CHOREOGRAPHING NETWORK-BASED INFLUENCES ON THE HOMEOWNERS' DECISION JOURNEY ABOUT ENERGY-RELATED RENOVATIONS

MARIA ISABEL ABREU, RUI A. F. DE OLIVEIRA & JORGE LOPES
Instituto Politécnico de Bragança, Portugal

ABSTRACT

Community engagement with the energy efficiency in housing is seen as a very challenging strategy that governments need to prioritize for climate agenda. Recent studies shed light on the underlying influences of some networks of actors in the homeowners' decision to improve the energy-efficiency of their homes. Understanding the accurate role that both social and professional networks within communities play among homeowners seems to be paramount for energy policies enlargement and effectiveness. In a network level perspective, interpersonal communication, which has so far been undervalued, appears to be an influential mode of trust and information to energy-related activities. An exploratory research has been carried out in order to gain a sense about the whole chain in action between the above mentioned actors as agents of change. Semi-structured in-depth interviews with different Portuguese stakeholders involved in the renovation journey of owner occupied single-family houses were conducted. The findings signpost that interpersonal networks play a trustworthy and beneficial source of information along the entire renovation decision-making journey. In general, these interpersonal connections are conveyed in the social network activating the homeowners' willingness to renovate, being a reliable channel for peer learning, guiding homeowners in the selection of professionals and acting also as an evaluative judgement tool to assess these same professionals in their technical advice. The results strengthen the view that the sense of neighbourliness, proximity and cooperation between citizens engaged in energy issues could pave the way to empower these utmost interpersonal networks which can have positive effects to encouraging house energy improvements.
Keywords: energy policies, homeowners, decision-making, social networks, renovation market professionals.

1 INTRODUCTION

Changing attitudes and behaviour remains a very necessary part of the efforts to reduce CO_2 emissions, however creating consumer demand for energy efficiency measures has been notoriously difficult to achieve. With buildings being a central part of our daily lives, the fact that 75% of the European building stock is still energy inefficient is a throwback for energy transition targets. In fact, around 74% of this stock belongs to the housing sector and is mostly inhabited by the owners, 70% on average in all European Union [1]. Furthermore, the weighted annual house energy renovation rate in the EU27 is still around 1% [1] with single-family houses being a challenge to policy-makers due to the many units, many owners and lack of shared organisations connecting them [2]. Additionally, people across major economies reduced visits to workplaces as teleworking become more normalised therefore time spent at home had increased by nearly 30% at the height of the lockdowns [3]. This time is being used to conduct activities that consume energy, leading to significant and complex shifts in homes energy demand [3]. Therefore, reducing green gas effect emissions in residential property owner-occupied is now more than ever a noteworthy challenge. The ultimate goal for energy policies is to make more non-interested householders attentive to home energy issues [4] since the official narratives are still much focus on already sensitized householders [5]. Moreover, there are cases where already interested citizens can abandon the renovation idea during the decision-making process before putting it into practice [6].

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First and foremost, the success in renovation of the existing building stock to low carbon standards depends on a social, cultural and economic change as much as technical innovation [2], [7], [8]. Therefore, in a counterpart to the techno-economic model (which is a context-free approach), new theories take into account the influence of the social context around the homeowners where house renovations can be a topic of conversation and a matter of trust, friendship and shared values [9]. House renovation intentions may easily be overextended to encompass low carbon outcomes if an influencer or adviser involved is motivated to suggest such changes to the original arrangement [10]. Therefore, further than save energy and generate energy in houses, engaging the "wider community" in this crusade should be a determinant goal for policy-makers [11]. Hence, energy policies should target the networks of actors with which householders have close interaction with [12]. Thus, strengthening knowledge sharing and communitarian citizenship among neighbourhood residents through empowered networks of multiple intermediaries between government and homeowners is seen as a step forward to sustain innovative energy policies [13]. Intermediary actors from the social network and professionals from the ordinary and large repair-maintenance and improvement house market can be a means to governments interacting with homeowners further than via regulations and market manipulation [14]. Despite the potential impact that changes in the behaviour of these intermediaries seems to have, there appears to be slight policies that targets these groups [12] and lack of investigation on how they are influential to push homeowners to eventually purchase consecutive low-carbon renovation measures. Thus, this research was designed to facilitate the emergence of key issues about the significance that these types of networks have to lever the homeowners' interest in renovation in order to gain a sense of the whole chain in action where their belonging parties have a role to play. From the knowledge and perspective of Portuguese homeowners and professionals on the repair-maintenance and improvement house market some highlights are presented.

