RENEWING RENOVATION: LOOKING AT RENOVATION OF OWNERS OCCUPIED HOUSES WITH SOCIO-MATERIALITY LENSES

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Owner occupied houses built in Sweden before 1980 are in need of renovation to achieve the 2020 energy performance directives. Despite political pressure, these renovations are far from been realised. To explain this slow take off, studies have mostly focused on the necessity to better bridge new technical solutions with the needs and behaviours of the users. We propose to enlarge this analysis to a broader set of actors including the craftsmen in charge of the physical work and the houses themselves with their specific features and characteristics. To do so we build our contribution on the concept of socio-materiality. This perspective argues that technological artefacts are socially constructed but recognises a role to materiality; it describes the social and the material as becoming constitutively entangled. Drawing on the case studies of 18 small craftsman companies and their customers, our method includes interviews, workshops and ethnographic work. The results show many differentiated representations of the renovation process at stake. Norms and experts are portraying the house as a holistic system which parts need to be in balance; the various craftsmen relying on their own trade have a rather fragmented view regarding the interventions they carry out; the owners are mainly interested in comfort, aesthetic and economic considerations; the house itself besides its original material features often displays unique characteristics as the result of diverse modifications executed since the days of its construction. All these positions need to be understood and somewhat aligned in order to achieve successful implementations

Keywords: energy renovation, socio-materiality, single family house owners.

INTRODUCTION

Sweden has formulated ambitious national policies regarding energy consumption and sustainability, but is challenged when facing implementation of solutions to reach these climate targets. Buildings represent 30% of the total energy consumption in Sweden (Boverket 2010). Energy renovation is therefore one of the most significant contributions to decrease energy usage. However if renovation of large housing development is taken care of by large contractor companies, the renovation of single family houses is lacking behind. In particular houses built between 1950 and 1975, representing 43% (Boverket 2005, SCB 2014) of the Swedish dwelling are in need of renovation. Houses of this period see many of their features such as ventilation, bathrooms, laundry, drainage, windows or roofing coming to end of their lifetime expectancies. However, many owners carry renovation and redecoration without including energy efficiency interventions. The situation seems to be similar in other

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European countries, where energy renovation has still not become a *"practice"* (Bartiaux *et al*. 2014).

In the present paper, we contribute to the study on the lack of retrofit initiatives when houses built between 1950-1975 need to be renovated. We use the term retrofit when the renovation process includes energy consumption concerns and renovation when energy saving is not included in the process. Building on the concept of socio-materiality, we include among the actors in presence during the renovation, the house itself with its specific features and history as well as the diverse documents helping the decision process. We focus on the performative role of material elements and the actors' different representations at the time when the scope of the renovation project is shaped. The concept of socio materiality understands technological artefacts as socially constructed but recognises a role to materiality; it describes the social and the material as becoming constitutively entangled. Drawing on the case studies of 18 small craftsman companies and their customers' engagement in renovation processes our method includes interviews, workshops and ethnographic field work.

The remainder of the paper opens with a short presentation of recent studies of single family houses followed by a theoretical frame presenting the concept of socio-materiality and the method section. The next section presents findings, discussions and conclusion.

RETROFIT (OR LACK OF IT) FOR SINGLE FAMILY HOUSES

The high cost associated to retrofit along with the difficulty to obtain distinct energy savings have often been used to explain the lack of success that retrofit meets with single family house owners. These cross benefit types of analysis have been criticized for having a too narrow view on energy investments.

More recent studies have focused on the actors and the decision processes prevailing in the choices of interventions, retrofit, renovation or decoration of houses (Vlasova Gram-Hanssen 2014, Archtnicht and Madelner 2014, Haines and Mitchell 2014). The actors usually identified in these processes include: the house owners, the craftsmen, the policy and regulation and sometimes the technical experts. The lack of energy saving initiatives for the renovation project is differently attributed following the actors.

