using a semi-structured questionnaire with open and closed questions; interviews lasted an average of 90 minutes. The 13 interviews were the main source of information for this study. This was supplemented with information published on the websites of the actors concerned: SHOs, firms of architects and construction companies.

The renovation projects were mainly carried out on terraced housing. The size of the projects varied between 24 dwellings and 290 dwellings and the investment per apartment ranged from approximately €20,000 to €120,000. A summary of the characteristics of the projects is presented in Table 6.1.

	PROJECT LOCATION	NUMBER OF DWELLINGS	TYPE OF DWELLINGS	TENDER	INVESTMENT PER DWELLING IN EUROS
1	Leiden	252	Terraced houses	Non-competitive	56,500
2	Leek	45	Terraced houses	Non-competitive	80,000
3	Hoek van Holland	52	Terraced houses	Non-competitive	120,000
4	Drunen	25	Terraced houses	Non-competitive	45,000
5	Haarsteeg	32	Terraced houses	Non-competitive	100,000
6	Almere	246	Apartment block	Non-competitive	23,000
7	Zwolle	148	Terraced houses and apartment blocks	Competitive	70,000
8	Biddinghuizen	80	Terraced houses	Competitive	40,000
9	Zwolle	24	Terraced houses	Competitive	108,333
10	Krimpen aan den IJssel	240	Terraced houses	Competitive	80,000
11	Ulft	54	Terraced houses	Competitive	80,000
12	Ulft	115	Terraced houses	Competitive	81,739
13	Leeuwarden	290	Terraced houses and apartment blocks	Competitive	19,931

TABLE 6.1 Overview of projects analysed

The contractual organisation that was put in place in the thirteen projects is analysed in this research to confirm the trend identified in previous studies and/or to find other possible models for contractual organisations. The architects' views of the changes in their role and in their relationship with the social housing organisation and construction companies compared to Design-Bid-Build projects were gathered using interviews. A summary of the data obtained from the interviews is presented in the next section, together with direct quotes to demonstrate the validity of our analysis.

In order to characterise the type of work, four parameters were taken into account in this research. The interviewed architects were asked to compare the analysed projects to similar previous projects developed using a Design-Bid-Build approach. They were asked to consider the following aspects specifically:

- Type of work
- Amount of work
- Time distribution of the work
- Payment for work.

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To evaluate the changes in the relationships with the SHO and the construction companies, the architects were asked to make an overall comparison of the quality of these relationships compared to Design-Bid-Build projects. They were also asked to evaluate the parameters of their relationship, namely the confidence that the SHO had in them and the sharing of information with the construction companies.

§ 6.3 Findings

§ 6.3.1 Tendering procedures

Two types of tendering procedures were identified among the analysed projects - non-competitive (six projects) and competitive (seven projects) (see Figure 6.1 for details).

In the non-competitive procedure, the selection of the consortium is commonly based on criteria unrelated to the project (e.g. capacity for team work, sustainability vision or capacity to innovate) and their previous experiences. The common practice is that only invited candidates participate in the selection procedure. In two of the projects using the non-competitive procedure there was no selection procedure and the successful candidate was appointed directly. The design work begins after the consortium has been selected. When the preliminary design is finished there is often a green light procedure – a moment when the SHO decides if it will proceed with the project and when the budget is finalised.

Under the competitive procedure, there is a pre-selection and a selection phase. The pre-selection phase is based on criteria unrelated to the project; usually, a limited number of candidates are invited directly to participate in the pre-selection process by the SHO but in some cases the SHO issues an open call. The pre-selected candidates are then invited to participate in the selection process, which is based on the evaluation of the preliminary design proposals. This means that prior to the selection of the consortium, most of the design work has already been completed. In six of the seven projects using the competitive procedure, three candidates were invited to the selection phase, while in the seventh case four candidates were invited. After the consortium has been selected, there is still some design work to be done to refine the initial design proposal. The size of the sample, thirteen projects, did not allow us to make a statistical analysis. However, some differences can be identified between the competitive and non-competitive projects.

