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Younger vs. older homeowners in building energy-related renovations: Learning from the Portuguese case

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Abstract

There is still a little recognition in policies that homeowners cannot be assumed as one homogeneous group when it comes to their decision for energy-saving renovation. The interest in energy efficiency varies among these homeowners depending not only on personal and contextual factors but also on everyday life activities and social practices. Some studies suggest that the homeowner's life stage have a significant role in shaping this interest. This study aims to understand the influence of the homeowner's age on the motivation for energy-related renovations of Portuguese owner-occupied single-family buildings and how this age is linked to the home-related and social practices that may encourage these renovations. A survey and a structured observation method were used. The younger Portuguese homeowners seem to be more environmentally conscious and adopt "little-by-little" energy renovations, even if less visible to the community. For the older, despite higher incomes, usual motivational arguments do not seem to work. If energy-related renovations are associated to some particular issues about aesthetics, indoor comfort conditions and sentimental meanings given to the home, these renovations are more likely to happen. However, both can be influenced by key moments in their life that trigger the renovation process.

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Keywords: Energy policy; Energy-related renovation; Homes; Homeowners; Social practice theory; User practices

1. Introduction

Since the majority of homes (70% across the EU) are owner-occupied and there is a considerable stock of single-family houses [1], it is fundamental to motivate homeowners to renovate in order to reduce energy consumptions. Commonly, policies try to convince homeowners to renovate their houses under established rules that are frequently very strict and demanding, considering these homeowners as a homogeneous group and a passive recipient [2]. These policies are negotiated at an upper level by policy-makers based on common premises related with energy savings and technology adoption. However, several studies have been reinforcing that to understand why homeowners decide

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to renovate energy efficiently needs to consider personal and contextual factors together with social factors such as the everyday dynamics of life at home, routines, lifestyles and socially shared practices and norms [3–13]. They concluded that the motivations for building energy-related renovations emerge also from the intentions of continuous home improvements related with aesthetics, trends, indoor environment, home functionality, comfort and lifestyles. Wilson et al. [14] identified the influences that are in the genesis of decision (why to renovate?). They call the ultimate influences and they are the result of personal and contextual factors, as for example the homeowner's positions in life, together with the conditions of everyday domestic life, these latter commonly not considered by policymakers. Previous homeowner's experiences, stage of life course, physical abilities in aging, roles within the household dynamics, tensions created by the conditions of domestic life, skills for DIY activities and the meanings of home are some examples of this kind of influences. On the other hand, there are some studies that reveal that there are differences in the motivations to home energy renovation between younger and older homeowners [15,16]. These motivations tend to change throughout the life of the homeowners because their perceptions of the world, their demands and their ambitions are constantly evolving. This brings to the discussion the importance of the homeowner's life stage connected with the daily life at home to explain the decision-making process to energy-related home renovation. This paper aims to get an in-depth knowledge about the influence of the homeowner's age on the motivation for energy-related renovations of Portuguese owner-occupied single-family buildings and to link this age with everyday home-related influence factors mentioned above.

2. Contextual background

In 2002, Almlund et al. [17] tried to understand and characterize who were the residents of Danish single-family buildings that had renovation needs. They focused on understanding the motivations for the renovation of a unique space, the kitchen, a part of the building, the windows and a resource, water (saving). They concluded that homeowners could be divided into three groups: the young, the middle age and the elderly homeowners. Younger families were more interested in the environmental issues and were willing to go for energy renovation but did not have enough capital to do it. Middle-aged families have better economic supporting and were interested in aesthetic and visual improvements when children leave home. The older ones do not do anything about their house because they do not expect to stay there for many years and benefit from it. Later, another study was dedicated to understanding whether this age-grouping could still be applied to the renovation of the whole building [18]. For younger homeowners (<50 years old) all the motivation factors used in the study were compelling. Middle-aged homeowners (50–59 years old) only showed a very positive reaction to architectural improvement and moderate reaction to energy consumption. Homeowners between the ages of 60 and 69 years have little interest and showed a modest motivation by comfort improvements and finally for the ones above 70 years old the layout was the only incentive factor. Mortensen et al. [18] propose that homeowners should be divided, at least, into two groups, the younger (<50 years old) and the older generations (≥50 years old). Nair et al. [3] concluded that the younger and higher educated were more likely to adopt an investment on energy efficiency than the older (>55 years old). Homeowners in the age group of 35 to 45 were more likely to adopt building envelope measures, while older homeowners prefer other high investment actions. However, Barr et al. [19] determined that the homeowners with a mean age of 55 years probably choose to undertake more investment and non-investment measures in energy efficiency compare with the younger. Moula et al. [20] examined the social acceptance of renewable energies and noticed that the older homeowners were more receptive than the younger. Baginski and Weber [21] say that renovations means to much stress for older homeowners and they fell an uncertainty of having to sell the house and not being able to profit from the renovation. This often keep older generations from undertaking actions together with some insecurity about their capabilities to manage the renovation. In contrast, to know the children will inherit the house is a good factor motivation for renovation at these ages. Recently, Bravo et al. [16] also determined that older house owners have more time to think about renovations related to aesthetics and less tendency to renovations predominantly more physical (thermal insulation works, for example). With age, they manifest less environmental and energy saving concerns. On the opposite, younger homeowners, especially the healthy, educated and urban, are more concerned about the latter issues and are motivated to put into action not so visible improvements. Nevertheless, the youngest homeowners with low incomes require financial incentives to go forward.

