Original research article

The relational dimensions of renovation: Implications for retrofit policy

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A B S T R A C T

Retrofitting the UK's housing stock is essential if the UK is to meet its climate commitments. Wider research has addressed how weaknesses in the drafting and implementation of retrofit policy have slowed progress in this area, including the tendency to treat homeowners as discrete, isolated decision makers. We contribute to this research by exploring the wider dynamics that underpin decision-making in and around households. We make this contribution by adapting Hargreaves and Middlemiss's research into the social relations of daily energy use, and Zelizer's research into the social relations of money, to consider how social relations influence decision-making over home renovations. Our findings are based on semi-structured interviews with homeowners in Otley, West Yorkshire, which we conducted from September to December 2021. This interview data demonstrates how the dynamic nature of relations with family and friends, tradespeople, gender, and money, shapes the reasons why people undertake renovations and what they aim to gain from undertaking these works. Focusing on wider renovations enabled us to speak with people who are not already engaged with retrofit policy, shedding light on possible interventions that target 'able-to-pay' owner-occupiers. For instance, we highlight the need to identify how people develop trust with tradespeople; account for different social groups' relations to the home; and to foreground how the role of the home changes through time.

1. Introduction

Improving the energy efficiency of residential buildings in the UK is essential if the country is to meet its commitments on climate change. Government figures indicate that the residential sector accounts for approximately 25 % of total energy use and up to 20 % of the UK's carbon dioxide emissions [1]. According to the national Climate Change Committee (CCC), the near-complete decarbonisation of heating residential buildings is needed to reach net-zero greenhouse gas emissions by 2050 [2], and carbon emissions are not falling fast enough to meet the UK's net-zero target [3]. The government's Clean Growth Strategy sets out ambitions for all homes in England and Wales to achieve an Energy Performance Certificate (EPC) rating of C by 2035, where cost effective, practical, and affordable [4]. As of 2019, 29 % of homes currently met this standard [5] Around 80 % of the buildings projected to be in use by 2050 have already been built and government reports identify improving the energy efficiency of existing housing as a priority [3,6]. Increasing energy-efficiency of the UK's housing stock could also deliver a range of co-benefits such as lower energy bills, improvement to health and comfort, and is a huge opportunity to generate jobs across the UK [6].

This paper takes a novel perspective on energy retrofit and renovations in the UK, building on Hargreaves and Middlemiss's [7] research into the role of social relations in everyday energy use, and Zelizer's work on the social relations of money [8,9], to find out how social relations shape decision-making over retrofit and renovations. We show how wider social dynamics shape the way in which people make decisions about their homes, and as such merit greater attention from retrofit researchers. Our findings indicate in particular that social ties with family and friends and tradespeople, as well as more abstract relations associated with gender, and relations shaping the spending of money, have an important influence on decision-making over home renovations. Both affiliations and more abstract relations are dynamic and change over time.

These observations have implications for energy policy, which needs to develop strategies that account for the reasons people choose to renovate their homes; the ways in which people develop trust with tradespeople; the unique experiences of various social groups; people's relational spending of money; and how these factors change through time. In sum, energy policy needs to recognise that homes don't make decisions; people do, and they do so in the context of social relations. Although these findings are UK specific, insights from applying a social relations approach could be adapted to other contexts.

The paper sets out the scale of the retrofitting challenge in the UK and how a relational perspective can help address this challenge. It then outlines the data collection process and key findings. Finally, we reflect on the value of a relational understanding of home renovations and consider implications for future retrofit support and research.

2. Retrofft research perspectives

2.1. From rational to situated

A variety of disciplines have worked to address the issue of energy-efficiency of the UK's housing stock; spanning technology and building sciences, economics, sociology, and psychology. These disciplines largely address either technological innovations (like technology and buildings sciences) and/or individual level decision-making (like economics and psychology) [10]. Most policy in the UK draws upon 'applied behavioural research' perspectives, rooted in economics, technology adaptation, and psychology [11–13]. This 'rational choice' perspective has been criticised for its individualism [14,15].

Typical of a more rational approach is the characterisation of challenges to retrofit as 'barriers to uptake'. Barriers can be defined as factors that inhibit investment in efficient and economically sound technologies [16]. Authors working in this tradition tend to articulate barriers such as organisation of the market, information shortcomings, behavioural influences, technical issues, and financial barriers [16]. This work provides useful insights into retrofit challenges, but has been criticised for two reasons. First, it tends to diminish the social context in which energy-efficiency improvements take place [17,18]. Second, it assumes that removal of barriers will result in increased uptake, which isn't always the case [12]. In response to these critiques, Brown et al. [19] have identified four interrelated 'systemic' challenges that homeowners face to retrofitting their homes. These challenges include: a lack of information, engagement, and trust; uncertainty over benefits and quality; complexity, disruption, and timing; and capital costs and split incentives [19].