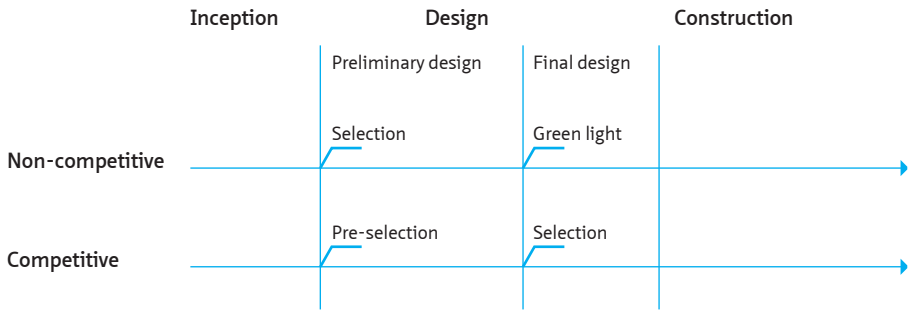


FIGURE 6.1 Phases of non-competitive and competitive procedures

§ 6.3.2 Contractual arrangements

In the Netherlands, there is no legal definition for a construction consortium and neither could a common definition be derived from the interviews. Different names were used by the interviewees to refer to the consortium; e.g. consortium, co-makers, co-creators or building team. In some cases, the consortium bore a resemblance to the TMO concept defined by Blois et al. (2011). The TMO is composed by all companies involved in the design and construction phases. In other cases, not all the companies involved in the design and construction were considered members of the consortium. For example, in some of the analysed projects, the actors that had a real influence on design decisions – the firm of architects, the main contractors, advisors and some specialist contractors (e.g. manufacturer of pre-fabricated façades, manufacturer of windows) were considered consortium members, while the other specialist contractors involved in the project were not considered members of the consortium.

Four different types of contractual arrangements with architects were identified – please refer to Table 6.2 for details. The most common arrangement was that the firm of architects was contracted by the main contractor. In these projects, the initiative for creating the consortium came from the main contractor. In only one of the ten projects where the architect was subcontracted by the main contractor did the initiative for the consortium come from the firm of architects.

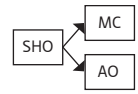
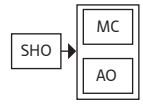
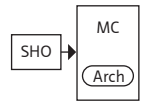
	CONTRACTUAL STRUCTURE	NUMBER OF PROJECTS
Architects office subcontracted by main contractor		10
Architects office contracted by the SHO		1
Architects office co-owner of a joint company		1
Architects employed by the main contractor		1

TABLE 6.2 Projects using each contractual arrangement

In none of the analysed projects did the firm of architects act as the main contractor and only one of the interviewed architects said that that would have been possible for his office. The financial risk involved in Design-Build projects was said to be too high to be taken on by architects alone. Limiting the scope for financial risk has already been cited by Wamelink et al. (2012) in his proposal for designer-led Design-Build projects, in which he advocates a leading role for architects.

Six out of thirteen architects declared that they shared some degree of risk with the main contractor. In two cases, this was because the architect and the main contractor belonged to the same company: in one case it was a joint company, with the architect owning 1.5% of the shared company; in the other case the architect was an employee of the main contractor. In the other four projects, an agreement on risk sharing had been reached: in three cases this was a limited percentage of the agreed architectural fees and in the fourth case the main contractor reserved a share of the budget to cover possible shortfalls – in the event that this money remained unused, it was to be shared among the consortium members as a bonus.

§ 6.3.3 Nature of work

The majority of the architects interviewed, nine out of thirteen, considered the working method to be different from comparable Design-Bid-Build projects, and eight of them explained this in similar terms. In Design-Bid-Build projects, the architect is in charge of proposing design solutions and giving a detailed description. With a consortium, on the other hand, the architect is in charge of collecting the proposals from all those

involved in the design, facilitating the design choices and taking care of the aesthetics of the project. One architect commented: "It is the same type of work but there is a different ratio between making drawings and giving advice. You act more like an advisor than a designer." However, the change in the nature of the work does not translate clearly into the amount of work done by the architect in each project. There was no significant difference between the competitive and non-competitive approaches in relation to the quantity of work. Please refer to Table 6.3 for further details.