3. Materials and methods

The analysis was based on a survey applied simultaneously with a qualitative research method involving structured behavioral observation to a group of fifty-seven Portuguese homeowners of owner-occupied single-family houses in 2016–17. The analysis reported in this paper is based on a preliminary stage of a larger scale research project on the home-related practices and social perspective of energy-related renovation of private homes. Given the number of respondents, the results are eventually not demonstrative of all cases and are limited to the universe of the circumstances found in the survey.

The sample was selected, initially, consulting the municipality services to identify districts with single-family building typologies constructed between 1970 and 2000 (considering more than 15 years of age). Three urban municipalities in the North of Portugal were considered for a preliminary approach. The homeowners were first contacted personally at their home and then a meeting was scheduled. The age of the homeowners and knowing if they had already put into practice at least one renovation measure on their home were the questions made to the homeowners in the first contact. This was important to select the sample to cover a wide range of ages. The respondents have qualifications from all educational levels.

Previously, three in-depth interviews to experts (informants) were also made to help to prepare the survey structure (the long-time experience was the main criteria). The survey was also tested in three homeowners to guarantee if all the important aspects were covered in order to answer the investigation questions and to see if the questions were clear. They were invited to put some comments about confusions, problems or recommendations. Based on this feedback, the final version of the survey was put into action at the home of the respondents to get a personal contact with the homeowners and their family (the inquirer took notes about the homeowners and their partners' reactions to the questions). The questions were both open-ended and closed-ended and were made in an informal and simple manner. The motivation factors related with everyday life practices, the number and type of energy-related renovations made in the past and the willingness to do more were the research variables explored, followed by a qualitative and quantitative content analysis.

4. Results and discussion

The majority of the respondents (61,4%) bought the single-family building where they actually live between the ages of 40 and 49 years old (Fig. 1). Most of the respondents acquired a single-family home after living for a few years in multifamily building homes and when they feel financially prepared to make this venture. The respondents were asked about the circumstances and age of the building when they went to live in the house. Two different situations were found: homeowners that have bought a new single-family house and the ones that have bought or inherit a second-hand house. In the second group, almost all the respondents had made at least one energy-related improvement when they start to live in the building. Replacing the windows, changing the domestic hot water and air heating system or installing/replacing the thermal insulation in the attic were the most common improvements. In practice, an energy-related renovation action took place because of an extraordinary event in homeowners' life (they were between the ages of 40 and 60).

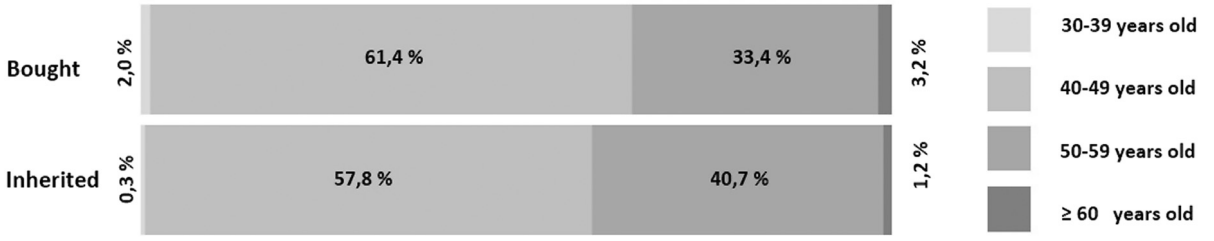

Fig. 1. Homeowners' age at the time they bought or inherited a single-family house to live in.

