6 Innovation in housing refurbishment through adopting a partnering approach

The research in Chapter 6 was carried out as part of the same knowledge exchange project that was reported on in Chapter 5, but one year later. In the intervening period, one more dyad had joined the project, bringing the total number of dyads to seven.

Table 6.2, in which a large number of governance tools are rated, includes fewer tools than presented in Chapter 2. The remaining tools could not be evaluated because the interviews had already taken place.

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Other parts were published in a popular journal: Straub, A., Roders, M., & Gruis, V. (2012). Ketenintegratie bij woningrenovatie: alleen proces- of ook productinnovatie? *Building Business*, 14(6), 38-41.

Abstract

Housing associations own 32 % of housing stock in the Netherlands, making them major actors in maintaining and improving the quality of life in the urban environment. The building stock requires effective innovation to keep pace with the needs of today's tenants. Moreover, the current financial circumstances and political environment have pushed housing associations to innovate in their (re)construction processes, for example by adopting a partnering approach. Several studies indicate that the implementation of innovations could benefit from partnering approaches in the construction supply chain.
An evaluation of refurbishment projects that have been carried out using a partnering approach, however, indicates that the innovation process itself was seen as the major innovation and may (initially) even hamper innovations that aim to upgrade the dwelling to current standards. This effect should be taken into account when developing innovations in dwellings.

Keywords: process innovation, product innovation, partnering, social housing

§ 6.1 Introduction

In the Netherlands, housing associations are major contributors to quality of life in local urban environments and dwellings because they own and maintain 32% of the total Dutch housing stock and are responsible for taking measures to upgrade the quality of these dwellings.

To keep the dwellings up-to-date with contemporary quality requirements, housing associations need to adapt the technical specifications of their dwellings - by installing new heating and ventilation equipment, a new kitchen or energy-saving double glazing or insulation, for example.

Such upgrades, the aim of which is to improve the material, technical and functional quality of the dwelling, are perceived as product innovations, the dwelling being regarded as a 'product' or asset belonging to the housing association. This perception is in line with, for example, Ling's (2003) definition of innovation as "a new idea that is implemented in a construction project with the intention of deriving additional benefits although there might have been associated risks and uncertainties. The new idea may refer to new design, technology, material component or construction method deployed in a project" (Ling, 2003, p. 635; see also Slaughter, 1998; Rogers, 2003; Sexton and Barrett, 2005).

Apart from these product innovations, housing associations are also innovating the processes that they use, forced by the ongoing push for greater efficiency and political pressure to focus on their core task: the provision of decent homes for those on lower incomes (Nieboer en Gruis, 2014). These process innovations focus on the way in which the associations carry out their maintenance and refurbishment work, aiming to achieve better collaboration with the construction sector (Georgius and Rienhart, 2013; Roders *et al.,* 2013; Vrijhoef, 2011).

Given the importance for housing associations of keeping their housing up-to-date (MinIKR, 2005) and for the construction industry of staying competitive (Blayse and Manley, 2004), several tools exist that support the wider distribution of innovative methods and approaches (Rogers, 2003). Firstly, it is important that innovative approaches and methods are communicated to the actors that are in a position to implement them. Based on the information and knowledge that they receive, these actors can then decide to adopt or reject these innovative methods. Additionally, there are governance tools that seek to influence attitudes towards innovation. These tools focus on incentives and regulations. Financial incentives, for example, can reduce financial barriers (Murphy *et al.,* 2012) which may be hampering the adoption of innovations; alternatively, regulations may oblige housing associations to adopt certain innovations. However, as drivers for innovation, regulatory tools have had a mixed

reception in the literature. On the one hand, stricter rules do lead to change, but using coercion to 'force' innovation usually only leads to incremental changes, simply in order to meet the new standards (Beerepoot and Beerepoot, 2007).