2 MATERIALS AND METHODS

A set of 21 semi-structured interviews were conducted under a qualitative in-depth exploratory study between October 2020 to September 2021 via video-conference and with a length of approximately 60 minutes. The interviews were conducted with eleven Portuguese homeowners of single-family buildings, three Portuguese energy advisors, four professionals from the craft business and three house energy systems certified installers. Studies suggest that seven interviews are sufficient for making relevant data emerge, however additional interviews were considered to provide redundancy and richness of data [15].

Studies identified some challenges when it comes to interviewing homeowners on their energy efficient decisions. Possible biases are related with: homeowners are highly involved in the decision and lack relevant technical and economical knowledge; they can demonstrate the commonly described "attitude action gap" (what consumers report as concerns or intentions has often little relation with what they do) and consumers tend to change their evaluation after high-involvement purchases [16]. Enquiring the energy advisors, craftspeople and installers was an efficient mean to get insights from the wide-ranging knowledge they gain through multiple in person consultations along their professional experience allowing detailed data to be collected with a limited number of interviews.

The participants were selected following purposeful sampling used in qualitative research for the identification and selection of information-rich cases related to a phenomenon (a specific criterion is used to select a particular sample where the aim is to collect in-depth information from the right respondents) [17]. The homeowners' sample (with ages between 39 and 65) varied according to actual possibilities and recommended by the professionals interviewed. Selecting homeowners that had already made some energy-related

improvements or who were in the process of doing so was the leading criterion. More than one person per household to participate in the interview was much appreciated (six interviews included, in full time, the couples and in the other interviews, family members were present on some of the questions). The aim was to collect, as many opinions and experiences of householders as possible because the decision to renovate homes involves family negotiation and social interaction [5] with the woman playing an important role on this subject [18]. Six interviewees from the market side participants were also home renovators.

The interview's body were slightly adapted for each of the different interviewees' groups. Hypotheses raised from the theoretical background were used to define the fundamental interview topics which were used to prepare a group of direct (closed and open) questions. As an exploratory study, the open questions aimed to induce the interviewed to speak more about a particular subject to deepen the knowledge about it or even make new issues arise. Avoiding using some particular terms related with the study aim until the interviewees raised their own themes made part of the interview strategy. This enabled the respondents to describe their experiences in their own expressions and thereby to redefine the scope of the interview questions when pertinent. Thus, unplanned questions also emerged in response to the flow of homeowners' narratives to let the interviewees express themselves following the course of their thoughts and to guarantee that the interviews made a logical sense for them [17].

The full data assembled was confronted, analysed and discussed through a qualitative research method. The interviews were digitally recorded and then their transcripts were coded and categorized (using webQDA) to detect the most common themes in line with the research questions. A template of themes derived from the literature was developed previously from a conceptual model to facilitate examination [19]. All the interviewees were given pseudonyms from the transcription phase onwards. Inductive reasoning was used to make themes emerge from the raw data through repeated examination and comparison [19] and a realist theory approach to analyse how the previous knowledge about the subject was enlighten by the new data [20]. Qualitative findings from the small sample interviews followed a statistical theory of small sample qualitative research [15] however given the number of respondents, the results could not eventually be demonstrative of all cases and are limited to the universe of the circumstances found.

3 CONTEXTUAL BACKGROUND

3.1 About homeowner's decision for home renovation

Except in some urgent or out of ordinary situations, renovation is usually an act of free will and voluntary decision [16] involving a negotiation at the households' level [4], [16], [21], [22]. Step-by-step renovations, and not one-time events, dominate by far as a continuous improvement for living in and maintaining homes [23]. Energy renovations are merged with the other renovations [16], [18], [23] and step by step decision moments are usual to happen [9], [24]. For a long time, pay-back times, energy savings and rational approaches were considered as the main arguments for energy improvements. Nowadays, a social perspective brings to light that the underlying influences to begin with a renovation are shaped by homeowners' personal and social aspects [5], [9] which seems to boost the beginning of the decision process [5], [24] (Fig. 1). Therefore, it is not only a question of giving homeowners the right information but to see them as socially contextualized individuals who have domestic routines, carry embodied knowledge and skills and follow social norms of what is normal to do and to say [9]. It is inside this social environment where they get encouraged,

seek and compare information and share experiences [4]. Decisions with high upfront payments, as house renovations, involve normally a voluntary external search [16] to form an opinion and seek reinsurance somewhere to supress feelings of uncertainty [12]. Simply becoming more receptive to information or otherwise by engaging in search behaviour [16].