		WORKLOAD		
Type of work		Less	Similar	More
Similar	Non-competitive	1	0	2
	Competitive	1	0	0
Different	Non-competitive	1	0	2
	Competitive	1	3	2

TABLE 6.3 Type of work and workload per project

In three of the four projects in which the architects reported a reduced workload, the claim was made that the constructor had taken on some of the duties that would previously have belonged to the architect. The fourth architect argued that because of the new set-up, the design process was more efficient and as a result there was a reduced workload.

No single reason emerged among the six architects that reported an increased workload compared to similar Design-Bid-Build projects. Three architects argued that the main contractor allocated them extra tasks that he believed the architect was the most competent to carry out. In two projects the extra tasks involved communication with tenants and in the other project they related to site supervision. The other three architects that reported a higher workload stated that this related to the specifics of the project: the fact that it was a pilot project, the fact that it was a renovation project (every house being slightly different) or the fact that BIM (building information modelling) was implemented.

In only one of the analysed projects BIM was implemented. It was not entirely successful because the firm of architects needed to use BIM and more traditional information tools in parallel because the small, specialised contractors involved in the project had no experience of working with BIM systems.

In reference to the time taken for the architects' work, one important difference was observed between projects with a non-competitive approach and projects with a competitive approach. The design phase in projects with a non-competitive approach was on average over twice as long as the projects with a competitive approach (see Figure 6.2 for details).

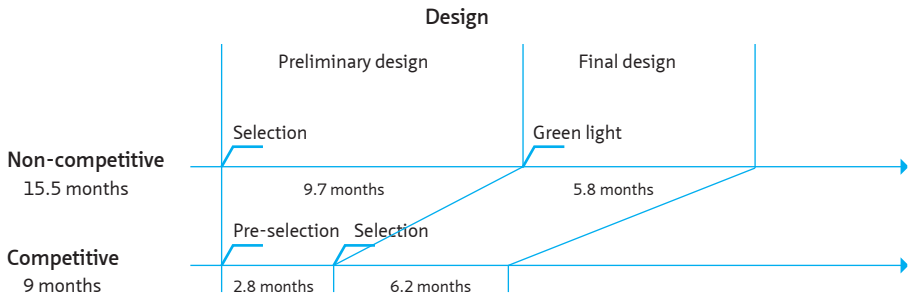


FIGURE 6.2 Average duration of design phase in months

Under the competitive approach, the selection of the consortium is based on the preliminary design presented by the candidates. The length of the selection procedure is defined by the SHO, which obliges the participating consortia to develop and submit their design proposals within a specific timeframe. The consortia participating in projects with a competitive approach needed an average of 2.8 months to develop their preliminary design.

Under a non-competitive process, the preliminary design is developed between the selection of the consortium and the green-light procedure. The average time for this phase among the analysed projects was 9.7 months, almost 3.5 times longer than for the competitive projects. One factor that needs to be taken into account is the tenants' approval of the renovation project. In the Netherlands at least 70% of the tenants need to approve such a project before it can proceed (Dutch civil code, BW 2 A.220.3). Under the non-competitive approach, the tenants' approval is given during the preliminary design phase while under the competitive approach it is given after the selection of the winning consortium. However, this does not result in a significant delay under the competitive approach in the final design phase: this is 6.2 months in comparison with 5.8 months under the non-competitive approach.

In relation to payment for the work done by the architects, no difference was reported in the hourly fee by any of the architects. Some of the architects that reported a lower workload per project indicated that they would need more projects per year in order to maintain a stable income.

It must be added, however, that the architects participating in competitive tenders ran a considerable risk of getting paid less for their work in the event that their consortium was not selected. Under the competitive approach, the majority of the architect's work is done before the tender and if the architect is not selected, they receive no payment for this work. In all the competitive tendered projects the SHO did pay some compensation to the non-selected candidates, ranging from €5,000 to €50,000.

However, this compensation does not cover the costs incurred by the consortium developing the offers, or even the cost of the firm of architects.

Of the seven projects with a competitive tender, three architects agreed with the construction company prior to the competition that they would receive full or almost full payment for their work. In three cases, they had agreed to be paid for 50% of their hours and in one case they had agreed to be paid for 33% of their hours.

