

# THE DEMONSTRATION PROJECT AS 'TOOL' FOR CLIENT DRIVEN INNOVATION: EXPLORING THE POTENTIAL FROM A SWEDISH PERSPECTIVE

**PAULA FEMENÍAS, PhD researcher**

Department of Architecture  
Chalmers University of Technology, Sweden  
femenias@chalmers.se

**ANNA KADEFORS, Associate Professor**

Department of Service Management  
Chalmers University of Technology, Sweden

**MICHAEL EDÉN, Professor**

Department of Architecture  
Chalmers University of Technology, Sweden

## **Abstract**

*This paper presents a recently initiated project that focus on client leadership in construction innovation aiming at more sustainable futures. The central questions are to study the potential for demonstration projects to support long-term and continuous innovation, implementation and learning in client organisations, and the relation of demonstration projects to other objectives and development activities in client organisations. The project is a collaborative research project involving a core group of construction clients and researchers. One main activity will be to empirically test and evaluate a set of tentative client management guidelines for the systematic and enhanced use of demonstration projects. The guidelines are based on previous research and have been developed in collaboration with the core group of clients. The paper gives a review of prospects and obstacles for innovation and diffusion of innovation, and points out and discusses seven areas that hypothetically will enhance the outcome of client driven demonstration projects: commitment and capability; analysis of demands and objectives; collaboration and dialogue; collaboration with research institutes; careful planning and realisation; documentation, follow-up and evaluation; implementation and diffusion.*

**Keywords:** demonstration project, learning projects, construction clients, innovation, sustainable building, guidelines

## **INTRODUCTION**

There is a need for continued and accelerated innovation among actors in the building sector in order to be competitive, adapt to societal changes, and reach objectives for climate change and sustainable development. Innovation in construction is since long intimately connected to experimentation and demonstration which provide full-scale test-beds for new concepts and technologies, and fill the function of raising interests and diffusing experiences. Although being recognized as an important vehicle for innovation and diffusion of innovation, demonstration projects have not been sufficiently integrated in long-term and continuous development process in the building sector (Femenías, 2004). As a consequence the influence from demonstration projects on mainstream building practices has been limited (Buijs and

Silvester, 1996; Fernie *et al.*, 2006). The starting point for this project is to overcome deficiencies related to innovation by developing knowledge that can be used to enhance demonstration projects with the aim to support development processes, and implementation and diffusion of innovation in construction. Our focus is on construction clients, which have increasingly been recognized as having a decisive role in construction innovation (Brandon and Lu, 2008). Recent studies show that there is still little known about the circumstances that form client's behaviour in relation to innovation processes (Ling *et al.*, 2007).

### **Purpose and layout of this paper**

This paper presents early findings from a recently initiated collaborative research project involving The Swedish Construction Clients Forum (SCCF), a core group of construction clients and researchers from complementary disciplines. The SCCF has pronounced the aim to develop client leadership in the construction sector and towards sustainable development which is described in their R&D program "The construction client as change agent" (SCCF, 2007). One of their specific commitments is to explore the potential for clients to systematically use demonstration projects as 'tools' for supporting innovation, and as basis for collaboration between clients and research institutions, an area in which Swedish clients are lagging behind for example building contractors. As a first step, the SCCF initiated and co-financed a prototype for a client management guideline for demonstration projects (Femenías and Edén, 2009) based on experiences from previous research (Femenías, 2004; Edén *et al.*, 2005; Rubino, 2009) and developed in collaboration between the researchers and a core group of innovation driving clients. These tentative guidelines are now to be tested in practice by the group of clients, evaluated and further developed, also to fit a broader perspective of client organisations and project contexts.

The aims for the project are three fold. The practical aim is to assist clients in innovation activities by supporting the development of management 'tools' for the systematic use of demonstration projects. The research aim is to develop more general understanding of innovation and development in client organisations, an area that so far is little studied (Brandon and Lu, 2008). The overall research question is: How are long-term and continuous innovation and development activities managed in client organisations, and what is the role of the demonstration projects in that context? The third aim is to develop models for collaborative research between researchers and industry partners based on work-shops and larger arena-meetings taking inspiration from recent advancements in action research.

