CONSTRUCTING AN ARENA FOR ENERGY EFFICIENT MULTI-FAMILY HOUSING DEVELOPMENT:

A case study of inter-organisational knowledge sharing

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Abstract

The Swedish building sector has for a long time struggled with the difficulty to create and share new knowledge. Within the sector, groups of professionals have been found to only share knowledge with members of their network, not with those they consider to be outsiders. As an attempt to unite different views and professional groupings, an arena project for sharing knowledge on energy efficient renovation of multi-family buildings was created by a group of scientists. This paper is examining the forming of this knowledge arena for sustainability. The overall purpose is to create an understanding of how knowledge can be shared between different communities. The paper identifies triggers that facilitate knowledge sharing between arena participants representing different organisations related to the Swedish building sector. By using case study methodology, data was collected through interviews with arena participants, observations and document studies. Findings revealed arena seminars and pilot projects as catalysts for social interaction, and a common tool served as a coincident boundary object. All three triggered sharing of knowledge across communities. Still, in spite of good prerequisites, the social interaction that took place on the arena was not enough to inspire sharing of knowledge to any large extent, thus preventing the arena project becoming what was hoped for, i.e. a driver of innovation for sustainability.

Keywords

Knowledge Management, Swedish building sector, Sustainable development, Social interaction, Boundary objects

1. Introduction

A process towards a viable and sustainable construction sector relies on its ability to foster and transfer innovated products, services and practices (Keast and Hampson, 2007). Sustainable and energy efficient renovations of the building stock involve innovations such as new materials, products, structures, designs and tools. The usefulness and performance of new innovations does however not depend solely on technology, it is also highly influenced by on-going acts of organising (Baumann, 2004). These organising processes create institutions that provide a pattern for behavioural norms within a specific setting, for example when deciding to renovate a multi-family house from the 70's. These institutions are in turn created by people that interact within them and create meaning of them in relation to their everyday context (Gluch, 2005; Stenberg, 2006). A process where knowledge and knowledge sharing between people becomes an essential part. However, the view given of the Swedish construction sector reveals an industry struggling with documented inefficiency and difficulties to create and share new knowledge (SOU 2000:44; SOU 2002:115; Statskontoret, 2009:6).

The need for cooperative activities, both within and between different organisations, has been emphasised as important for innovation (Slaughter, 1998; Harty, 2005; Keast and Hampson, 2007; Ling *et al.*, 2007). Ling *et al*. (2007), for example, conclude that for a successful implementation of innovations there is a need for involvement of a variety of organisational units. They emphasise that organisations that maintain their competence through different cooperate means, including internal groups, R&D projects, and long-termed relationships with stakeholders, achieve larger innovation capabilities than others. However, a recent survey show that companies within the Swedish building sector have scarce or even absence of cooperation with R&D departments or institutes, as well as with other environmental knowledge intense organisations, as for example environmental organisations and authorities (Gluch *et al*, 2010). Studies of organisational culture and behavior in the construction sector show that groups of professionals have been found to only share knowledge with members of their personal network and not with those they consider to be outsiders (see for instance Kadefors, 2002; Bresnen *et al*, 2005; Knauseder, 2007). More, in housing organisations those who make business-strategic decisions, including those on sustainability, are seldom the same people as those who possess environmental expertise (Stenberg, 2006). These different actor groups represent disparate discourses where one group may be guided by short-term prerogatives while others take on a more long-term perspective.

As an attempt to unite different views and professional groupings, a knowledge arena project for energy efficient renovation of multi-family buildings was created in 2008. The initiative was driven by state directed funding for energy efficiency of the Swedish building stock, an emergent perceived need for knowledge among municipal housing companies, and an enthusiastic research leader at a technical university. Based on case study methodology this paper is examining the forming of a knowledge arena for sustainability.

The overall purpose of the paper is to understand how knowledge can be shared between different communities; in this case various research communities, municipal housing companies, energy suppliers and governmental organisations. The research is based on the assumption that sustainable innovation is dependent on access to external knowledge sources through for example inter-organisational relationships and cooperation (Gluch *et al*, 2009). This means that innovation happen when people from various knowledge fields meet and interact around a shared interest and/or task. To fulfill the purpose, the researchers have followed the process of creating and maintaining a knowledge arena for energy efficient renovation of buildings over a period of two years (2008-2010). Specific focus has been on identifying triggers for interaction and knowledge sharing between actors that normally do not meet in their everyday practice.