Although companies in the construction sector need to innovate in order to stay competitive, it is not always easy to get an innovation process off the ground. According to Nam and Tatum (1992), the construction sector has small profit margins and this acts as a brake on innovation. Small margins are inherent to the traditional construction process, and are the result of price competition. The level of innovation depends on the risks that a construction company is willing to take in order to implement innovation. The risks are covered by a certain margin in their bid for a project. The stronger the competition on price, the smaller the margin, and the smaller the degree of innovation that can be accommodated. On the other hand, construction clients, too, tend to be averse to substantial risks. As a consequence they specify exactly what they want to do to eliminate as much uncertainty as possible. These specifications form the basis for the tendering procedure. The construction companies only provide what has been prescribed, in their drive to save as much as possible and putting in the lowest bid. Detailed specifications not only hamper innovations because they result in limited profit margins, but they also leave limited room for flexibility in choosing the right products or construction methods in order to achieve the performance required (Sexton and Barrett, 2005). To promote innovation, the procurement of work needs to move to a performance-based set-up, which means that clients describe the performance they need or want but leaves the construction sector to determine the best way to achieve that performance (Egan, 1998; Nam and Tatum, 1992; Sexton and Barrett 2005).

Performance-based construction is facilitated by a construction process based on an integrated approach, in which firms collaborate without company boundaries to obstruct the free flow of knowledge and experience (Dulaimi et al. 2002; Blayse and Manley, 2004). A partnering approach is one form of collaboration (Hughes *et al.,* 2012) in order to carry out a construction project that embraces the focus on integrated projects. Throughout this paper, the definition of partnering as developed by the Construction Industry Institute (CII, 1991) will be 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."

Looking at the innovation process in more detail, effort should be made to diffuse innovations more widely (Rogers, 2003). At the firm level, this occurs best in a network environment (Barrett *et al.,* 2005), such as a partnering approach. Within a project,

the team members should also be fully committed, and should not adopt an 'arm's length approach' (Ling, 2003). They should be inspired by 'champions and visionaries' (Ling, 2003) or by change agents, who act to bring about changes in behaviour (Rogers, 2003).

The aim of this study is to reveal how housing associations, together with construction companies, deal with the implementation of product innovations to improve the technical and functional quality of the dwellings in refurbishment projects using partnering approaches. The focus is primarily on how the innovations have been implemented. The participants were also questioned about which tools may increase the implementation of innovations.

The following sections will elaborate on the method used in this study. The research question was: "What are the conditions for implementing product innovations in housing refurbishment projects using a partnering approach?" After presenting the findings relating to this 'instrumental' question, these will be discussed from the viewpoint of both implementers and policymakers, so that these groups can gain an understanding of the feasibility of the innovation that is being required of housing associations.

§ 6.2 Methodology

The study used a case-study approach. General contractors and housing associations participated in a knowledge exchange project on partnering for the purpose of housing refurbishment. In the Netherlands, they belonged to a small group of forward-looking parties that are experimenting with partnering in housing refurbishment projects. The knowledge exchange project took place in 2011-2012 and was carried out in collaboration with seven dyads, each formed by a housing association and a general contractor. To participate in the knowledge exchange project, the participants had to carry out a pilot project in housing refurbishment that used a partnering approach.

The knowledge exchange project was initiated with the aim of enabling housing associations and general contractors to gain experience of partnering in the context of housing refurbishment projects. The authors of this paper also participated in the project for scientific support and evaluation. Initially, a total of 20 housing associations and 19 general contractors were individually invited to participate in the project. Not all of the invited housing associations and contractors were willing or able to participate, so the knowledge exchange project was carried out with its seven dyads.

The participants shared their experiences in plenary sessions every 4-6 months. Every session had a central theme - namely: the expectations and approaches of participants, examples from outside the project, contracts, innovation, organisational change and general experiences with the pilot projects (Roders *et al.,* 2013). This paper elaborates on the results of the third aspect: innovation.

The data collection began with a survey in October 2011, followed by a plenary meeting on 30 November 2011, where the results of the survey were discussed. The survey focused on the innovations that were achieved in projects, as well as the conditions necessary for (stimulating) innovation. In the survey, 50% of the data was collected by phone interviews and 50% through surveys sent to the participants by e-mail. Due to limited resources, not all data could be collected through interviews. The results were validated in the plenary session. The questions in the phone interviews and e-mail surveys were identical and consisted of a series of open questions. When processing the responses, no differentiation was made between the data gathered by phone or e-mail. The interview and survey results were presented to the participants in the project at the plenary session, so that the participants could reflect on these. A total of 22 persons responded to the interviews and surveys. The plenary session was attended by 21 persons, as well as three experts in construction processes and innovation who were not otherwise involved in the knowledge exchange project (see Table 6.1).