More specific, this paper first gives a review of prospects and obstacles related to demonstration projects and client driven innovation presented in earlier research and which are starting points for this research. Second, a short introduction to the development of demonstration projects for sustainable building in Sweden gives an empirical background to our formulation of six hypothetical factors that potentially are beneficial for client driven demonstration projects, and which will be empirically tested in the continued research. Finally, we draw some conclusions setting out a range of issues to be examined.

## **DEMONSTRATION PROJECTS AND CLIENT INNOVATION**

We use the wide definition of innovation described by Rogers (1995) as 'an idea, practice, or object that is perceived as new by an individual or another unit of adoption'. The innovation can be new for the adopting organisation but not necessarily new for all organisations. The innovation can also be a package of technological solutions and refer to process and

management issues. Before a new idea becomes an integral part of on-going practices, the adopting individual or organisation passes through a series of choices and actions through which information is sought and processed to reduce uncertainty inherent to the new idea (Rogers, 1995). This adoption process can be characterised by a process in which an organisation accepts and assimilates an innovation.

The definition we wish to explore for demonstration projects is that of the learning project. As most building projects produce knowledge the specificity of the demonstration projects can be defined as having the *pronounced* aim to build up knowledge which implies evaluation and diffusion of experience, internally and externally, and implementation of the results. We intend to explore the potential of the demonstration project to contribute to knowledge building processes in the organisations directly involved, but also how the demonstration project can support knowledge building processes in the sector as a whole.

### **Prospects and obstacles for change related to demonstration projects**

Even though impressive results have been achieved in individual demonstration projects they have so far had little influence on mainstream building practices (e.g. Buijs and Silvester, 1996; Bröchner and Månsson, 1997; Femenías, 2004). In spite of criticism of the benefit of demonstration projects as means to induce change (e.g. Fernie *et al.*, 2006) demonstration projects continue to be part of national and international governmental policy in particular regarding new areas like the environment, energy and sustainability issues. In Sweden there are also signs of increased interest in demonstration projects among building sector actors. This interest is likely to be driven by a sensibility for business opportunities inspired by the successful results of recent environmental building projects, and supported by public-private initiatives as the Building/living dialogue which will be further explained in this paper.

There are several factors that constitute the weaknesses in diffusion of demonstration projects. Among these we find deficiencies in the project organisation, in the set up and follow-up of goals, and in the lack of documentation and evaluation (Hal van, 2000; Femenías, 2004). A demonstration project that is not sufficiently monitored, evaluated and reported will lose in reliability and transferability. Another inhibiting factor is inherent in the act of demonstrating. An organisation that is observed uses special efforts to attain goals. Thus the reproduction of the objectives in a normal project setting is often perceived as difficult (e.g. Fernie *et al.*, 2006).

Structural weaknesses in the building sector are also part of the explanation. Innovation in construction is to a great extent carried out on in temporary projects organisations and on a project level (e.g. Barrett *et al.*, 2008). The organisational structures for driving innovation in the permanent organisations are less elaborated (Bresnen *et al.*, 2005; Davies and Hobday, 2005) and demonstration projects is seldom embedded in the continuous activities (Femenías, 2004). In general, the weak links between the temporary project and more long-term and continuous processes in the permanent organisations (Dubois and Gadde, 2002) implies that systems for learning from project experience are seldom well developed. In addition, the strong decentralisation of the building sector has the result that decisions for innovation are needed and taken on a project level, and will have little influence on top management strategy that in turn has been found to face difficulties in influencing project level operations (Bresnen *et al.*, 2005). As a consequence the dissemination from demonstration projects and building projects in general strongly relies on individuals and their networks.

The problems with diffusion from demonstration projects cannot only be described as knowledge management problems or intrinsic problems in the sector. The lack of influence of demonstration projects can also be explained by incompatibility of sustainable solutions in respect of existing technical, institutional (including financial) and social systems (e.g. Fernie *et al.*, 2006) and by the lack of governmental policy support and actions (Hal van, 2000).