2 Literature review

Since the beginning of the 1980's and even more so in the 1990's, the development of the theoretical field Knowledge Management has mainly circulated around the concepts of knowing in organisations, organisational learning and the management of knowledge. Within literature two ways of viewing knowledge can be distinguished: 1) as an asset, or 2) as a process. The two views upon knowledge imply fundamental differences related to assumptions about the nature of knowledge, knowing and knowers (Wenger (1998).

According to Empson (2001) can those who look upon knowledge as an asset seek "to identify valuable knowledge within organizations and to develop mechanisms for managing it effectively" (Empson, 2001:812). This means that it with proper structure and management can become an organisational competitive advantage (see for instance Zander and Kogut, 1995; Teece, 1998; Nonaka *et al*, 2001). This notion diminishes, according to Gherardi and Nicolini (2003), knowledge into a storable product that can be sent and received. From a process perspective knowledge is instead looked upon as a result of social construction and interaction which "cannot be analysed and understood as an objective reality" (Empson (2001: 813). A view also shared by for instance Wenger (1998) and Nicolini *et al* (2003). Much research has been done adopting both views within various industries over time. However, knowledge as an asset has been the dominating view for research done on the

building sector. Present study adopts the process view on knowledge and management of knowledge. The objective of this line of research is to understand the creation of knowledge, how it is conveyed, articulated and legitimated. This is done by studying individuals' interaction in specific contexts, in our case through studying joint activities between practitioners and scientists.

2.1 Sharing knowledge inside and between communities

Wenger (1998) sees acquiring knowledge as a social process and introduces the theory of communities of practice. His theory is based on the assumption that knowing is a competence valued by others and thus is pursued through active engagement in the surrounding environment, where meaning is created through negotiation of a common way to view the world, which in turn is reflected in practice. According to Wenger (1998) meaning is created through talking, individually or collectively, about experiences in life, thus making the world meaningful. Practice is regarded as an institutionalised 'doing', which has been constructed through a social system of relations where agency is distributed between individuals and artefacts. Practice is also emergent consisting of collective and situational actions that take place through interconnected net-works and communities (Gheradi, 2009). It is in interaction that information may be appropriated, i.e. engaged and becomes part of a person's internalised stock of knowledge, and subsequently enacted upon (Gherardi and Nicolini, 2000; Gluch and Räisänen, 2009). In this shaping process, notions of, for example, the natural environment are verbalised and translated into objects that in turn are made sense of and translated into action (Füssel, 2005; Stenberg and Räisänen, 2006).

According to Kimble *et al* (2010) the knowledge in a group or a community reflects its norms and preoccupations. This may hamper the community's ability to develop new ideas. Thus, activities for retrieving new knowledge from outside is often needed and can according to Teigland and Wasko (2003) start through participation in networks, through informal meetings or by participation in workgroups. Drawing on theories such as Wenger's (1998) communities of practice, Kimble *et al* (2010) conclude after studying groups of IT professionals and networks of healthcare professionals that "innovation in groups depends on information and knowledge gained by cross boundaries between communities" (Kimble *et al*, 2010:7). In order to be successful they state that an understanding on what can be achieved through interaction between the different participating actors from different communities must be in place. More, Wenger's (1998), among others, way of looking up on the knowledge acquiring process, stresses the importance to also understand social interaction mechanisms when studying knowledge and learning.

2.2 Boundary objects

Boundary objects are suggested to bridge different viewpoints and enhance cooperation between actors within and between groups (Star and Griesemer, 1989; Knorr Cetina, 1997; Styhre and Gluch, 2010). Star and Griesemer (1989) introduced the concept of boundary objects after studying tensions caused by different viewpoints in a group of scientific actors associated with the Museum of Vertebrate Zoology at the University of California, Berkeley, USA. Objects are in this sense not neutral material artefacts but socially constructed, symbolic and attached with meaning (Bresnen and Harty, 2010). Boundary objects have been defined as follows:

> *"Boundary objects are those objects that both inhabit several communities of practice and satisfy the informational requirement of each of them. Boundary objects are thus both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites.[…] The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting communities" (Bowker and Star, 1999: 297)* .