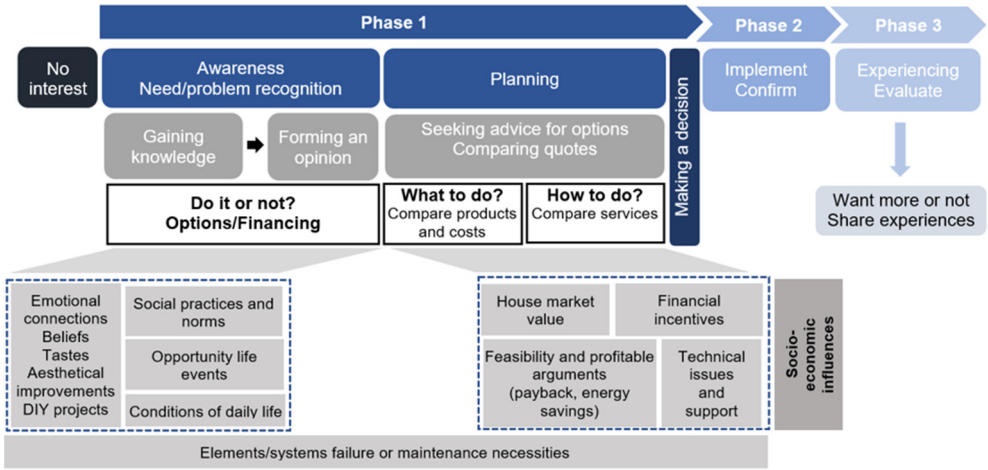

Figure 1: House renovation decision journey and influences [4], [5], [21], [22].

3.2 Knowledge networks around the homeowners for information and advice

Governments apparatus is characterised usually by not meeting homeowners face-to-face (bureaucratic reception on physical offices and websites, automated phone attendance, regulations and norms, etc.) [14]. To bond this distance and within governments vision for a society where empowered communities and voluntary action are widespread a comprehensive inclusion of non-state stakeholders from different levels in networks is needed [25].

It is at the social network level that interpersonal communication is a source of information [9] and where a specific mode of trust is built [12]. Face-to-face social relationships and the norms of reciprocity and trustworthiness formed within this networks leads inadvertently to members of a community identifying with each other, sharing values, ideas and favours [26]. Inside these networks strong ties between a close circle of family or friends are created, where there is a great deal of similarity [12]. However, weak ties also exist, a more fragile relationship due to occasional interactions, but in return provide access to new information, perspectives and experiences [12]. Voluntary peer learning process inside these networks can create and sustain know-how for householders' practices which are the ground for understanding what assemble house energy renovation actions [9]. Empowering these social linkages is argued as paramount for actual policies enlargement [11] in order to mobilize a "culture of energy" spread in the community [9].

Additionally, these social networks are also the field to get access and mobilize recourses with a specific purpose, for example when homeowners ask purposively for information using their interpersonal sources [26]. Homeowners search for trustable, simple, personally relevant and easily comparable information rather than exclusively technical and detailed [5]. Clear advice, reliable products and credible contractors are paramount [27]. Thus, the social

networks are the field for informal conversations within socializing practices or for consultation of professionals from the social sphere around the homeowners [12]. Therefore, beyond the social network, where interpersonal connections are established, proximate networks of professional as agents of information and advice can work as mediating actors between governments and homeowners [13] ensuring other possible mode of trust to sustain house renovation decisions. Hence, despite an intense interaction between house owners and energy advisers has been sustained by policies, other potential actors seem to have a prominent role on this domain [4], [28], as for example craftspeople and installers. They seem to play an undervalued role in influencing both the adoption and use of domestic energy technology [10] and in shaping the ways in which energy-related renovations are carried out [9], [29]. As micro-enterprises they operate in informal networks of local skills and connections, often well-established depending on current local market demand [10]. Furthermore, their work is characterized by face-to-face interaction and by a near physical experience with the materiality of the house [14]. However, these professional's priorities and motivations not always align voluntarily with policy priorities [29]. Despite some intermediaries carry more less specialized knowledge in energy-related issues, as for example, certified energy advisers and specialized installers, craftspeople can act currently as non-certified energy consultants and for whom to go from single solution to system solutions can be a challenge [14]. The dispersed nature of these professionals' skills can make effective communication channels difficult to find [30] and the lack of access to competent or trustworthy contractors might hinder the final decision to renovate [31].