### **Client leadership as a means to enhance the outcome of demonstration projects?**

Another difficulty with demonstration projects is that there is often no clear benefiter or 'project owner'. Innovations are sometimes realised as a result of an opportunity to receive grants for the innovation or demonstration. In this research project we will explore client leadership as a means to enhance implementation and learning from demonstration projects.

The importance of active construction client leadership in construction innovation has been increasingly recognised in recent years (e.g. Egan, 1998; SOU, 2002:115; Brandon and Lu, 2008). Although there are many examples of influential and innovative clients (Slaughter and Cate, 2008) the clients' roles in driving innovation has also been challenged (Sexton *et al.*, 2008). Some authors prefer to attribute innovation in construction to an interactive process between the client and the project team in which the empowering of the client, the management of the project dynamics, the appropriate user involvement, and team building (Barrett and Stanley, 1999) would be just as important as the clients' supreme role as drivers and champions of innovation. Some authors claim clients to be risk averse and find innovation promoted by architects and technical consultants rather than clients (Ivory, 2005).

## **DEVELOPMENT OF SUSTAINABLE BUILDING IN SWEDEN**

In this paragraph we draw a short background to the development of sustainable building practices in Sweden and the role of demonstration projects. The development of sustainable building has in Sweden been extensively driven bottom-up by engaged practitioners, researchers and a few enlightened clients. In time these processes has received top-down support through government. On the one side early sustainable building projects can be defined by a small scale, by holistic and situation-bound eco-cycle approaches, and by one-off clients as supporters and benefiter. On the other side many projects with a one-sided energy focus originated in the backwash of the 1970s oil crises. Both types of projects have in the 1960s through the 1990s had experimental character and limited influence due to undeveloped technology and deficiencies in technology transfer. In combination with a lack of architectural qualities, and in some cases user comfort, these early projects have contributed to a persistent negative reputation of 'ecological' building and building experiments in general. On the long term these early projects have been important for the development of sustainable building, however mainly for those who were directly involved.

First, in the end of the 1990s a few municipal housing companies had the ambition to integrate sustainable building principles in their long-term strategies through demonstration projects. However, they did not continue to engage in innovation. The demonstration projects were left as solitary investments and instead the housing companies focused on implementing environmental management systems on a more mainstream and broad level.

### **Two ground breaking demonstration projects**

Two groundbreaking demonstration projects for sustainable building were carried out in the early 2000s. One project is the transformation of a socially deprived housing area in the

suburbs of Göteborg which involved the retrofitting of 1970s multi-family housing blocks, a project that benefited from a European Demonstration Programme. The project called the Solar houses in Gårdsten has been highly successful. The retrofitting package, developed by an architect, with experience from earlier experimental projects, and a researcher resulted in considerable reduction of resource use and gave accuracy to the demonstration. The project addressed the mobilisation of tenants and their active involvement in the process which led to large social enhancements, i.e. high levels on the 'satisfied tenants' index', no vacancies, and reduced crime rates. The careful planning and monitoring of the demonstration project have contributed to its success. The project has gained large national and international attention. It has been awarded several times, including the prestigious UN Habitat price.

The second project is Lindås, the first Swedish passive housing (i.e. high thermal insulation, a tight envelope, control over air-flows and no conventional heating system). The project has strongly contributed to the current interest in passive and energy efficient building in Sweden. Initially the concept was highly questioned. However, the architect behind the project did not doubt his concept as it was based on many years of experimentation in Sweden and in Germany. Important factors in the success of the Lindås demonstration are: careful planning and implementation (collaboration between actors, and education of all involved), monitoring by an external research institute, the well-organised information diffusion, and positive results in terms of energy savings, and residents' health and satisfaction. As a result of the successful demonstration, the Swedish national Passive House Centre was opened in 2007.