Star and Greisemer (1989) identified four types of boundary objects: *repositories*, *ideal types*, *coincident boundaries* and *standardised forms*. Repositories are described as 'piles' of objects where different actors can use and borrow from the 'pile' for their own purpose. One example of a repository, given by Star and Griesemer, is the library. Ideal types are presented as objects such as diagrams or maps. In construction an example of an ideal type of boundary object is drawings. Objects that are shared by cooperating parties and are viewed as a common referent, but differ in internal contents are described by Star and Griesemer as coincident boundaries. An example of a coincident boundary object in construction is tendering documents. Boundary objects can also be standardised forms, holding descriptions of methods and ways to communicate across scattered organiations, as for instance documents in a technical platform used for constructing bridges or warehouses (Styhre and Gluch, 2010) or environmental managements systems.

According to Bucciarelli (1994), who have studied the nature of engineering design can boundary objects be used in a social construction process among project participants (i.e. groups) in order to overcome conflicts, set common goals and enhance interoperations between different object worlds'. These objects aim at creating common knowledge bases within the organisational structures connected to the objects. Furthermore, and also in line with Star and Greisemer (1989), Subrahamanian *et al* (2003) argue that boundary objects

have to be translated by an interpreter in order to play a role at the interface of engineering work since different discourses concepts are understood differently. The boundary object thereby links different perspectives between members in groups, networks or organisations and as internal and external changes influence these constellations and interfaces there is a need to reexamine and develop the boundary objects in order to create new common grounds (see for instance Subrahamanian *et al*, 2003; Carlile, 2002).

3 Method

Semi-structured interviews were carried out with 18 respondents from different organisations, partaking in an arena project for sharing knowledge in order to develop energy efficient municipal housing when renovating. All interviewed organisations, companies and institutions were situated in the south-western parts of Sweden. The interviewees were divided into three groups, also called communities; scientists (8), practitioners (7) and others (3). Interviewees belonging to the scientist community were employed at either a Technical University or a Technical Research Institute. These interviewees are in this paper referred to as scientists. Interviewees employed with municipal housing companies (most of them belonging to the same mother company within the region), are in this paper referred to as practitioners. A local energy company and the Region Västra Götaland (a regional organisation governed by democratically elected politicians) were also partaking in the arena project and are here referred to as others.

Interviewees were selected from the arena project's contact list ensuring all participating organisations were interviewed via their official contact person for the arena project. The interview guide had open-ended questions, meaning that the interviewees were allowed to further elaborate around the issue of energy efficiency and their mutual engagement in the arena project. Questions were formulated to identify knowledge sharing activities from a process point of view, encouraging interviewees to give their view on interaction within the arena, where and when they felt knowledge was shared and during what circumstances. All interviews were carried out between March and May, 2010, and lasted between 1 and 3 hours. Interviews were recorded, summarised and grouped into answers made by scientists, practitioners and others. Later, their answers were analysed to find interaction patterns, i.e. occasions where knowledge had been shared, under what circumstances and with whom, thus identifying triggers for knowledge sharing.

Furthermore, the researchers also sat in on; four planning meetings, two seminars and two reference group meetings held within the arena project in order to observe interaction, follow discussion topics as well as use of language and terms. Information gathered at these occasions created an understanding of the interviewees' line of thought and helped the

interviewer ask relevant follow-up questions. The researchers also had access to documents produced within the arena project, such as meeting protocols, information leaflets and seminar material. Meetings and documents were read through and gave the interviewer background information on how the arena project had been developed, for what purposes and how it functioned.

4 Case description

Although debated upon, figures show that in Sweden, housing and services utilise approximately 40% of the total energy use (Ågren *et al*, 2008) and close to 50% of the electricity (Energimyndigheten, 2010). It is therefore of national interest to decrease energy consumption in housing. Today, there are approx. 600.000 apartments constructed between 1965-75, in Sweden often referred to as 'the great housing development' or 'the million housing program'. A majority of these multi-family apartment buildings are today in need of extensive refurbishment, due to their large use of energy, but also as a part of continuous maintenance. Also, a majority of these buildings belong to municipal housing companies that have budget constraints on maintenance in order to deliver a cost effective service to municipal inhabitants.

In order to take on the challenges of decreasing energy use in housing, reliable knowledge is needed on planning and shaping of housing, as well as how its operation affect the energy use. Thus, in order to find incentives, as well as management control measures, the state funding was aimed at encouraging innovative technical solutions and collaboration between actors within the Swedish building sector. Incentives and measures that would make the municipal housing companies take on the challenge of decreasing the use of energy in multi-family housing.