For the house owners, one of the main barriers identified is the lack of information and technical knowledge regarding retrofit. (Mortensen *et al*. 2014). In addition, house owners address their investments to other forms of renovation triggered by comfort, lifestyle and esthetical aspirations (Risholt and Berker 2013). However these studies also show that successful retrofits are clearly associated with proactive house owners (Risholt and Berker 2013, Galvin and Sunikka-Blank, 2014).

The craftsmen are said to be insufficiently equipped to develop and adapt new solutions to their current practices, they lack the full set of skills and resources to deal with but also to benefit from the upcoming increase of opportunities (Mokhlesian and Holmen 2012). Under pressure to deliver within tight time frames, they tend to offer and repeat standardized solutions to their customers (Archtnicht and Madelner 2014).

Policy and regulations should foster and support changes in actual practices by developing new building and operation standards (Directive 2010/31/EU). Economic and information policy instruments may be more useful than regulatory instruments to influence owners of existing houses to adopt building envelope measures (Mokhlesian and Holmen 2012). Without their actions, the energy targets seem to be difficult to

realize (ibidem 2012). However, as the retrofit strategies presented are not addressing their lifestyle and aspiration, house owners may not find these recommendations helpful or practical enough to follow them as in the Danish case described by Christensen *et al*. (2014).

Energy experts and energy consultants as private or public servants are helping house owners by informing about concrete possibilities of reducing houses energy consumption or producing new energy. Their role has been recognized in supporting retrofit projects (Vlasova and Garm-Hanssen, 2014). In Sweden these experts' advices seem to be followed by the house owners when consulted, the problem is that only few of the owners are actually seeking their expertise (Mahapatra *et al*. 2011).

However, the retrofit market is not only depending on the four actors, large do-it-yourself chains and magazines are also participating by assisting clients to carry jobs themselves (Buser and Carlsson, 2014). If house owners have opted for having a craftsman to carry the renovation, they usually follow their neighbours' advices both in term of technical solutions and companies choices. There is a preference to contact and hire local small and medium sized enterprises (SMEs) (Doona and Jarlbro 2009). Yet, the possibility among other provided by internet, for customers to access advices and services increases their ability to opt for energy efficient solutions and to require specific products (Risholt and Berker 2013). This also puts pressure on the SMEs not only to innovate and increase their portfolio of solutions but also to be able to advocate and argue for their choices when meeting their clients.

THEORETICAL FRAME

To analyse the interactions of the different actors in the renovation process, we build on the concept of socio-materiality (Carlile *et al*. 2012). The scholars engaged in the socio-materiality discussion aim at bringing back *"matter"*, *"thing"*, in a field where most of the interactions between people and technology have been claimed to be socially constructed. They argue that the emphasis of the role of language, *"the language turn"* taking place in the beginning of the 80ies, has eclipsed and marginalised objects from researchers' views. Building on the strands of science and technology studies, which analyse the social aspects of production of science and technologies (Latour 2005, Bijker 1995, Knorr Cetina 1999) and the strands of practice studies which recognise that the activities performed in organisations are not only mental activities but are also inscribed and enacted in body and materiality (Nicolini *et al*. 2003, Carlile *et al* 2013), the socio materiality stream is interested in studying the *"constitutive entanglement of the social and the material in everyday organisational life"* (Orlikowski 2007). In this context, objects have emergent and relational qualities rather than being considered as fixed things (Clegg and al. 2013). This position confers a role to objects in organisational life. The capacity of the nonhuman entities to act without the support of human intervention is called material agency (Leonardi, 2012). This agency is performed trough the things humans cannot completely or directly control (Leonardi 2012). However, material agency can only be activated as humans approach these entities. It is inseparable from the network of social practice it is part of (Suchman 2000). Through practice as they are 'performed', human actors attribute meaning and uses to the materiality and these representations are neither fixed nor stable but emerging: *"Representations, then, are not passive re-presentations but active, constitutive features of (socio-material) practice"* (Monteiro *et al*. 2012).