The data were collected by means of structured interviews based on open questions. These were derived from literature on innovation in construction and focused mainly on the organisational changes necessary to introduce innovations. However, to obtain a clear picture of these innovations, the participants were first questioned about the type of innovation. Subsequently, questions were asked about who initiated innovation, which types of project delivery method were adopted and which individuals were involved in implementation. Finally, the participants were questioned about tools to encourage innovations. These tools were derived from a previous study by the researchers on governance tools (Chapter 2 of this thesis).

PROJECT	FIRM	FUNCTION	PLENARY	INTERVIEW
A	Specialised contractor (HVAC)	Division manager	yes	yes
A	General contractor	Director	yes	yes
A	Housing association	Manager Real Estate	yes	
A	Specialised contractor (Façades)	Director	yes	yes
A	General contractor	Planner		yes
A	Housing association	Project leader		yes
B	Housing association	Policy consultant	yes	
B	Housing association	Project leader	yes	yes
B	General contractor	Division manager	yes	yes
C	General contractor	Director	yes	yes
C	Housing association	Division manager	yes	
D	Architect	Designer/Project leader	yes	yes
D	General contractor	Project leader	yes	yes
D	Housing association	Project leader	yes	yes
E	General contractor	Calculator/Planner	yes	yes
E	Consultancy	Consultant		yes
E	Specialised contractor (HVAC)	Project leader	yes	yes
E	Specialised contractor (HVAC)	Division manager	yes	
E	Housing association	Director	yes	
E	Housing association	Manager Real Estate	yes	
E	Consultancy	Project leader		yes
E	Consultancy	Consultant		yes
E	Architect	Designer/Project leader		yes
E	Housing association	Program manager		yes
F	Housing association	Manager Maintenance	yes	
F	General contractor	Project leader	yes	yes
F	Housing association	Project leader		yes
F	General contractor	Director		yes
G	General contractor	Director	yes	yes
X	General contractor	Director	yes	
X	Knowledge platform	Innovation specialist	yes	
X	Knowledge platform	Innovation specialist	yes	
X	Knowledge platform	Innovation specialist	yes	

TABLE 6.1 Participants in plenary session and interviews

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§ 6.3 Results

Although the aim of the research was to reveal the potential of partnering as an approach to implementing product innovations, the first question in the survey was whether the participants had in fact implemented any kind of innovation in a recent project that had involved partnering. It was decided to broaden this question to capture as much information as possible on how the innovation process is carried out. It was then possible to narrow this information down further to the subject of product innovation at a later stage. In total, 19 of the 22 participants stated that they had been involved with innovation. The following sections elaborate on the answers given by these 19 participants.

§ 6.3.1 Type of innovation

When asked about the type of innovation, most participants responded that the innovation primarily involved process improvements: a better collective preparation phase that involved all specialist contractors. The adoption of a partnering approach was perceived as an innovation in itself. Subjects such as 'collaborative development' or 'integrated design' were mentioned. Collaboration was mentioned, but also the instruments that can lead to a better collaboration, such as 'implementing Building Information Modelling (BIM)' and 'lean planning'.

The development and implementation of new products was mentioned less frequently. At the plenary meeting, it was remarked that carrying out the work using a partnering approach was so time-consuming and expensive that it was not feasible to consider product innovation too.

§ 6.3.2 Who initiates innovation?