The arena project was initiated by scientists from a Technical University in conjunction with scientists at a Technical Research Institute. Together they applied for and received the state funding. In order to fully finance the arena project, all participating organisations had to pay a fee that later could be used as stake when involving scientists as experts in business operations, for example in construction and refurbishment projects. Other members of the arena project were practitioners from six municipal housing companies, a local energy company (Ecom) and Region Västra Götaland (RVG), an organisation governed by democratically elected politicians and assigned to protect the well of the region.

The initiative to create the arena project was taken by the scientists in the autumn of 2007 and the project was officially launched in the beginning of July 2008. The driving force in the creation process was a dedicated scientist, also assigned arena project leader, well respected for his long-term experience and reliable knowledge of energy technology. More,

by the end of 2008 the first pilot project on the arena started. Additionally, the arena project has extended the two-year time line by half a year, now estimated to finish by the end of 2010.

As stated in official arena documents, the purpose of the arena project was three-folded; 1) to share knowledge between scientists and practitioners (i.e. clients, contractors and consultants), 2) for scientists to gain knowledge from real life projects on different aspects of energy efficiency in order to 3) mediate this knowledge to future projects. Aspects evaluated by the scientist were divided into two rather detached focus fields; one subdivided into four technical areas (installations, function of building exterior, classification and conserving and retrofitting of buildings), and one subdivided and related to implementation, knowledge transfer and incentives. As part of the second focus field, the research project presented in this paper has only investigated and evaluated the focus field of technology. The interaction in the arena project between scientists and practitioners was intended to evolve around ongoing pilot projects, where scientists contributed with expertise when evaluating different aspects of the project performance. Also, interaction between scientists and practitioners was intended to take place at planned arena seminars handling issues related to the two focus fields.

Approaching the end of the arena project for sharing knowledge on how to make multi-family housing more energy efficient, three pilot projects have been started and one completed. Also, two seminars have been held, one within each focus field. What is more, numerous meetings have taken place on the arena, and three scientists have used the arena project doing interview studies.

5 Constructing an arena – identifying triggers for sharing knowledge

When analysing data, key triggers were identified as drivers for sharing knowledge on the arena.

5.1 Arena seminars

Nearly all interviewees stated that they participated in the seminars arranged within the arena project. Also, several delegates were often sent from each company, organisation or institution, thus making seminars well-attended by all communities. The first seminar focused on technical solutions to build and renovate in an energy efficient way. The seminar also had a field trip to the first pilot project incorporated. Many practitioners stated that, prior to the first seminar and field trip, they had little knowledge of what possibilities the arena project had, what it stood for and how it worked. However, several interviewed practitioners stated

that they during that seminar made, and later maintained, contact with scientists. Contacts they claimed they otherwise would not have made, as shown in the citation below:

> **"***I wouldn't have called him if I hadn't been [on site] at that seminar, I don't think."*
>
> Interviewed Practitioner

Interviews showed that interaction amongst participants at this seminar later made two other municipal housing companies decide to initiate their own pilot projects, thus using their arena fee as payment for involving scientists in their construction process.

Other interviewees also saw the arena seminars as a great opportunity to listen in on the specification of daily obstacles practitioners meet when working with energy efficiency, and to observe how these obstacles were dealt with in interaction between practitioners and scientists. Thus, others took on the role as primarily observers and spreaders of knowledge obtained within the arena project to other energy efficiency projects in the region, as demonstrated by the citation below:

> *"We try to spread the good word and the power of good examples. In addition, we work with municipalities, many of them are doing well, but we try to make them put even more focus on these [energy] issues as they have great impact on the way [housing] gets built."*
>
> Interviewed RVG

In doing so, these arena participants gathered knowledge on current and future technologies and market trends on making housing more energy efficient. Later, this knowledge was shared with other housing companies not participating in the arena project. Furthermore, the local energy company used the arena project seminars to gain knowledge on clients' thoughts on energy solutions for multi-family housing, trying to market own services and solutions to facilitate the process, as shown in the citation below:

> *"The purpose is to listen and learn [from our clients] and sense the trends. What type of energy solutions do our*

clients want in the future? But also, to present our products and the advantages we see that they have."

Interviewed ECom

Information gathered on the arena by the local energy company was thus primarily used to develop company services to meet market demands.

Most interviewed practitioners stated that they partook in the seminars, and found them interesting. However, they also considered them not as efficient for sharing and building new knowledge as the pilot projects.