4 RESULTS AND DISCUSSION

4.1 Make homeowners interested: Gaining awareness, knowledge and forming an opinion

Firstly, in contrast to the expected governmental targets, this study disclosed that awareness raising is still far from being a common trigger for homeowners began to think about house renovation. The homeowners' willingness to renovate can be activated by informal daily conversations or by visible energy solutions neighbours and friends introduced in their houses. This can work as "eyes-catchers" for raising their awareness. However, from the stories collected, these circumstances need to be preceded by a pre-conceived disposition about making some improvements to the house. When asked about the cause of this preceding intentions the interviewees mainly reported issues related with personal tastes, physical condition of the house, conditions of domestic life and life stages. Attractiveness by indoor comfort, house design, aesthetics, DIY tasks and low carbon and smart innovative technologies (tech-savvy) for heating and cooling homes were the taste-related motivations identified. In some cases, house was no longer compatible with homeowners' personal and family living standards or homeowners were confronted with opportunity occasions some of them coincident with transitions periods in their life. The concern about social identity homeowners' house exhibit to the local community was also noticeable in the interviewees narratives which probably can be very related with the influence social values and norms inside the community have in shaping the homeowners' motivation [2], [9]. Thus, deep personal wishes and preferences already pre-existed in the majority of cases which seems to be activated into real actions with social network triggers (Fig. 2).

After some kind of interest on renovation was established, several homeowners expressed that they experienced to be overwhelmed by what they expected would be the next steps in

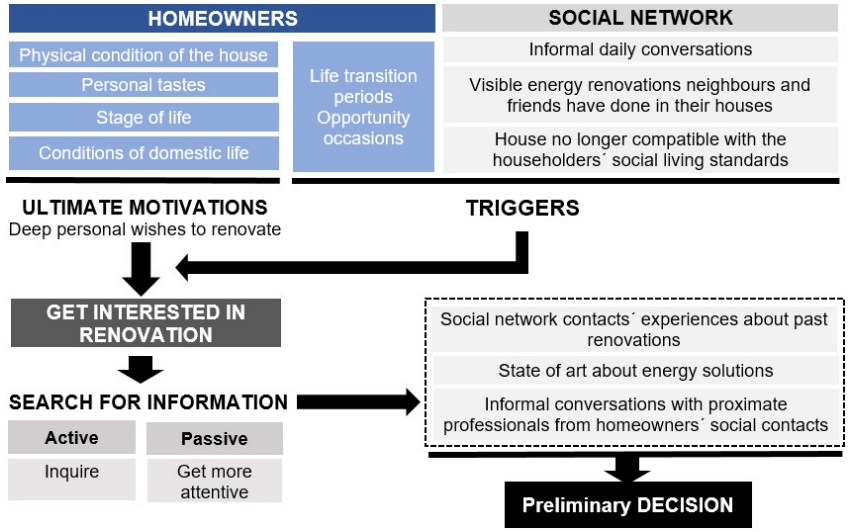

Figure 2: Ultimate motivations and the social network as a trigger to boost homeowners' renovation willingness.

the decision process. They sensed insecurity when they thought about seriously engage with energy savings measures due mainly to the uncertainty about financial capacity to support a potential renovation, fear of disruption of family life or effectiveness of improvements in indoor comfort. On this phase, homeowners feel the need for more information mainly to reinforce their preliminary idea about what they consider it would be the most suitable solutions to implement. Interpersonal contacts (from neighbourhood, local community and social media networks) were the sources from whom they receive early information, being passively more receptive to casual information or inquiring inside their close contacts. The raise of attention was, in great part, moulded by the peer learning process through what homeowners considered that reliable information is disseminated positively due to the fact that peers are "non-commercial" sources. Experiences on renovation and the state of art were the issues more pursued. However, professionals, normally belonging to householders' interpersonal contacts or recommended by someone they knew from their social interactions, are also informal sources for information. From the narratives analysis was clear these interpersonal channels can give encouragement and strengthen the idea of going forward with their intentions for renovation (Fig. 2). A particular finding is the fact that impersonal channels also were object of more attention during this phase, as media channels or campaigns.