Paraphrasing Suchman describing a bridge (2009:316) we argue that like an organisation, a house *"can be viewed as an arrangement of more or less effectively stabilised material and social relations…the stability of the house is a matter of materiality, based on architecture, builders and inhabitants practices. This materiality though is inseparable from the network of social practice that must be put in to place to maintain and renovate this artefact over time. More specifically to discuss material agency in renovation process integrating or not energy saving measures, we focus on the performative features of houses and the actors' representations as engaged in this process"*.

The group of scholars gathered under the concept of socio-materiality is not unified. There are tensions within the socio-materiality stream regarding the independency of agency for both human and material. Where for Orlikowski and Yates any *"distinction between humans and technologies is only analytical and can only be done with the recognition that these entities necessarily entails each other practice"* (2008: 256); others see agency for both human and materiality as separate elements whose interactions can be traced and analysed (Leonardi 2013, Mutch 2013).

A brief browse in the literature specific to the construction sector shows that studies building on socio-materiality are rather rare. However, the relation between humans and non-human actors (Latour 2005) has been described by several authors using other concepts such as boundary object (Harty 2008) and Actor Network Theory (Tryggestad *et al* 2013, Sage *et al*. 2014).

METHOD

The method is multidisciplinary and employs an interpretive approach to discuss the empirical material (Burrell and Morgan 1979, Bryman and Bell 2011). The frame of understanding is based on a selective literature review drawing on organisational theories on socio-materiality.

The empirical material for this paper has two sources: the first and main contribution is an ongoing PhD (2013-2016) conducted by one of the author. Her focus is to document and analyse the integration of new energy saving solutions for the renovation of single family houses with a particular attention to the relation between the house owners and the craftsmen engaged to carry the work. This longitudinal study includes so far 13 interviews with craftsmen and enterprise representatives; nine interviews with customers: 5 at the customers' homes at the end of the craftsmen's initial visits and four on the phone after the visit; and six observations of initial encounters between craftsmen and customers to design and decide the scope of the renovation. To these have to be added 14 workshops with a total of 18 craftsmen's companies to discuss and develop the potential of new energy saving solutions for their customers, and including twice the presence of technical experts.

The second source which complements the first one is an example auto–ethnography (Alvesson, 2008). Auto-ethnography can be described as, *"a form or method of research that involves self-observation and reflexive investigation in the context of ethnographic field work and writing"* (Maréchal 2010:43). The second author has been engaged in the process of finding a new house in the region of Gothenburg, (between 2012 -2014). She has visited more than 100 houses and read almost as many technical reports, before finally being able to buy a property in need of renovation last October. She has since been confronted to the choices, advices and works of experts and craftsmen. For this paper, the material included the description and technical

reports from 20 of the visited houses, as well as notes taken after the meetings with the expert, the real estate agent, the former owner and the neighbours.

FINDINGS

Context of renovation in the region of Gothenburg

All renovation projects used as cases for this study have been initiated by the house owner. So far, we have identified four situations at the beginning of the renovation process: the sale of a property; the buying of an existing property; the need for repair; the comfort upgrade to meet lifestyle aspirations or/and energy savings.

As the situation of the second author may have suggested, the region of Gothenburg is under heavy pressure regarding access to residence, for both acquisition and renting of apartment and houses. With few objects on the market, a large amount of buyers and a system of auction similar to the one in Scotland, the prices of housing have increased of 19% for the last 12 months. This situation often pushes buyers to overrun their initial budget. Several of the interviewed craftsmen incriminate this situation to account for the lack of retrofit and large renovation initiatives as the *"buyers are broke once they enter their new property"*.

When selling a property, the Swedish law requires the publication of a technical report describing the physical state of the building and if needed the improvements required for its maintenances. This technical report is a PDF document listing the different parts of the house and indicates which elements need to be taken care of, with a grading system of the seriousness of the failure. Since 2008-2009, the seller has also to provide an energy declaration of the actual consumption of the building as well as solutions and associated costs to reach the new energy standards. Besides the buyer is compelled to organise his or her own technical expertise of the property and make its own assessment, this is often organised by the real estate agent with the same technical expert as the seller used.