The younger respondents reveal more willingness to put in action more energy-related renovations (even not visible measures like wall and attic insulations, etc.) without putting to many constraints, but as age advances the willingness decrease. The respondents up to 50 years old, because they have already grown with more awareness about environmental issues, show more concern and more knowledge about energy efficiency and innovative technologies than the others. They mention they have more daily habits related to energy efficiency and dream

to own an environmentally friendly house. The respondents aged between 50 and 65 years, demonstrate willingness but subject to conditions: if they feel in physical condition to manage the renovation process; if these energy-related renovations can be associated with other home improvements; if the aim is to adapt the home with the comfort and safety conditions they wish for the retirement age; if these renovations reduce energy consumptions and if the energy renovations can help their physical abilities to manage the home facilities and appliances. Middle age is the beginning of a period of less physical capacity to withstand the effort of renovations but, on the other side, of greater financial provision. This group is more influenced by the other householders' opinions and by sentimental values given to the house in order to make decisions about renovations. After 15 years of living in the house the motivation to renovate diminishes and 45,4% of the respondents with more than 60 years old said they are thinking about buying a new house instead of renovate. Pensioners ($\geq$65 years old) were not very motivated to renovate because they think they are not going to benefit many years from it and they do not like the idea of homelife disrupted with the renovation taking place. However, some have mentioned a few drivers related with the concern about comfort indoors, spending more energy because of being at home during the day and the interest of their children to live in their home in the future.

Results also disclosed that majority (76,3%) of the respondents adopt normally a practice of a "little-by-little" renovation except on exceptional moments like, for example, when they bought or inherit a second-hand house. They start with what they consider the most important measures. The younger respondents ($<$50 years old) were those who stated most that they like to plan the improvement of their house and even to get personally involved in the choice of solutions and some of them in the execution of some tasks (Do-It-Yourself - DIY). In contrast, almost all the respondents above 60 years old referred that prefer to do more than one energy improvement at once and to request one-stop-shop services.

The standard of living, income and financial situation of the family is also closely related to homeowners' age. At the present time, policies are carried out believing that higher incomes usually drive the desire to renovate because upfront costs are more important than the rate of return [21]. Although income and financial stability tend to grow with the age of the homeowners, it is not the older who show the highest willingness to renovate. Until a certain age (50 years old) this could be a driver but from this stage on other constraints can become much more relevant. The financing support policies are more adequate for the youngers with low-income. The arguments used in policies (in the Energy Performance Certificate, for example), about informing the homeowners when does the investment in energy efficiency payoff, is neither effective for the young nor for the elderly. The younger respondents consider the usual payback periods of more than 15 years demotivating and the older considered that these periods are not proper because they will not be going to live enough to benefit from them.

The existence of children at home is a strong factor conditioning decision-making to renovate with energy efficiency (a new child, children at school age and return of progenies to the housing). The existence of children is a characteristic of younger/middle ages and strengthen the Portuguese respondents' ideas about doing renovations. First, it calls for a change in daily routines and hence a rethinking about the conditions of the indoor spaces for socializing within the family. Second, there is a greater concern about the comfort for the children and the energy saving due to the increase of the energy consumption that having children result in. The respondents with children aged between 10 and 18 years, who were 40 to 60 years old, demonstrated more willingness and put in action more energy renovation measures comparably to all the other homeowners. It is a period where they reorganize domestic life and rethink the use of the indoor spaces.

The improvement of the building aesthetics is a greater motivation mainly for the younger and middle-aged ($<$65 years old) and this issue can boost energy-related renovations. These generations revealed the desire for a new lifestyle, social status and concern about what the family exhibit to the local community. The younger seem more motivated to renovate less visible parts (wall and roof/attic insulations, etc.) and the middle ages (50–60 years old) more likely renovate the visible ones (windows, thermal solar collectors, etc.). Some of the latter said that they are in a position in life where they want to do what pleases them most and do not mind spending money on it. Despite the energy renewable systems, recognized as an expression of modernity and concern for the environment, seem to be more attractive for the younger respondents, were the older who mostly installed these systems on their homes. A percentage of 30,4% of respondents have already installed a renewable energy system, most of them with 50 to 65 years of age.

Important influences that encouraged energy-related renovations of single-family buildings related with the social dynamics of life at home were also identified in the survey. It was possible to classify which are the most relevant for each or both of the two distinctive homeowners' age groups (Fig. 2).