Sociological theories help us understand energy use from the perspective of social structures, routines, and shared practices rather than individual agency [20–23]. Wilson et al. [12] call for a 'situated approach' that considers 'applied behavioural research' within a broader *social* context of how and why people renovate their homes.

Practice Theory, which studies the performance of practices in daily life [24], is arguably the most commonly used social theory used in retrofit research [25]. Practice approaches have highlighted how energy is not consumed by individuals, rather, it is a means for performing everyday practices such as cooking, eating, and entertaining others [26]. Maller et al. [27], found that narratives of energy-efficiency are only pursued when they are compatible with the accommodation of existing or future anticipated household practices. Judson and Maller [28] found that renovation intentions are determined by everyday practices and accommodating changes in these practices as households shift between life stages often involves a change of space and function in the home. Practice theory has illuminated how embodied skills and experiences, and the rhythms and routines of everyday life influence energy-related behaviour in homes.

A potential limitation of such an approach is that home renovations are often not habitual or routinized practices. For example, people only replace windows a few times in their lifetime [14,29]. This relates to a broader critique of practice theory, namely that a focus on the everyday makes it difficult to imagine how changes could be achieved [30]. We propose that other social theories could therefore offer a clearer understanding of renovations as a periodic and inconsistent event. One such approach to understanding how and why people decide to renovate their homes is via the study of social relations. A social relations approach is yet to be widely applied in energy-related research and, as the next section discusses, could provide valuable insights into the processes that shape retrofit decision making.

2.2. Theorising social relations

In recent years there has been a 'relational turn' in sociology which advocates that the basic unit of analysis should shift from that of individuals or institutions, to the patterns of social relations between actors and the resources exchanged between them [31]. Patterns of relations vary across cultures, groups, and individuals, and 'micro-relations' (such as relationships with friends, family, teachers, or organisations) as well as 'macro-relations' (such as relationships associated with class, gender, or religion) shape people's actions [7,32].

We want to bring social relations theory into the retrofit debate because it shifts the starting assumptions comprising economic decision making. It also allows us to engage more deeply with social relations of money. A relational approach highlights the dynamic nature of relational exchange, encouraging us to "reorient our understanding of the social as not the context for but constitutive of the economic" [31]. Zelizer [8,9] proposes a 'relational economic sociology', which highlights how economic exchange is a result of entirely social processes. In particular, she proposes that economic transactions are comprised of four social components: 1) relations (a social relation or social tie); 2) transactions (an economic transaction or exchange); 3) media (a token or 'media' for the transaction which can be monetary or non-monetary); and 4) meaning (negotiated meanings around the social tie, the transaction, the media, and what it means in terms of the relationship). Varying combinations of such elements are called 'relational packages', which can determine factors such as who pays, what people will pay for, how much they will pay, how often, when, and with what currency [8]. Social identities (such as age, class, and gender) can introduce further variation into these relational packages.

Economic exchange requires 'relational work' to create viable matches between these elements. For each category of social relation, people establish distinct understandings, transactions, and media as appropriate for that relation, and the character of economic activity varies significantly depending in these features [8]. In this way, money itself is not a homogenous commodity, since actors establish and maintain relationships through economic transactions, and people use social and cultural processes to make distinctions between different categories of money [31]. Significantly for retrofit, this theory focusses on the social dynamics of organising, justifying, and evaluating decision-making in people's homes, such as whether and how to carry out energy-efficiency improvements, and which form of money is best suited to such measures (savings, loans, grants, inheritance etc.) A crucial insight of Zelizer's [9] work is that how money comes into a household – as gift, payment or entitlement – will shape how that money is then allocated.

2.3. Applying social relations to energy studies

The concept of social relations is yet to be widely applied in energy related studies. Hargreaves and Middlemiss [7], review this emerging literature, and in doing so identify three main categories of social relation that are particularly influential on everyday energy consumption: 1) relations with families and friends; 2) relations with agencies and communities; and 3) relations associated with social identities. The following section considers how these relations could also influence retrofit decision-making.