The selling of property is not seen by our interviewees as an opportunity to engage in neither large technical retrofits nor renovations. Among the work performed we have one investment in a new heating option. The owners rather invest in cosmetic intervention, like painting and trendy furniture. The business of redecorating houses is booming in Gothenburg giving a uniform look to the properties on sale. This trend is strongly supported by magazines and TV programmes defining what a stylish and attractable house should look like.These lifestyle trends also support the renovation for comfort or energy savings as valorisation mean for the house owner, following an *"eco-chic"* fashion. Though the narratives about retrofit usually include economic rationality and potential savings.

Scope, choices and decision

To help to make a decision about the scope of renovation, the house owners have at disposition a lot of different sources for inspiration: neighbours, media (magazines, internet, TV programmes), do-it-yourself shops, technical reports.

They can also contact the professional actors: craftsmen, public or private energy experts, architects. But the choices of what competences and which professionals to involve can be seen as a burden. As described in a previous study, (authors selves references, 2014), Internet is not very helpful to find and select a specific craftsman. The preferred source of information to engage a professional is often personal contact and network; as described by a house-owner: *"My husband knew the owner since*

before we wanted to renovate, that is how we decided to hire him. Regarding the other craftsmen, we got to know people during the renovation process and through people you can find out who is good and who is not depending on what needs to be done, and from this information we add on new craftsmen in the process".

In our panel, is it not so much what the house owners want to achieve which is an issue but more the matching between the goals they have in mind, the people to carry the work and the physical characteristics of their property. When contacting professionals, house owners expect them to bridge their expected improvements with the features of their own house. However, house owners knowledge about their property is not always up to date as underlined by one the craftsmen: *"Most of the house-owners are not aware of the bad condition of their houses, how the lifespan of some of the materials is long gone and that these desperately need to be replaced to fulfil its purpose… so when they find out, they have to change priority".*

But knowledge of the craftsmen may also be challenged as here by one of the energy expert: *"I have heard craftsmen saying that we should not change the house and its settings because these old houses have never had any problems! And I usually say then that it is amazing that we do not have more problems considering how the houses were constructed before…."*

The house owner may give up his own intention and follow the opinion of the expert as in this observation: a customer comments the solution of solar panels installed by his neighbour and asks the craftsman if this might be something that he too should invest in. However, the craftsman advises against it, claiming that it is not a solution he would recommend as it would not cover the house's specific needs; he then continues to sell his own solution of geothermal heating.Paradoxically, the house owner may be surprised if the professional is not coming with challenging ideas on how to carry the renovation. One of the house owners was disappointed by the craftsman accepting their suggestions of what needed to be done without discussing the solutions she and her husband had proposed.

The different sources of expertise may also be contradicting: old double glass windows have been sealed to their frame by the painting of previous house owner's. The technical report indicates that these old windows may have low insolation efficiency so shifting them could be a good investment. When the new owner informs the expert during the technical visit that she intends to do so, he replies back: *"Why would you like to do that, these windows are fitting with this type of house. Bah, there is no need for that. It is not worth it, it won't pay back".* Actually all her initiatives to increase energy efficiency, like: new roof, heat pump or extended insulation are turned down. She is instead instructed to use only part of the ventilation system and as often as possible let the door of the bathroom in the cellar be open to balance humidity levels, as *"these old houses are working quite nicely"* (expert).

If craftsmen appear to show confidence in their own trade, they may dismiss the competences of others. Competition between professionals is also appearing during the workshops when the craftsmen are gathered to discuss new possible energy solutions: *"There are big risks of moisture problems in houses, however, there are also a lot of myths in the field. I have collaborated with several different carpenters during my years and they can have very different opinions of what can and should be done and how it should be performed, 20 different carpenters can have 20 different ideas"* (craftsman).

Another craftsman claims that *"Even if customers want to insulate their houses it is not for everybody to have."* This position of the craftsman though should not be read as simple resistance to changes. The punctual energy saving interventions of the houses may have unattended consequences which may carry the need for further interventions. Tightening the windows modifies the former ventilation process of the house and increases the risk of keeping moister in the house. Introducing geothermal heating require changes in the chimney pipes and its aeration. Changing from oil tank to district heating may increase the humidity of the cellar. The craftsmen interviewed claim that they rather avoid the domino effects of such changes to minimize the risk of mould problems or speed up the decay of materials.