§ 6.3.4 Relationship with the SHO

Compared to previous similar Design-Bid-Build projects the contractual relationship between the architect and the SHO changes in integrated projects because in the majority of the cases the SHO is no longer the client of the architect, but of the main contractor (please refer to Table 6.2 for details). However, the new contractual situation does not adversely affect the quality of the relationship in the opinion of the interviewed architects and in some cases it actually had a positive influence. Of the ten projects in which the architect was contracted by the main contractor, six rated the quality of their relationship with the SHO as similar to previous Design-Bid-Build projects, three as better and only one as worse. There was no significant difference between the competitive and non-competitive projects (please refer to Table 6.4 for details). In the other three projects, in which the architect was not contracted by the main contractor, the architects rated their relationship with the SHO as better than in previous Design-Bid-Build projects.

	WORSE	SIMILAR	BETTER
Non-competitive	0	4	2
Competitive	1	2	1

TABLE 6.4 Rating of the architect-SHO relationship in comparison to previous similar Design-Bid-Build projects for projects where the architect was contracted by the main contractor

In the interviews the architects were also asked if they thought the SHO's confidence in them was less than in previous similar Design-Bid-Build projects and the answer was a unanimous 'no'. However, five of the six architects who rated their relationship with the SHO as similar believed that their position as a professional had been compromised because they had been contracted by the main contractor and not by the SHO.
One architect said: "The distance is a bit bigger. You feel that who pays decides and that has an influence. We knew the SHO and all the others sitting around the table and we had close contact with them, but communication went through the filter of the main contractor. Before a proposal arrived at the SHO, it was checked for financial feasibility. It is a slightly different role for the SHO."

In the one case where the relationship was rated as worse than previous experiences, the architect was involved in the project when the SHO and the main contractor had already begun negotiating about the project; it was one of the projects with a non-competitive process. The main contractor was in charge of communicating with the tenants and in this case was not entirely successful because the approach taken was too technical. At a certain stage of the project, the SHO decided that it would feel more comfortable if it was in charge of the contract with the architect. After this contractual change was made, the project developed without major incidents.

In the three projects in which the architect was contracted by the main contractor and rated its relationship as better, it was argued that the SHO communicated very effectively with the consortium during the design phase. One of the architects said: "I think the relationship was better because together with the contractor you are in front, you are a strong team. It is not just you as an architect dealing with the housing corporation. You are supported by the contractor."

§ 6.3.5 Relationship with the construction companies

Nine out of the thirteen architects considered the relationship between the architect and the construction companies involved in the renovation project to be better than in comparable Design-Bid-Build projects (please refer to Table 6.5 for details). None of the architects interviewed rated their current relationship as worse and four rated it as similar. Three of the four architects that rated the relationship as similar stated in the interview that they had previously had a good relationship with the construction companies and the relationship had simply not changed.

	WORSE	SIMILAR	BETTER
Architects – Construction companies	0	4	9

TABLE 6.5 Architects' opinions about their relationship with the construction companies compared to previous similar Design-Bid-Build projects

All the architects stated during the interviews that they had direct feedback from the construction companies during the design phase meetings and also that the communication by electronic means was fast, which avoided delays in taking design decisions. One of the architects said: "The relationship is better because you get to know each other through the intensive collaboration. The attitude of the parties is important to promote a spirit of cooperation."

Three electronic communication methods were used by the architects during the realisation of the projects: e-mail (seven), a project webpage that allowed communication and the storage of large files (five), and BIM (one). The architects who made use of the simplest electronic communication method, e-mail, had a generally positive experience. One of the seven architects thought that communication could be improved by using a project webpage because it would facilitate keeping track of the design decisions. Four of the five architects who used a project webpage were not particularly positive about their experience, commenting that the project webpage was used mainly to store large files but communication had been still been conducted by e-mail. The architect that was involved in the project that used BIM commented in the interview that it was not practical in their project because not all the subcontractors had used it. Only one of the architects using the project webpage had had a positive experience of it and stated that in future projects they would probably use BIM.

A significant proportion of the communication between architects and construction companies in the form of drawings and technical specifications (Styhre and Gluch, 2009). In order to assess the formality of communication between architects and the construction companies, the architects were asked about the level of detail in the drawings they passed to the construction companies. Ten of the thirteen architects interviewed considered that the level of detail in communications with the construction companies was lower than in comparable Design-Bid-Build projects (please refer to Table 6.6 for details).