### **A new generation of demonstration projects?**

Sustainable building practices are eventually gaining broader legitimacy in Sweden, through the success of recent demonstration projects and supported by enhanced tools for planning and design such as LCA and LCC. Other factors that we assume support the process are: the strong focus on energy issues that fit the market's demand for economically profitable investments, and the fact that sustainable building opens up for new business opportunities and gives positive marketing. Synergetic effects in terms of user comfort and satisfaction, and a better overall building quality have positively credited last years' energy efficient building concepts. A shift in attention towards quantitative performance indicators has also been supportive to the development. The voluntary dialogue programme Bygga/Bo, a joint action between governmental, public and private actors in the building sector has been important to the development. The dialogue set up objectives for carbon reduction and sustainable development, and supports the initiation and evaluation of demonstration projects.

In the latter parts of the 2000s a number of forerunners among Swedish clients have integrated objectives for energy efficiency and more sustainable building practices in their activities for construction and management of existing stocks. They engage in pushing the development further, and they invite the rest of the sector to take part of their experiences. Älvstranden Utveckling AB is one example. They are a municipal land owner and developer with the mission to develop the former harbour in Göteborg city. They have developed their sustainable building competence through a series of demonstration projects. The investment in sustainable building is part of their trademark and their engagement in the Bygga/Bo dialogue. Their first demonstration project completed in 2006 had the objective to have environmental declarations of all materials used. Inspired by the good results, Älvstranden Utveckling AB engaged in a new building project with high objectives for energy efficiency and the use of LCC. 'Hamnhuset' completed in 2008, their third demonstration project, was one of Sweden's first multi-family housing block built with passive house principles. Älvstranden Utveckling AB has benefited from collaboration with research institutions in the

planning, and follow-up of their projects. They have successfully developed a LCC tool to support decisions taken for investments in energy efficiency. Älvstranden Utveckling AB has been involved in an earlier research collaboration with Chalmers University, an arena project called Demo04/06. Demo04/06 gathered researchers and practitioners from six evolving demonstration projects for sustainable building between 2004 and 2008 with the aim to exchange experiences and enhance knowledge dissemination (Rubino, 2009). In Sweden, several arena projects have been initiated last years with the objectives to develop research-practice collaboration, share knowledge between members, and disseminate knowledge to a larger forum of actors. The person-to-person contact that is emphasised in the arena projects have by Rogers (1995) been pointed out as a factor that that favours innovation adoption.

## **TENTATIVE CLIENT GUIDELINES FOR DEMONSTRATION PROJECTS**

Could the way of working with innovation and demonstration projects, here exemplified by Älvstranden Utveckling AB be a model for a larger number of client organisations? This is has been a starting point for the development of a set of tentative guidelines for client driven demonstration projects which will be tested empirically in the continued research. In this section we summarise seven potential factors or areas, which have been identified in previous research (Hal van, 2000; Femenías, 2004; Edén *et al.*, 2005; Rubino, 2009), and formulated in co-operation with a core group of active construction clients (Femenías and Edén, 2009). The factors which hypothetically have a positive influence on the outcome of demonstration projects are: *commitment and capability; analysis of demands and objectives; collaboration and dialogue; collaboration with research institutes; careful planning and realisation; documentation, follow-up and evaluation; implementation and diffusion*. The factors should not be seen as appearing chronological but working parallel during the whole demonstration project process. They can address the whole building process or parts of it.

### *Commitment and capability*

Commitment is the starting point for innovation and development and will be important from the start throughout the whole demonstration project. The capability of the organisation is another predisposing factor. The client organisation needs to support the innovation on a management level and on the project level. They need the support of committed and capable consultants and entrepreneurs. For example, Älvstranden Utveckling AB, in their passive house project chose only consultants that were part of the Bygga/Bo dialogue in order to ensure their commitment to sustainability issues.

### *Analysis of demands and objectives*

The analysis of demands and objectives is the starting point for development and innovation. Client leadership in innovation does not necessarily mean that the client is the one that has the knowledge of what kind of innovation to engage in. The client should have the ability to listen to consultants, entrepreneurs, researchers and others that can come with potential ideas. If the organisation is un-experienced it can be wise to limit the risk in the first project by setting a lower ambition level and implement innovations already tried out by other organisations, and to limit the width of the demonstration project by focusing on a smaller number of new factors. As the organisation proceeds in their development process, they will acquire experience to be able to successively raise the ambition level in following projects.