5.2 Pilot projects

Most interviewed scientist and practitioners expressed that they found participating in the pilot projects very self-evolving. Especially the scientists were eager to collaborate both amongst themselves and with the practitioners in order to learn more from real-life situations. Also, practitioners participating in the first pilot project expressed that they had learnt a lot from collaborating with the scientists and that they, via arena fees along with additional own financing, had tested and evaluated technical solutions, e.g. windows installations, in their pilot project. According to the interviews, had performance of these tests not otherwise been done, as the quote below indicates:

"We wouldn't have done all these things. We wouldn't have done that full scale testing of the windows at the Technical Research Institute, as they wouldn't have been involved. Some things we would have calculated, but we would have used some consultants to do them, someone without an expertise background, as we probably wouldn't have come in contact with all the experts."

Interviewed Practitioner

Participating in the arena project with a pilot project thus enabled practitioners to afford hiring scientists as consultants, creating an opportunity to interact that would otherwise not occurred. Interviewees felt that participation in pilot projects lead to a continuous dialog. A dialog that the practitioners stated they seldom experienced in other projects. As a part of the planning phase of the first pilot project, practitioners and scientists used a workshop to discuss possible technical solutions and their effects on the building exterior, as well as their effect on making the building more energy efficient. All interviewees participating in this

workshop expressed great excitement over the interaction and the sense they had of sharing knowledge, as illustrated by the quote below:

"We just opened up and talked about what we knew best.
[…] Both me, and the others, we all learnt something new.
[…] It would have mattered without that workshop, we all
got the feeling that it was a common project."

Interviewed Scientist

As the quote above indicates, knowledge was shared as a result of open and face-to-face communication amongst workshop participants. More, many interviewees, both scientists and practitioners, also pointed out the project leader of the first pilot project as a driver and facilitator for knowledge sharing at multiple planned as well as coincidental occasions. What is more, the project leader for the first pilot project planned for and eased interaction among project participants by sharing her enthusiasm, as the citation below demonstrates:

"It was she who encouraged us, she sat up meetings, like
the workshop, presented a structured agenda and a plan,
and it was a good plan. But, also her desire and
motivation to do this pilot project."

Interviewed Scientist

Later, some of the participating scientists in the pilot project had regular contact with the construction site through frequent visits on site. These occasions facilitated a continuous discussion on questions raised by site personnel throughout the construction phase.. The frequent interactions were much appreciated by both practitioners and scientists and were stated by the participating interviewees as opportunities where much knowledge was exchanged. Therefore, the project leader of the first pilot project suggested an introduction of cross-reference groups in all future pilot projects, consisting of both scientists and practitioners partaking in the arena project, in order to further enhance knowledge sharing on the arena.

5.3 Development and use of a common LCC- tool

A tool for calculating life cycle cost (LCC) was developed on the arena by scientists in conjunction with the project leader of the first pilot project and the municipal housing companies' common parent organisation. What is more, in order to take on long term perspectives on management of housing, the tool was used by nearly all practitioners in similar ways, but for different purposes and in different situations. For instance, was the tool used frequently in the first pilot project to decide on what products or solutions to use. Its effects are talked of below:

> *"It was a challenge. One discovers what problems, possible solutions and constraints there are financially and technically, and what you can do. […] I learnt a lot from this project!"*
>
> Interviewed Practitioner

Results from using the tool in the first pilot project thus served as support and mediator in discussions between scientists and practitioners partaking in the project. However, the attitudes towards the tool differed amongst the practitioners, as another municipal housing company used it to compare new and old installation products do make decisions whether to replace them or not. How that is looked upon is stated below:

> *"I guess we're not fully finished using the LCC-tool. We don't see it as an autocratic investment tool. It is rather one part of the evaluation of the investment"*
>
> Interviewed Practitioner

Here, the tool provided a foundation for intra-organisational discussions and decision making. Yet another municipal housing company did not use it at all, for reasons given below:

> *"We have the program here, and so on, but we haven't had any projects where it could be put into use, sort of speak."*
>
> Interviewed Practitioner

However, interviews showed that few of the practitioners knew how the tool had been developed or by whom. Furthermore, few interviewees, part form the practitioners and the scientists involved in the development, had knowledge of that the tool was a product of the arena project.