	LOWER	SIMILAR	HIGHER
Level of detail	10	2	1

TABLE 6.6 Level of detail in the communication between architect and construction companies compared to previous similar Design-Bid-Build projects

The interviewees commented that drawings for comparable Design-Bid-Build projects are developed to a high degree of detail while some of the drawings used in the projects were only elaborated up to a sketch level. For example, where prefabricated façades were used, the construction company in charge of that part of the project would work on the detailed drawing of the façade while the ensemble was supervised by the architect.

When asked whether the level of detail in communications with the constructor was the same, one of the architects commented: "I relied a bit on the expertise of the builder. We did not need to detail everything because they are just as capable of doing a proper job. We only interfered in the section of the roof, because the roof was completely renewed and the contour of the building was changed. There we did some detailing."

The two architects that stated that the level of detail in the drawings was the same, who were both participating in a competitive procedure, explained that the preliminary designs presented for the selection procedure were already at the level of detail of final designs. The only architect that declared a higher level of detail explained in the interview that the construction companies involved in his project had no previous experience with the passive house standards used for the project.

§ 6.4 Discussion

The findings show that in the new set-up the architect is in a different position in relation to the client and the construction companies compared to Design-Bid-Build projects. The new set-up brings with it new game rules and also defines some new roles: architects still have a central position in elaborating design proposals, but their duties and power to make decisions are reduced because they are no longer in the leading role.

§ 6.4.1 Initiative

Taking the initiative, and as such taking the leading role, is generally associated with the party that bears the financial risk. In the analysed projects the initiative among the consortium members was mainly taken by the main contractor. This is in line with what has been previously found in other studies (Greenwood et al., 2008; Raisbeck, 2008; Volker & Klein, 2010). In some of the interviews, a certain degree of resignation was expressed over the fact that the architects had lost some of their decision-making power. Three strategies were identified as possible alternatives for regaining some of that decision-making power by taking a higher level of initiative.

The first strategy is to place the architect's firm at a similar or even higher level of responsibility than the main contractor. To give the architect a higher level of responsibility means that the architect's office would assume the role of the main contractor, both in terms of organisation and financial risk. This option, mentioned by one of the interviewees, would only be feasible for large firms of architects and as such, would not be feasible for the majority of architecture firms in the Europe. Just 4% of architectural practices across Europe have more than five employees (ACE, 2012). The idea of the architecture office taking the leading role has already been covered in a previous study by Wamelink (2012).

The second strategy, for smaller architect's offices, is to place themselves at a similar level to the main contractor by creating a joint company. The only joint company created among the analysed consortia was the product of an initiative by the architect's office and in that joint company, the architect's office only participated with a small percentage, related to the risk it could bear. Companies other than the architect's office and the main contractor can also participate in the joint company. The idea of sharing the profits and the risks in order to obtain the same level of commitment from the main actors involved in construction projects is not new. Projects that use multiparty agreements such as Project Alliancing or Integrated Project Delivery have the same goal, but these approaches have not been applied to housing projects in the Netherlands as yet.

The third strategy is for the architect to play the role of 'team integrator'. Even though formally the initiative and the leading role are taken by the main contractor, the design choices are still made with the participation of the consortium members. In the consortium, the architect can act as a technical and aesthetical advisor – an idea that was expressed in some of the interviews – and leave the design choices for the main contractor; alternatively the architect can take on the role of team integrator. The team integrator ensures the involvement of all the actors in developing the design and making design choices and ensures that the joint knowledge of the consortium members is used to produce the best design proposal. Previous research by Renier and Volker (2009) in the Netherlands has already shown that architects are well prepared for the role of team integrator, but our research shows that more initiative is required from the architect to prevent another consortium member from taking this role. Moreover, new skills are needed to become a good team integrator.

§ 6.4.2 Skills

In order to apply the strategies proposed here, it is necessary for architects to acquire extra project management skills and team management skills. Architects need extra project management skills to evaluate their role as a leading or co-leading team member and the associated risks. For example, in the project in which the architect's office formed a joint company with the main contractor, the architect's office took only a very small share. But although the share was just 1.5%, the new position enabled the architect's office to assume the same level of responsibility as the main contractor.