4.2 The planning and decision phase: What and how to renovate

Once renovation willingness is established and an initial opinion is formed, homeowners started to search for more customized information to operationalize the renovation in more detail. Information collected exclusively from the social network could not unravel all the uncertainties about their particular circumstances and they seek tailor-made advice to minimize their concerns. A custom-made plan became a necessity and homeowners felt overloaded with the multifarious information from different sources. They qualified the

experience as a difficult process to discern all the information, sometimes conflicting, that tend to make homeowners procrastinate in the decision. It was the case of Patrícia:

> "We were little bit confused about what we should invest first, if thermal insulation in the roof or install a biomass boiler and a solar panel. We tried to search for opinions from friends but at some point it was a little contradicting and advice were not always adapted to our circumstances".
>
> (Patrícia, 44, female)

Almost all the Portuguese homeowners interviewed stated they felt confused to whom contact to search for customized information. Again interpersonal mediators from the social network played a hinge role, inquired purposively or in opportunity moments by the homeowners. First, disclosing information about their experience on renovation solutions they encouraged, or discouraged, the homeowners about their intentions. Second, recommending professionals to guide about tailored options, help planning it and subsequently assist to materialize the renovation itself. Notably, the homeowners interviewed denoted that they have a scrambled and confused idea about the professional jurisdiction and skills of each of the market actors. They think all practitioners are at some point suited to give advice about energy issues for buildings. Despite some considered energy advisors as reliable professionals, respondents recognized that they did not knew their work and reputability so well as the craftspeople and installers work. Consequently, these last turned out to be privileged for contact. Established as small firms for a long time in the local market and doing several kinds of works in the buildings for which they gained a recognised reputation and trustiness. As was the case of Nuno, as demonstrated by the following quote:

> "I know their work. They already made some works in my house in the pass. It was clearly to me who I should contact in first place".
>
> (Nuno,44, male)

The professionals interviewed stressed that homeowners' reliability and trust in these proximate professionals was enhanced by their personal visits at homeowners' homes where skilled practitioners are able to see their non-verbal language which they think can provide a more reliable and realistic projection of energy savings for their particular case. Two of the energy advisors mentioned that they gather many times data on the house before any interactions with the householders. Assessing the property's attributes in terms of its location, looking for signs of life-stage or assessing the state of repair of the property were procedures revealed. Craftsmen and installers interviewed did not reported so much such practice. A possible result of the comprehensive training that certified energy advisors are subject to.

As mentioned before, homeowners have at this point a preliminary strong idea about what they wish to implement based mainly on their personal motivations and wishes. The majority of the homeowners recognized that when they contact a professional they bring with them preconceived ideas about what to do. Conflicts between what homeowners wished to implement and what was recommended by certified energy advisors was revealed in the narratives. The professional adviser seems to be often used by the homeowners to assess the properness of their already preferred solutions. This was pointed by one energy advisor:

> "Many times when we are asked to give support to homeowners they had already made some previous works suggested by a constructor or craftsman and it was not the most cost-effective".
>
> (Sofia, female, energy advisor)

Energy advisors had more difficulty to adapt to homeowners' requests when they believed homeowners' wishes were not the most efficient solutions to save energy and money. They seem to be more rigidly linked to regulations and technical framing and consequently less sensitized to homeowners' circumstances. Homeowners did not give positive feedbacks about this, they want to be valued and feel their opinions are important to the process. It is the case of Edgar, who assumed that was tempted to compare information with what their social network contacts considered about.

> "We had a little confront with the energy advisor, we wanted PV-panels and we try to convince him but he was not very receptive. We have friends with PV-panels on their homes and they are quite satisfied".
>
> (Edgar, 50, male)

One of the energy advisors interviewed, underlined that strong persuasive skills were needed to change some homeowners' ideas embedded in what he called "emotional choices". Other energy advisor highlighted that "was well prepared to offer technical advice but he lacked the training in communication skills to provide end-users with wider arguments".