The respondents were also asked which party initiates innovation. Housing associations were mentioned the most frequently, followed by shared initiatives undertaken by the general contractor and the housing association. The roles of other partners, such as architects, specialist contractors and manufacturers were minor, according to the respondents. At the plenary discussion, the suggestion was made that the manufacturers should play a central role in implementing product innovations, but for the use of their products they depend on either the housing association or the

general contractor. It was also suggested that to encourage innovation, both firms and clients need to be prepared to take risks. Construction companies by nature tend to display a high degree of entrepreneurship, which makes them familiar with handling risk. However, those companies have small profit margins, leaving little room for investment in innovation. Many general and specialist contractors are reluctant to develop innovative construction concepts because this involves the risk of becoming more expensive than their competitors. Another perceived risk is that clients see them as insufficiently flexible vis-à-vis the client's needs.

§ 6.3.3 Project delivery method

On the question of which project delivery method creates the best conditions for innovation, the general opinion was that the process itself is not the decisive factor. What is more important is that housing associations abandon their control role and trust their partners' ability to innovate. The general and specialist contractors commented that, in their experience, housing associations – particularly larger ones – often tend to retain their controlling role, which leads to a hierarchical approach. It was stated that the focus on competition in one-off projects limits the possibilities of repetition, and that the greatest benefit can be realised where there is a continuous flow of projects. This is because there is more experience with the type of project and better communication between employees of all partners. Moreover, errors made in previous projects can be corrected.

Two project delivery methods were used by the participants. Under the first method, the client and firm collaborate at an early stage on the basis of a previously established relationship. In these projects, the performance indicators were defined jointly. Under the other project delivery method, the housing association draws up the performance requirements in advance via a tendering procedure. The consortium with the project that corresponds most closely to the performance indicators wins the tender. The current study did not determine which of these two strategies produced more innovation.

The supply chains in the knowledge exchange project were all set up as if for a one-off project, even those occurring within an already established relationship.

§ 6.3.4 Who was involved?

One of the questions in the survey focused more specifically on the individuals that were involved in the innovation and the factors that helped or hindered the adoption of innovation by those working in the partnerships. Project leaders were mentioned the mostly frequently as being involved in implementing innovations, but others included general management, planners, calculators and sales employees. What is important for all those involved is that they are results-driven and are able to work and interact well with others. The participants believed it is important for people to share the same 'mind-set'. Additionally, clear guidance by general management and/or project management was also very important. The need for one individual to take on the role of process coach or innovation stimulator was also highlighted. Some participants mentioned that focusing on success stories within their own organisation was a very important means of ensuring commitment.

The factors that were cited as decisive for successful implementation of innovation were: selecting the right partners, trust, transparency, collaborative goal-setting and focusing on the employees who need to implement the innovation. The participants in the plenary session shared the opinion that there is a reasonable risk that board members of housing associations may start asking for different partners after a few projects have been carried out by the same firms, which is the case with a partnering approach. The board is under pressure to be seen as an independent institution that is careful about using its tenants' money to maintain its building stock by, for example, creating competition between its supply chain partners. A possible solution to this problem was suggested: maintaining the collaboration between client and firm, but increasing the desired level of performance in each successive project.

Some employees (of clients) were said to find it difficult to change their routines. They tend to fall back into their 'old habits'. On the other hand, it was recognised that it is difficult for project leaders who are carrying out multiple refurbishment projects, both in a traditional and in a partnering setting, to switch between different types of project and modify their behaviour accordingly. In traditional projects, defensive behaviour is required, while cooperative and proactive behaviour is required in partnering projects.

§ 6.4 How to encourage innovation?

Table 6.2 shows a number of tools that policymakers can employ to encourage and stimulate innovation in the construction sector.

Government regulation can lead to innovation. For instance, if government regulations forbid products from being used or approaches from being applied, other (innovative) products or approaches must be developed. However, the interviewees did not view regulation in the form of laws, certificates and permits as a necessary stimulus to innovation. The participants rated the necessity of regulation as 'neutral'. This was confirmed in the plenary session, when people stated that in business 'you are too late if you wait for regulations to be enacted'. Some even took the view that once something is included in legislation, it is no longer innovative.