Additional team management skills are needed to coordinate a design team that include parties that are used to participating in the design process (technical advisors) and parties that are much less used to participating in the design process (main contractor and specialised contractors). As some of our interviewees mentioned, the

traditional roles of the main contractors (making requests) and specialised contractors (delivering a service) are difficult to alter, but in order to arrive at the best design proposal from the shared knowledge of the Design-Build team, the architect will need to involve all parties actively in the creation of the design proposal.

§ 6.5 Conclusion

A total of 21 social housing renovation projects featuring an integrated contract that included both design and construction work in a single contract with the involvement of an architect were identified in the period 2005-2013. This research, which is based on an analysis of thirteen of the projects, helps us to understand the changes in the role of the architect compared to Design-Bid-Build projects.

Integrated contracts are tendered via a competitive or non-competitive tendering procedure. As far as the architects are concerned, the main two differences between the two procedures are:

- in the competitive procedure, the work of the architect is condensed into a shorter timeframe (42% shorter than with a non-competitive procedure);
- in the competitive procedure, there is a higher risk that the working hours will not be paid in full in the event that the consortium is not awarded the contract.

Four types of contractual arrangement have been identified. Under the most common contractual arrangement, the SHO has a contract with the main contractor and the main contractor has a contract with the architect. The new contractual position of the architect, compared to traditional Design-Bid-Build projects, does not have a negative effect and in some cases it actually had a positive effect on the relationship between the architect and the SHO. In fact, the architect does not perceive that the SHO has less confidence in his advice. The new set-up has a positive effect on the relationship between the architect and the construction companies; the relationship is rated as better and the communication between architects and construction companies is less formal than in Design-Bid-Build projects.

The use of integrated contracts is not directly related to the workload per project for the architect compared to Design-Bid-Build projects. In some cases architects were no longer involved in project management tasks, while in other cases architects were assigned additional responsibilities, such as communicating with tenants. It seems that architects working on integrated projects often made a switch from the role of designer to that of technical and aesthetic advisor.

If architects would like to retain their leading role in the design process in this new set-up, they need to gain more project management and team management skills so that they can take the initiative more easily. How to introduce these skills into existing educational programmes for architects is a possible subject for further research.

References

Architects Council of Europe, 2012, *The Architectural Profession in Europe 2012*, Architects Council of Europe, Brussels.

Akintoye, A., L. Bing, P.L. Edwards and C. Hardcastle, 2005, Critical success factors for PPP/PFI projects in the UK construction industry, *Construction Management and Economics, 23*(5), 459-471.

Anumba, C.J., and N.F.O. Evbuomwan, 1997, Concurrent engineering in design-build projects, *Construction Management and Economics, 15*(3), 271-281.

Blayse, A.M. and K. Manley, 2004, Key influences on construction innovation, *Construction Innovation, 4*(3), 143-154.

Blois, M. de, B. Herazo-Cueto, I. Latunova and G. Lizarralde, 2011, Relationships between construction clients and participants of the building industry: Structures and mechanisms of coordination and communication, *Architectural Engineering and Design Management, 7*(1), 3-22.

Bruggeman, E.M., M.A.B Chao-Duivis, and A.Z.R. Koning, 2010, *A practical guide to Dutch building contracts*, Instituut voor Bouwrecht, Den Haag.

Chao-Duivis, M.A.B. and J.W.F. Wamelink, 2013, *Juridische aspecten van ketensamenwerking*, Vereniging voor Bouwrecht, Den Haag.

Boes, H. and A. Dorée, 2008, Public procurement of local authorities in the Netherlands: a case of breaking tradition for a more strategic approach?, *24th ARCOM conference proceedings*, Cardiff, UK.

Bygballe, L.E., M. Jahre and A. Swärd, 2010, Partnering relationships in construction: A literature review, *Journal of Purchasing and Supply Management, 16*(4), 239-253.

Chan, E.H.W and A.T.W. Yu, 2005, Contract strategy for design management in the design and build system, *International Journal of Project Management, 23*, 630-639.

Cheng, M.Y. and M.H. Tsai, 2008, Cross-organization process integration in design–build team, *Automation in Construction, 17*(2), 151-162.

Egan, J.S., 1998, *Rethinking Construction*, Department of the Environment, Transport and the Regions, London.

El Asmar, M., A. Hanna, and W. Loh, 2013, Quantifying Performance for the Integrated Project Delivery System as Compared to Established Delivery Systems, *Journal of Construction Engineering and Management, 139*(11), 04013012.