On the other hand, the craftspeople and installers pointed several times they felt the necessity to filter what was technically feasible in order to suggest technologies which would meet the householder's preferences and simultaneously reduce energy costs. A reason found for they be preferably consulted is that homeowners detect and appreciate in this group an ability to "walk with" them through their preferences. They identified in them the capacity to select the appropriate solutions embracing the circumstantial information from the householders' context. Clients' motivation decrease when professional advice is too impersonal, as was revealed in the statement of Samuel:

> "I saw many times their expressions of disappointment when I suggested some solutions that they did not like or were in conflict with what they previously have in mind".
>
> (Samuel, craftsman)

However, the oral information received from an advisor in-person diminish the many fears and doubts, reinforce trust and is more effective than a simple simulation software tool available or a web platform as is revealed in the following quotation:

> "It is easier to trust experts as persons than in systems".
>
> (João, 49, male)

A particular aspect that came to the surface through the data analysis is that interviewees from craft business did not recognize themselves as building energy efficient practitioners. They accepted that they have been playing a role as energy advisers notwithstanding the majority never had an accurate training in a whole house renovation perspective which make sense since the majority of the energy renovations are made simultaneously with other renovations [23]. Despite the installers being the most trained, each of one is mostly expert on few specific technologies. This was revealed by Fábio:

> "The installer showed us a type of boiler to install but after a quick search in google we saw it was not the newest model. We ask one of our neighbours, who is a mechanical engineer, about his opinion. We became very disappointed

> and distrustful about some installers since then… It is better to always confirm their technical recommendations".
>
> (Fábio, 57, male)

Therefore, crafts business offered many times a contradictory advice in great part because house renovation market is fragmented between different types of professionals who are mainly concerned with business, to fit the economy of homeowners (and mainly with up-front costs) and to build a good reputation for future works [4], [10]. Thus**,** crafts business' information was seen by the respondents with more or less caution and distrust on some occasions. Homeowners interviewed reflected upon these professionals as still dull and poorly regulated, which affected their trust in their professional capacities because they consider they ultimately want to trade something motivated by profit. These uncertainties seem to be surpassed when they are recommended by interpersonal contacts or their reputation is blameless within the community.

Outcomes revealed also that when homeowners did not like or trust the installation service businesses or when the information provided by them about commissioning is unsatisfactory, they would be less likely to adopt a technology, which even is more reinforced when a still-developing technology is in discussion. Again homeowners tend to confirm with their interpersonal connections to seek their opinion. However, this was not the case for a technology adopter present in the sample, whose taste-related motivation make him run for high-tech solutions for his house. He was trialling a PV-panel despite the energy advisor did not recommend to be installed. One of the energy advisors, also stated from his experience, that the latest energy technology is seen as something that some people demand for a question of prestige and social status inside de community. Findings revealed as well that if the householder feels installation has been messier or disruptive than it should be it is likely they express dissatisfaction with the overall technology performance and can later on give a bad peer advice at the social network level. The experience of the installation itself and the support available after installation were mentioned as extremely important to rethink on doing more energy renovations in the future. Again homeowners either verified through their interpersonal networks if the whole experience they had was currently the way things are normal to happen about the installation itself and the efficiency of the technical solutions (Fig. 3).

Additionally, some respondents recognized that after they were fully committed to renovate, they became themselves opinion-leaders from the social networks and had already encouraged others to enrol in a network of collective learning.

Findings indicate that both craftspeople and installers can play a beneficial role more influential than it is expected by policy-makers and the governmental agenda and they tend to be preferable by homeowners compared with certified energy consultants. Despite professionals are more present in this phase of decision due to their expertise, social networks continue to be always a support that homeowners request both to search for guidance and to make cross-checking with the information or service given by professionals. Outcomes signpost that this is a search for positive feedback from whom they feel connected by proximity and by the circumstance they probably experience similar problems.

5 CONCLUSIONS

The results revealed that social networks matter in a home renovation decision and that interpersonal trust walks with the homeowners along the decision journey. As a field for network of collective learning and influence, social networks play a main role since the