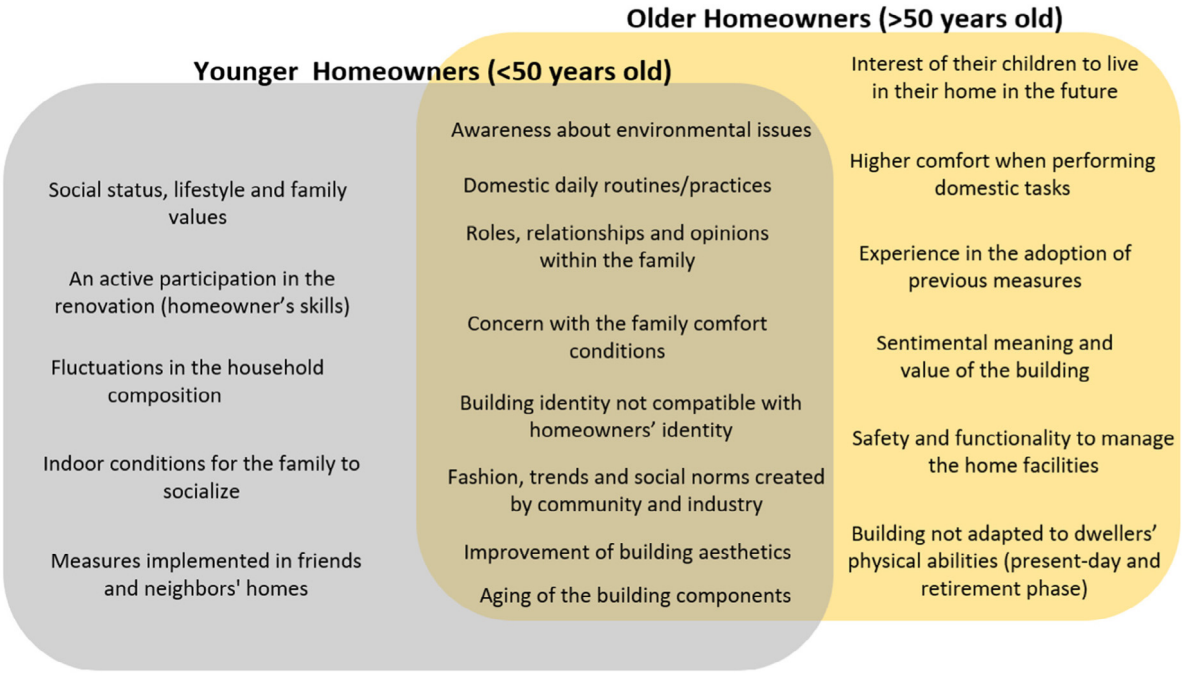

Fig. 2. Influence factors for energy-related renovations in single-family owner-occupied buildings by age groups.

5. Conclusions

In Portugal, different generations of homeowners should be handled differently in the motivation policies to increase energy-related renovation rates. The two main homeowners' age groups considered by Mortensen et al. [18] can be also applied to the Portuguese case, although a third age group was, as well, identified. This study also highlights that is possible to make a connection between the homeowners' everyday social practices and a specific age group regarding the adoption of energy-related renovations.

Younger homeowners usually perform more "little-by-little" energy renovations (sometimes DIY) compared with the older, who appreciate more single events for renovate. Some extraordinary moments in Portuguese respondents' stage of life were key moments that led to energy-related renovations. Policies should be target Portuguese homeowners in that specific life stage because renovation is more likely to happen. The moment of buying a second-hand single-house, new child and the beginning of retirement are important dates.

Younger generations (<50 years of age) demonstrated, in general, more environmental concerns and knowledge about energy efficiency and innovative technologies than the older generations. They have more daily practices related with this issue and many of them seek for comfort in an environmentally friendly home, whilst lacking the financial conditions to do it. Financing support programs and energy saving arguments could be a good strategy for this group.

The middle-aged respondents (50–65 years of age) wish for a new lifestyle and social status and give more importance to aesthetics and to the image that their house displays. They prefer to adopt energy-related visible measures, either investment or non-investment measures.

The older generations (>65 years of age) are those that have more financial capacity to invest but, at the same time, have less willingness to renovate. Sometimes, after a certain time living in the house, they consider to buy a new house and not renovate. They do not like many home disturbances so they prefer single events and one-stop-shop services. Financial incentives are not the most important measure to stimulate the two last groups and the argument used by energy advisors (and by the Energy Performance Certificate System - EPCS) about payback periods (normally longs) does not have any influence because they are not going to live so much years to benefit from it. The older think more about the home conditions, functionality, safety and comfort in their everyday life

and for the retirement period. The meanings of the home and the householder's opinions inside the family also play an important role for them.

Future studies could focus on reinforcing these preliminary findings by extending the sample to more urban and also rural municipality areas. Relate these outputs with other homeowners' personal and contextual factors and then explore tailored instruments for policies, in line with the EPCS implemented and applying anthropological fieldwork studies, could be the next step. Apply this methodology to multifamily buildings is another important stage that follows. This approach to the homeowner's motivations calls for proximity policies implementation in which the energy advisors and the local bodies probably have a central role to play. On this context, a comparison with other countries, where related policies have already been put into practice, can be an assertive research strategy to deepen this subject.

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