Elvin, G., 2010, Principles of integrated practice in architecture, *Journal of Architectural and Planning Research, 27*(4), 287-300.

Greenwood, D., P. Walker and A. Walker, 2008, The world turned upside-down: Architects as subcontractors in design-and-build contracts, *ARCOM 2008 conference proceedings*, 507-516, Cardiff, United Kingdom.

Konchar, M., and V. Sanvido, 1998, Comparison of U.S. project delivery systems, *Journal of Construction Engineering and Management, 124*(6), 435-444.

Hal, A. van, L. van der Steen and E. van der Werf, 2011, Approaches towards a smart and speedy improvement of the in series developed post war housing stock, *MISBE conference proceedings*, Amsterdam, the Netherlands.

Hardeman, S., 2012, *Aanbestedingsgedrag opdrachtgever*, Economisch Instituut voor de Bouw, Amsterdam.

Hoezen, M.E.L. and L. Volker, 2012, The need for sensemaking and negotiation in procurement situations, *EPOC conference proceedings*, Estes Park, Colorado, United States.

Korkmaz, S., D. Riley and M. Horman, 2010, Piloting evaluation metrics for sustainable high-performance building project delivery, *Journal of Construction Engineering and Management, 136*(8), 877-855.

Lahdenperä, P., 2012, Making sense of multi-party contractual arrangements of project partnering, project alliancing and integrated project delivery, *Construction Management and Economics, 30*(1), 57-79.

Latham, M., 1994, *Constructing the Team*, HMSO, London.

Leiringer, R., 2006, Technological innovation in PPPs: incentives, opportunities and actions, *Construction Management and Economics, 24*(3), 301-308.

Lizarralde, G., M. de Blois and I. Latunova, 2011, Structuring of temporary multi-organizations: Contingency theory in the building sector, *Project Management Journal, 42*(4), 19-36.
Molenaar, K. R., A.D. Songer and M. Barash, 1999, Public-sector design/build evolution and performance, *Journal of Management in Engineering, 15*(2), 54-62.
Mollaoglu-Korkmaz, S., L. Swarup and D. Riley, 2013, Delivering Sustainable, High-Performance Buildings: Influence of Project Delivery Methods on Integration and Project Outcomes, *Journal of Management in Engineering, 29*(1), 71-78.
Pittini, A. and E. Laino, 2011, *2012 Housing Europe Review*, Cecodhas Housing Europe, Brussels.
Pocock, J.B., 1996, *The relationship between alternative project approaches, integration and performance*, dissertation, University of Illinois, Champaign.
Raisbeck, P., 2008, Perceptions of architectural design and project risk: Understanding the architects' role in a PPP project, *Construction Management and Economics, 26*(11), 1145-1157.
Renier, B. and L. Volker, 2009, *The architect as a system integrator?*, PSI Bouw & TU Delft, Delft.
Ronald, R. and K. Dol, 2011, Housing in the Netherlands before and after the global financial crisis, in Forrest, R. and N.-M. Yip (eds), *Housing markets and the global financial crisis*, 93-113. Edward Elgar Publishing, Cheltenham, GLOS.
Savanović, P., E.N.M. van der Werf, T. Leuftink and J.W. van de Groep, 2012, Innovation for Energy Efficient Renovation in Dutch Social Housing, *ISPIM Conference proceedings*, Barcelona, Spain.
Salcedo Rahola, T.B., A. Straub, A. Ruiz and Y. Galiègue, 2014, Energy efficiency in French social housing renovations via design-build-maintain, *Open House International, 39*(2), 48-56 .
Styhre, A. and P. Gluch, 2009, Visual representations and knowledge-intensive work, *VINE, 39*(2), 108-124.
Sebastian, R., 2011, Changing roles of the clients, architects and contractors through BIM, *Engineering, Construction and Architectural Management, 18*(2), 176-187.
Volker, L. and R. Klein, 2010, Architect participation in integrated project delivery: the future mainspring of architectural design firms?, *Design Management and Technology, 5*(3), 39-58.
Wamelink, J.W.F., J.S.J. Koolwijk and A.J. van Doorn, 2012, Integrated project delivery: The designer as integrator, *MCRP Conference Proceedings*, Montreal, Canada.