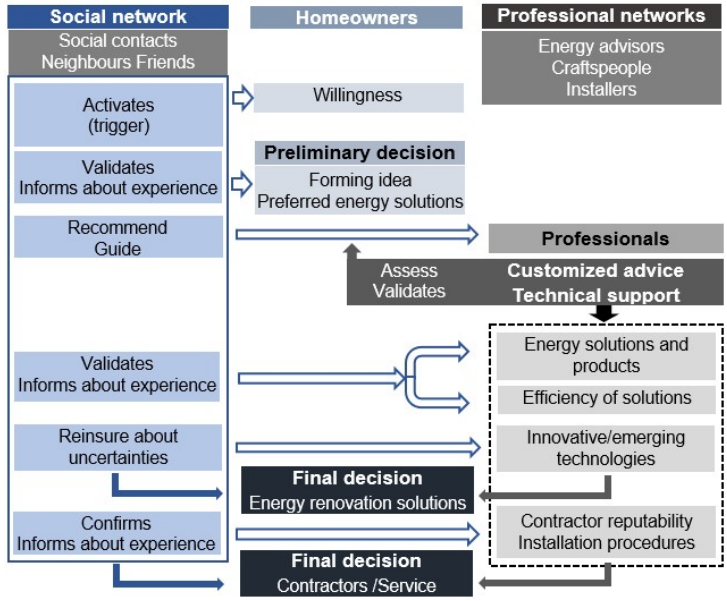

Figure 3: Social and professional networks interaction in the homeowners' renovation decision-making process.

beginning of the homeowners' decision journey makes use of friendship and shared values. In the first place, the outcomes suggest that homeowners seem to be very attracted to display what is socially established and tend to replicate what others do. Undervalued established values and norms reproduced in the community through interpersonal connections through the "sense of community" can induce homeowners to go for home improvements. Hence, this can increase the interest of not yet committed energy users thus activating potential renovators. However, the findings also revealed that this social context influence is more likely to happen if homeowners have preceding intentions and preconceived ideas to renovate related with the physical condition of the house, the conditions of their domestic life, their personal tastes and stage of life. Despite professional support being crucial to definitely engage homeowners due to their expertise to make an accurate technical selection of products and services, knowledge and experience available through homeowners' social network, mediated through their peers, acts as a guide to recommend professionals and as a cross checking tool about their advice and reputability. In sum, these interpersonal networks that homeowners inquire purposively to validate the information are used to audit professional advice and encompass the entire decision-making journey.

The outcomes also signpost the key role of trustworthy networks of small firms of craftspeople and installers who act as energy consultants surpassing many times certified energy agents. Their positive reputation inside the homeowners' interpersonal network still make them as favourites to ask for advice despite these craft businesses and installation services work under a fragmented market of practitioners. The absence of knowledge in a whole perspective about how to make homes more energy efficient can often result in a contradictory technical advice that affects homeowners' trust in their capacities. Many times concerned with their business, they are unlikely to orient their behaviour according to policies

of environmental and energy values. However, the study points that homeowners appreciate their nontechnical skills on an adaptive capacity to assimilate contextual and circumstantial information from the householders and to think in line with their wishes and needs. In fact, homeowners tend to seek validation about previous or preliminary choices, not always being very responsive to energy efficiency rational arguments. This is something energy advisors are not so flexible to act upon.

In sum, interpersonal and established professional networks interrelate and complement each other acting the second as a technical support as expected and the first as a guide, cross checking and reinforcement tool for homeowners bringing to the light the importance of trusted messengers to support homeowners' decisions. A continuous support is essential to ensure that homeowners acquire the provision they need to progress in the decision for which technical information is an essential feature but trust and communication skills do not get behind.

This study gave rise to a number of questions for future research and policies. In the short–medium run, policies need to provide the positive social context to established a strong local community of knowledge networks to target different types of homeowners' profiles and lift their interest in home renovation. On the other hand, changing the institutional arrangement and leaving it, in part, for more traditional actors is necessary. It is the case for letting craftspeople and installers also take part as trust intermediaries to be deployed at specific stages of the decision-making process. A closer cooperation between them and the certified energy advisors seems to be required, where the first ones need to acquire more comprehensive technical capabilities and the seconds need to take lessons from the well-established network market of craft businesses. Challenging means towards the energetic transition in homes can be in the ability of governments to involve strategic intermediaries from different levels promoting dialogue and partnerships. Finally, the study is developed based on empirical evidence from a qualitative study on a specific region and with a limited sample size of renovation adopters. Extending the scope of data collection can probably generate further findings. Further studies could also test a wider set of other factors related with the social network situation, such as specific cultural community aspects and neighbourhood socio-economic characteristics. Also a research among homeowners is needed to provide more insights about which of homeowners' profiles are motivated by what type of energy service design in a way that factors that are foremost important for each stage of decision could be investigated.

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