### *Collaboration and dialogue*

The benefits of increased collaboration and dialogue in construction have been highlighted last years (e.g. Brandon and Lu, 2008). Several successful demonstration projects claim the advantages of teamwork, where ideally most actors are involved from the early phases until the delivery and use. The advantage of involving consultants and other actors during a larger part of the process is that their skills will be better used and they become engaged when involved in the set up of objectives and other parameters for the project.

#### *Collaboration with research institutes*

There are clients that bear witness on the advantages of collaboration with research institutions, for planning and setting up objectives, and for monitoring and evaluation. The long-term collaboration between research and practitioners can be of benefit for both parties. The researchers will get study objects and the possibility to try out 'theories' in practice.

#### *Careful planning and realisation*

In order to achieve the objectives, it is necessary that the organisation have the capabilities but also that they allocate the necessary resources to reach the objectives. This includes the planning and budgeting for documentation, follow-up, evaluation and dissemination of results but also the eventual extra time needed in planning and realisation when dealing with new technologies or concepts. In order to realise the objectives it can be necessary to educate staff, contracted actors and construction workers, and to find new forms of collaboration.

#### *Documentation, follow-up and evaluation*

Documentation, monitoring and evaluation are the very heart of demonstration projects. Without evaluations the experiences will be difficult to disseminate and use in new situations. The monitoring and evaluation carried out by independent research institutions increase the validity of experiences. The objectives should be followed up, deviations from original objectives should be documented, and alternative solutions should be defended. Repeated evaluations over a longer time period add value as buildings are complex and have long life.

#### *Implementation and diffusion*

The demonstration project does not end with the evaluation and feed-back. The demonstration or learning process is a loop that feed back into the organisation and into new projects. The experiences should if possible be disseminated to rest of the sector, ideally throughout the whole project which enables the experiences to be used before the final reports are published.

## **DISCUSSION – HOW DO THE GUIDELINES CONFORM TO EARLIER STUDIES?**

How do our tentative guidelines conform to factors that are likely to influence client's innovation adopting behaviour, identified in earlier research? Ling *et al.*, (2007) argue that innovation research has to some extent investigated factors that influence the initial decision to innovate and adopt innovation (e.g. Rogers, 1995) but little has been investigated on the factors that will influence decisions at other stages of the innovation and adoption process. Clients have various interests and competence levels and client strategies to innovation are likely to vary considerably. For example, experienced clients with in-house competence have been found to innovate more than nonprofessional clients (Slaughter and Cate, 2008).

Past research has showed that the attributes and qualities of the innovation itself are decisive for the initial decision to adopt (Rogers, 1995; Hal van, 2000). Many researchers have had

five factors recognised as influential to the innovation adoption process and identified by Rogers (1995) as a starting point: the *relative advantage* (compared to other solutions), the *compatibility* (to existing values and experiences), the *complexity* (the degree to which the solution is difficult to understand and use), the *trialability* (the degree to which it can be tried out on a limited scale), and the *observability* (the degree to which it can be diffused to others).

Ling *et al.*, (2007) have further developed these factors into six hypothetically influencing factors for client innovation: *expected goals* (and benefits), *capability* (of project participants to ensure the successful implementation), *challenges faced* (must not be overly critical and possible to meet by the client organisation and the project organisation), *efforts exerted* (additional resources allocated to the project and reward systems to recognize innovators), *commitment* (of all stakeholders, the support of a project champion and gatekeepers who identify solutions), and *constraints* (external factors such as regulation, contract forms etc.). An empirical test in Hong Kong of these six factors showed that not all were significant (Ling *et al.*, 2007). Innovation was by Ling *et al.*, (2007) found to be particularly beneficial for clients if: they were technical, consistent with the client's values and norms, if the client had technical capabilities, and if experienced staff were innovation champions. The formation of separate implementation teams, coordination and monitoring mechanisms, and the provision of training were also found to facilitate the successful implementation of innovation.