Facing numerous choices when engaging in a renovation process: *"there is a kind of relief in trusting professionals as it takes from your shoulders the weight of having to make your own decisions, even if you have doubt about the quality of their solutions"* (house owner).

DISCUSSION

The concept of socio materiality allows to conceptualise how humans and non-humans are participating to create choices and scope of the energy renovation process. A house is not only a passive object which should be expected to be continuously shaped by humans. The conditions and the materials which have contributed to the building of the house as well as the successive interventions which have been conducted create a specific situation which escapes from readymade or generic solutions. The house influences and participates to the renovation process by its features and limits the possibilities of intervention, and consequently exhibits its performing role.

Moreover the representations associated to the house by the actors both human and non- human mobilised in the process also participate in the shaping of the renovation project.

The following chart resumes the characteristics and roles of the actors, human and non-human, their representations respectively of the house, and of the renovation project when the scope of renovation is defined. These representations are neither stable nor fixed and may content contradictory statements for the same actor. They show the diversity of interests, positions and goals that the renovation project may mobilise. Their interactions are multiple and complex and we present here a simplified version of this complexity. (Chart should be here)

Agency is a relational process, where some objects are mobilised to empower some of the dominant actors, in this study the experts and the professionals, and disempower their challengers (Clegg *et al*. 2013). The house owners have the difficult task to be project manager for the renovation project. They have to organise professionals who appear to be more knowledgeable not only about the renovation possibilities but also about their own houses. The representations of experts, craftsmen and house owners are often challenging each other as they are built on different meaning and practices related to the houses. In the projects we have looked at, the house owners tends to follow the craftsman they have hired even if his decisions may be contradictory to their own aspiration. The expertise and professional competences mobilised are valorised higher than the house owners own interpretations.

CONCLUSION

Researches on renovation have usually considered the house as a passive element which can be configured at will. Using socio-material lenses to understand the slow take off of the retrofit of single-family houses in the region of Gothenburg underlines the performative role of the house in the process. Both its material features and the social practices to which the house is associated actively shape the decision processes and may limit the scope of the project. If most of the analyses done by other scholars on the barriers to retrofits are confirmed by our empirical case, our contribution shows that the houses themselves play a role in the shaping of the renovation processes. So socio materiality helps us to renew renovation.

Table 1 The socio-materiality of renovation process of single house owner

Actors	Characteristics and role	Representations of the house	Representation of the renovation
House (1950-75)	Original technical features Aging and ware out of material Add on: new bathroom, extension Professional and non-professional interventions	Broken Not functioning properly Not functioning ultimately	Improve the function of the system Repair Maintain Embellish
House owner	Owner, initiator, project manager Individual, couple, family, pets Customer client	Privacy, comfort , identity, emotions, aspirations, aesthetics, cost,	Improve comfort, self-image, value , own economy Impress the neighbours Comply to social order
Craftsmen	Translate the technical features of the house to the owner Define the possibilities and the scope Co-design the scope of the renovation Carry the work Expertise	Focus on materiality and things that need to be fixed Fragmented view related to his own trade Give judgment on the quality of the house Stereotypic understanding of what the owner want and can	Jobs Budget both time and cost Craftsmanship Service Workload Organisation complexity
Experts	Provide expertise Provide new solutions Translate the technical features of the house to the owner	A system	Jobs Sell technical solutions (depends on experts) Make sure laws and policies are followed Make sure improvements works as a whole?
Legislation	Mathematic formula and report between space and energy	Goals to be achieved	Justification of the renovation
Technical reports	Paper or electronic, text, photos, measures pictograms	House fragmented in a succession of elements Hierarchy of the problems - benign to acute Users friendly	Identify (possible) work to be done
Energy report	Paper or electronic, list of items and statistics, figures, formula, very little text, costs	See the house as a system which needs to be balanced Technical features	Propose cost efficient solution to balance or reduce the energy consumption

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