Incentives may help to encourage innovative behaviour. The measures in this group were generally found to be necessary, but the financial incentives such as tax measures or subsidies were evaluated more neutrally than measures concentrating on social corporate responsibility and covenants. Some even found these financial incentives to be unnecessary because of the associated administrative burden. They believed that intrinsic motivation is necessary to innovate and that the innovation should ultimately 'pay for itself'. Others referred to the subsidy policy as being unstable, implying that subsidies may stop at any time, so that long-term investment would turn out to be too risky. The focus of the participants is more oriented on establishing a good reputation with stakeholders, judging by the importance accorded to corporate social responsibility and covenants.

The most important means of stimulating innovation mentioned by the participants was for partners to take a proactive approach and work together on solutions. In addition, the involvement of motivators, such as change agents or coaches within the partnership was found to be very important.

The information tools were, to a large extent, evaluated as neutral, with a somewhat negative evaluation for TV programmes, and a positive evaluation for demonstration projects.

	N	VERY NECESSARY	NECESSARY	NEUTRAL	REDUNDANT	VERY REDUNDANT
Regulation tools						
Building code	21**	1	4	12	4	0
Certification	21**	1	5	11	4	0
Permits	21**	1	4	12	4	0
Incentives						
Subsidies	23*	5	8	8	2	0
Special loans (e.g. green mortgage)	22	3	10	7	2	0
Tax reduction on innovative products	22	4	11	6	1	0
Tax deduction on innovative products	22	4	9	8	1	0
Competition	22	4	6	8	2	2
Corporate Social Responsibility	23*	7	11	5	0	0
Covenants	23*	5	13	3	2	0
Performance label (e.g. BREEAM)	22	4	7	9	2	0
Pro-active project partners	22	18	3	1	0	0
'Intelligent' supply chain (knowledge with all parties in the supply chain)	22	15	5	1	1	0
Motivator within the supply chain	22	16	5	0	1	0
Motivator outside the supply chain	22	7	9	6	0	0
Information tools						
Online tools and information	22	8	9	5	0	0
Television campaigns	22	0	5	9	7	1
Tailored advice (consultant)	22	4	11	4	3	0
Road shows (demonstration in the office)	22	3	6	8	4	1
Demonstration project (demonstration on site)	22	10	6	4	2	0
Communities of practice (knowledge exchange project)	22	9	11	2	0	0
Discussion platforms	22	5	14	1	2	0
Education programmes	22	8	11	3	0	0

TABLE 6.2 Tools for encouraging of innovation

**1 participant gave 2 answers; **1 participant did not answer.*

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§ 6.5 Discussion

The composition of the partnerships was determined by the housing associations and/or the construction companies involved. What was notable was the hesitation of many housing associations to take part in such a project, since it would involve forming a partnership with a general contractor and/or suppliers. This happened in previous studies too (Briscoe and Dainty, 2005; Humphreys *et al.*, 2003). The participants were not a random sample from the whole construction sector, but they made a conscious decision to take part in the project to share their experiences of partnering. This meant that all partners were involved in an innovation process and almost all participants (19 out of 22) said that they had also dealt with some kind of innovation in construction processes previously.

While the literature on innovation in construction suggests that an integrated approach should be considered for the implementation of innovations, the current study indicates that this approach does not automatically lead to more product innovation. Since the dyads all had limited experience of the partnering approach, they worked very hard on the construction process itself, which they considered as the major innovation. They stated that the process innovation took so much time that they had no time left for product innovation. In other words, the product innovations were pushed out by the focus on partnering.

Although the housing associations were mostly considered as the initiators of the innovation, it became clear that implementing innovation is not a 'one-man show'. Within all companies in the partnership, including the housing associations, people from both the strategic level and the operational level need to be motivated to work together to implement innovations. To stimulate innovation, the participants are sensitive to measures that appeal to their own curiosity and knowledge development, or their strategic position within their actor network. Furthermore, they consider demonstration projects to be necessary and believe that corporate social responsibility and covenants are important drivers of innovation. Financial incentives and regulation were found to be less important, although not unimportant.