Egmond *et al.*, (2005) and Hartmann *et al.*, (2008) have studied factors that constitute the innovation adoption environment of public clients, a wider perspective than the internal organisation of the clients, which might be of interest for our further research. Based on a model for behavioural change by Green and Kreuter's (1999) Egmond *et al.* (2005) describe three general categories of factors that they found to be determinants that will affect the behaviour environment of clients adopting innovation: *predisposing factors* (internal antecedents to behaviour adherent in the organisation e.g. size, awareness, knowledge, norms); *enabling factors* (external antecedents belonging to the situation which will facilitate the action e.g. new skills, financial and technical resources; and *reinforcing factors* (consequences of an action which determinates the positive or negative feed-back e.g. recognition, financial rewards and reactions of costumers). The model proposed by Egmond *et al.* (2005) has by Femenías and van Hal (2009) been complemented with two factors: *responsive factors* (describes how clients respond and act to realise the adoption and implementation of innovation) and *constraining factors* (obstacles for innovation).

Hartmann *et al.*, (2008) found four factors related to public client's innovative behaviour. The first two, *social requirements* and *social responsibility* are connected to the political arena in which public clients act. The other two, *project-independent knowledge* versus *project-dependent uncertainty* are linked to the project specific contexts that in their studied cases prevented the initial ideas from immediate implementation.

### **A comparison between the hypothetical guidelines and earlier theories**

Our seven hypothetical factors to enhance the outcome of client driven demonstration projects seems to correspond well with most of the factors or decisive areas found in earlier research. However, some of our factors differ from earlier results. Notably, earlier theories with innovation benefiting factors seem to have their starting-point in a rational choice to innovate. Rogers (1995) and followers set the quality and relative advantage of an innovation as point of departure for the innovation adoption process. One of our hypotheses is that the starting point is the commitment to contribute to development in general not in a specific technology or concept. The commitment to engage in development and maybe more specific

in sustainable development is part of the client's business and operational strategy. The decision concerning the innovation to invest in will be a second step. Thus our model takes an earlier and more strategic start than related innovation and adoption theories.

At this stage of the research process our tentative empirical material does not show any strong bias towards technical issues and technical capabilities in client organisations. In addition, our tentative empirical material has examples that oppose to the link between innovative behaviour among clients and the use of experienced staff members as innovation champions, as was found by Ling *et al.*, (2007). However the rejection of these factors will need further empirical studies. On the whole, the idea of identifying areas or factors that benefit client innovation and client driven demonstration projects seems like a possible way to proceed with the research.

## **CONCLUDING REMARKS**

Undoubtedly, clients have a prominent role in increasing the innovation and diffusion rate in the building sector, in the field of sustainable building but also in other domains. There is an interest among Swedish client organisation to engage in learning and demonstration projects which is supporting to the idea of developing client driven demonstration projects. Problems with earlier demonstration projects justifies the development of guidelines, also as a means to support organisations that have experience with demonstration projects but not routines for innovation and development projects sufficiently embedded in the organisation.

Questions that will be developed in the continuation of this project are the role of the client in innovation and in demonstration projects, in relation to other involved actors and stakeholders, and also how different client organisations handle the process of setting objectives for development and innovation, with or without external support, and in what way they bring in knowledge into the organisation, if necessary, to set the ambition levels and choose solutions to reach objectives, and to evaluate and disseminate results.

## **ACKNOWLEDGEMENTS**

This research project is supported by The Swedish Research Council and the Swedish Construction Sector Innovation Centre.