Moreover, as practitioners had had no input in the initiation or outline of the arena project, suggestions were made by practitioners during interviews on more tools that would enhance communication and sharing of knowledge on the arena. For instance, several interviewed practitioners suggested a common arena portal where updated activities could be administrated by all participants. By doing so, they thought knowledge about what was ongoing in the arena project would be instantly and more effectively transferred than the current sporadic email message update from the arena project leader.

6 Discussion

This paper has taken the process point of view when identifying triggers that drive sharing of knowledge. The identified triggers are; arena seminars and pilot projects as catalysts for social interaction, and tools that have the possibility to serve as coincident boundary objects.

State funding and an enthusiastic arena project leader enabled the arena project. However, they were not triggers for the actual sharing of knowledge on the arena. Two stated purposes of the arena project refer to knowledge as something earned and mediated. This rather naïve adopted point of view of knowledge as a storable resource can well have affected the interaction and sharing of knowledge on the arena.

Acquiring knowledge is however a social process that needs, but is not solely dependent on, face-to-face interaction. More, knowing is seen as competence evaluated by others through negotiation and active commitment to the surrounding environment, i.e. to groups of professionals or members of personal network. The choice to participate in and develop the arena practice was made through talking about shared frameworks and perspectives that created mutual engagement, e.g. when scientists initiated the arena and outlined its boundaries and content when writing up the application for state funding.

Participation in the arena project increased gradually through social interaction between its participants, which lead to strengthened individual relations. Here, arena seminars and later the more deep interaction amongst participants in pilot projects worked as catalysts for social interaction, and thus facilitated knowledge sharing, similar to what was described by for instance Wenger (1998) and Gheradi and Nicolini (2000).

Seminars were seen as less efficient for sharing and building new knowledge than the pilot projects. However, seminars served as, what Wenger (1998) refers to as, drivers for active engagement in the surrounding environment. As a result, new meaning and a common world

view was negotiated amongst arena participants through collective talk of experiences made when renovating using energy efficient technology. This happened at numerous occasions throughout the arena project, for instance, at the first arena seminar with the included field trip. More, new practices were developed over time, such as using the LCC-tool in everyday decision making, as fresh ideas were incorporated into participating organisations, companies and institutions through their arena representatives. As a result of social interaction at arena seminars, where knowledge was appropriated, i.e. became a part of participants' internalised stock of knowledge, actions were later adjusted according to that acquired knowledge, e.g. more pilot projects started. This inter-organisational processing of new knowledge explains the gradual development of the arena. Later, the development of practice and the sharing of knowledge deepened in the first pilot project, as a result of more intensive social interaction through the workshop, project meetings and regular visits on site.

The long term perspective was a preoccupation within the different practitioner organiations as monetary constraints prevented them to fully take on the challenge of reducing the use of energy in multi-family housing. Here, the LCC-tool developed on the arena had the intention to facilitate decision making related to these issues. The variation in use of the developed LCC-tool shows how practitioners struggle to justify investments in energy technology during renovations.

More, boundary objects are used in the social construction process to bridge difference in viewpoints and enhance cooperation between actors. To be perceived as a boundary object, the tool had to be interpreted in order to play a role at the interface of different world views. Thus, data extracted from the LCC-tool gave both practitioners and scientists in the first pilot project, as well as practitioners within the same municipal housing company, a common knowledge and served as foundation for discussions on choosing products. Therefore, the LCC-tool can be seen as a coincident boundary object, as described by Star and Griesemer (1989), since it is shared by cooperating parties and is viewed as a common referent, but differ in initial contents.

The suggestions made on a common arena portal and cross-reference groups in projects can both have the potential to ease interaction on the arena and serve as facilitators for sharing of knowledge.

7 Conclusions and further research

In spite of good prerequisites in form of funding, needs and enthusiasm, the creation of the arena project for sharing knowledge to find sustainable and energy efficient solutions for the renovation of multi-family housing have experienced problems in taking off and becoming what was hoped for, i.e a driver of innovation for sustainability. The social interaction that

took place on the arena was not enough to enhance sharing of knowledge to any larger extent. However, the focus of the arena project has been on technical issues and little attention has therefore been paid to incentives that drive sharing of knowledge, and thus innovation.

The triggers identified in the study are strongly related to social interaction and have enhanced the sharing of knowledge. By bringing these triggers into light, this paper contributes towards the understanding of what drives knowledge sharing, and thus innovation in inter-organisational environments.

However, further investigations of under what circumstances theses triggers occur, and what impact they have in various situations and settings in the Swedish building sector are needed.

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