§ 6.6 Conclusion

This article has brought together the experiences of a number of housing associations and contractors in implementing innovations in the refurbishment of the housing stock. Innovation is perceived as a vital prerequisite for achieving general policy objectives relating to major societal concerns such as the need for climate change adaptations. Several studies have already indicated that innovation can benefit from an integrated construction process that is based on collaborative rather than adversarial relationships. However, evidence suggests that partnering itself does not automatically lead to product innovations and most of the respondents see partnering itself as an innovation in its own right. Process innovation required a great deal of attention, while less emphasis was placed on opportunities for product innovations.

Policy-makers need to take these findings into account when imposing requirements for product innovations to achieve objectives related to contemporary societal objectives such as climate change adaptation projects. Furthermore, it may even be counterproductive to focus solely on product innovation since companies may first have to start adapting their processes. Translating this into the governance of climate change adaptations, two strategies for further investigation are suggested. The first is not only to focus on implementing climate change adaptations in dwellings (product innovations), but also on improving the construction process itself (process innovations). The second is to focus on the pioneers in integrated construction processes: they already have an innovative process in place, so they are able to focus genuinely on the product innovations that are required.

References

Barrett, P., Sexton, M., & Lee, A. (2005). *Performance based building innovation, PeBBu Domain 8 Final Report.* Salford: University of Salford.

Beerepoot, M., & Beerepoot, N. (2007). Government regulation as an impetus for innovation: Evidence from energy performance regulation in the Dutch residential building sector. *Energy Policy, 35*(10), 4812–4825.

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

Briscoe, G., & Dainty, A. (2005). Construction supply chain integration: an elusive goal? *Supply Chain Management: An International Journal, 10*(4), 319–326.

CII (Construction Industry Institute). (1991). *In Search of Partnering Excellence*. Austin, Texas.

Dulaimi, M.F., Ling, F.Y.Y., Ofori, G., & De Silva, N. (2002). Enhancing integration and innovation in construction. *Building Research and Information, 30*(4), 237–247.

Egan, J. (1998). *Rethinking construction: The report of the Construction Task Force*. London: DETR.

Georgius, M., & Rienhart, E. (2013). *Op weg naar regisserend opdrachtgeverschap [On the way to a guiding client]*. Den Haag: Aedes.

Hughes, D., Williams, T., & Ren, Z. (2012). Differing perspectives on collaboration in construction. *Collaboration in Construction, 12*(3), 355–368.

Humphreys, P., Matthews, J., & Kumaraswamy, M. (2003). Pre-construction project partnering: from adversarial to collaborative relationships. *Supply Chain Management: An International Journal, 8*(2), 166–178.

Ling, F.Y.Y. (2003). Managing the implementation of construction innovations. *Construction Management and Economics, 21*(6), 635–649.

MinIKR (Ministry of the Interior and Kingdom Relations). (2005). *Besluit beheer sociale-huursector [Social Rented Sector Management Order]*. 's-Gravenhage: Sdu Uitgevers.

Murphy, L., Meijer, F., & Visscher, H. (2012). A qualitative evaluation of policy instruments used to improve energy performance of existing private dwellings in the Netherlands. *Energy Policy, 45*, 459–468.

Nam, C.H., & Tatum, C.B. (1992). Government-Industry cooperation: Fast-track concrete innovation. *Journal of Construction Engineering and Management, 118*(3), 454–471.

Nieboer, N., & Gruis, V.H. (2014). Shifting back-changing organisational strategies in Dutch social housing. *Journal of Housing and the Built Environment, 29*(1), 1–13.

Roders, M., Gruis, V., & Straub, A. (2013). *Even anders. Ervaringen in zeven pilots met keteninnovatie bij woningrenovatie. [Something different. Experiences in seven pilot projects with partnering in housing renovation]*. Utrecht: Kenniscentrum Technologie & Innovatie.

Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Sexton, M., & Barrett, P. (2005). Performance-based building and innovation: balancing client and industry needs. *Building Research and Information, 33*(2), 142–148.

Slaughter, E.S. (1998). Models of construction innovation. *Journal of Construction Engineering and Management, 124*(3), 226–231.

Vrijhoef, R. (2011). *Supply chain integration in the building industry. The emergence of integrated and repetitive strategies in a fragmented and project-driven industry*. Amsterdam: IOS Press.