## **LITERATURE**

- Barrett, P. and Stanley, C., *Better Construction Briefing*, Blackwell Science, Oxford, 1999
- Barrett, P., Abbot, C., Sexton, M. and Ruddock, L., *Hidden innovation in the construction and property sectors*. RICS Research Paper Series, Vol 7, No 20, RICS, London. 2008
- Bresnen, M., A. Goussevskaia, and J. Swan. Managing projects as complex social settings. *Building Research and Information*. 3 (6), 487-493. 2005
- Brandon, P. and Lu, S.L., *Clients Driving Innovation*, Eds. Wiley-Blackwell, 2008
- Bröchner, J and Månsson, L-G., *Nyttan av experimentbyggande : projekt stödda av Bygghögskolebyråerna 1977-1994*. Bygghögskolebyråerna. 1997
- Buijs, A. and Silvester, S., "Demonstration projects and sustainable housing" *Building Research and Information*, 24 (4) pp. 195 – 202. 1996

- Davies, A. And Hobday, M., *The business of projects. Managing innovation in complex products and systems*. New York: Cambridge University Press, 2005
- Dubois, A. And Gadde L-H., 'Construction industry as a loosely coupled system.' *Construction Management and Economics*, 20(7), pp. 621-631, 2002
- Edén, M., Femenías, P. and B. Rubino. "Demonstration Projects as an Arena for Implementation and Development of Sustainable Building." *Proceedings from The International Sustainable Building Conference SB05 26-28 September Tokyo*. 2005
- Egan, J., *Rethinking Construction*. London, DETR HMSO. 1998
- Egmond, C. , Jonkers, R. and Kok, K., 'A strategy to encourage housing associations to invest in energy conservation' *Energy Policy*, 33, 2374-2384, 2005
- Femenías, P., *Demonstration Projects for Sustainable Building: Towards a Strategy for Sustainable Development in the Building Sector based on Swedish and Dutch Experiences*. Chalmers Architecture. Dissertation, 2004
- Femenías, P. and M. Edén. *Byggherremodell för demonstrationsprojekt – Implementeringsguide* The Swedish Construction Clients Forum. Stockholm. 2009
- Femenías, P. and Hal van A., 'Sustainable Housing Transformations: The Housing Association as a Change Agent for Environmental Innovation and Social Regeneration – Two case studies', the ENHR conference Prague, 2009
- Fernie, S., R. Leiringer, and T., Thorpe. Change in Construction: A Critical Perspective. *Building Research & Information*, 34 (2), 91-103, 2006.
- Green, L. and Kreuter, M (1999) *Health promotion planning*. 3<sup>rd</sup> ed. Mountain View.
- Hal, van, A., *Beyond the demonstration project: Diffusion of environmental innovations in housing*. Dissertation. Delft University of Technology. Best: Anaes, 2000
- Hartmann, A, Reymen, I M M, and Oosterrom, G., 'Factors constituting the innovation adoption environment of public clients' *Building Research and Information*, vol. 36, no. 5, pp. 436-449. 2008
- Ling, F. Y. Y., Hartmann, A., Kumaraswamy, M., Dulaimi, M., 'Influences on innovation benefits during implementation: Client's perspective' *Construction Engineering and Management*, 133 (4), pp. 306-31, 2007
- Rogers, E. *Diffusion of Innovations*, 4<sup>th</sup> edition The Free Press, New York. 1995
- Rubino, B., A new generation of demo-projects for sustainable sector-integrated innovations. The Fifth International Conference on Construction. May 2009, Istanbul, Turkey, 2009
- Sexton, M., Abbot, C. And Lu, S-L., 'Challenging the illusion of the all powerful clients' role in driving innovation', In Brandon and Lu eds. *Clients Driving Innovation*. Wiley-Blackwell, 2008
- Slaughter E. S. and Cate, W. L., 'Critical actions by clients for effective development and implementation of construction innovation' In Brandon and Lu eds. *Clients Driving Innovation*. Wiley-Blackwell, 2008
- SOU 2002:115, *Skärpning gubbar! Om konkurrensen, kvaliteten, kostnaderna och kompetensen i byggsektorn*. Governmental communication. Stockholm, 2002
- SCCF, *Byggherren som förändringsagent till nytta för användaren*. FoU program 2007, Byggherreforum, 2007
- Ivory, C., 'The cult of customer responsiveness: is design innovation the price of a client focused construction industry?' *Construction Management and Economics*, 23 (8), pp 861-870, 2005