Firstly, relations with family and friends influence both why and how

people decide to renovate their homes. The concept of 'linked lives' suggests that individual action is often shaped by the demands of others, and changes in one person's life impacts upon others, especially family and friends [33]. Decisions to renovate often occur through tensions or imbalances within the home, such as current or anticipated physical needs or managing conflicting uses of space, which is more likely in households with young children or elderly people [34]. Evidence also suggests that information found through social networks of family and friends is as much as four-times more likely to influence the of adoption retrofit measures compared to expert advice [35] while sharing of positive stories between friends and neighbours can influence the uptake of solar panels [36]. To date, however, there is limited research into how retrofit is arrived at via interactions between friends and families.

Second, relations with agencies and communities can also influence retrofit decision-making. Relations with agencies – such as tradespeople, energy suppliers, and government organisations – tend to be marked by a lack of trust which leads to low uptake of retrofit measures [37,38]. Retrofit organisations must carry out relational work to prove that they are trustworthy and that their advice responds to specific household needs [39]. In addition, households must deploy different methods to assess the trustworthiness of people in the industry [37]. Community retrofit organisations have arisen in recent years, partly in response to a lack of trust in tradespeople and finance providers [40]. There is also increasing research into the central role of intermediaries and alternative business models that can help to build relations of trust both within the retrofit supply chain and between households and retrofit suppliers [41]. Despite trust being recognised as an important element of market exchange, how it is generated is understudied in the field of retrofit [42]. Research into the social relations of retrofit decision-making could help fill this gap.

Finally, relations associated with social identity – such as age, gender, disability status, family composition and class – can influence uptake of retrofit measures and shape the resources people have access to, how they are targeted (or not) by policies, how they see themselves, and how they interact with others [7]. Research suggests that cultural scripts around what transactions are appropriate vary with gender, race, class, and other characteristics [43]. Reid et al. [44] show how identifying households as needing assistance to improve energy-efficiency can be stigmatising and, conversely, how energy-efficiency projects have become associated with wealthy environmentalists. In a male dominated industry, gender could also have a significant impact on retrofit decision-making, with evidence suggesting that women tend to take a more 'behind the scenes' role in decision-making [45]. While there are some examples of the influence of class and gender in energy-efficiency research, current research says very little about cultural diversity [46], especially with regards to aspects of identity such as age, ethnicity, locality, or disability status. Similarly these attributes can overlap, as trust in the wider institutions of society is a good indicator as to whether consumers will engage in 'smart' energy behaviours [47].

This paper brings together Hargreaves and Middlemiss's typology with Zelizer's relational economic sociology, to make sense of an empirical example of how social relations shape retrofit decision-making. In doing so, we address what 'relational work' happens in the three categories of relation identified by Hargreaves and Middlemiss, as well as in the spending of money for renovations. We consequently bring together the existing ideas from the energy literature on social relations and energy, with Zelizer's ideas about the role of money in society. To be precise, we bring these concepts to the data as a sensitizing framework: using them to help us identify the relational work happening within retrofit, and to understand what role this plays in success and failure. We finish by reflecting on and how this relational understanding might influence the development of more effective policies.

3. Data collection and analysis

This paper explored renovations experiences in the town of Otley in West Yorkshire, UK, using semi-structured, qualitative interviews. This method gave interviewees the opportunity to describe renovation experiences in their own terms, although the interviews followed a similar structure. The interview protocol was designed to encourage interviewees to re-trace the steps of the renovation process, asking them to recall how they decided to renovate; who they turned to for help and support; how they interacted with tradespeople; and how they managed finances before, during and after the renovation. This protocol ensured that we covered similar themes with all of the participants, while providing data on how social relations shaped experiences at different points of the renovation process.

We interviewed fifteen people from September to December 2021 (Table 1), with the small sample size helping to enhance the validity of a

Table 1
Interviewees and renovations carried out.

Interviewee[a]	Gender	Age	Household	Work done
Nicole	Female	60–69	1 adult	New double-glazed windows, doors, DIY loft insulation, new radiators and boiler.
Julie	Female	40–49	2 adults, 2 children	Total refurbishment, replastering, new windows, carpets, electrics, plumbing and radiators. Extended a bathroom, created a shower room. New wood burner.
Anne	Female	50–59	1 adult, 2 children	Total refurbishment, replastering, new heating system, cavity-wall, loft and floor insulation, new bathroom, kitchen and wood-burning stove.
Michael	Male	60–69	2 adults	Refurbished rooms, new windows and boiler, changed layout downstairs, underfloor heating.
Diane	Female	30–39	2 adults, 1 child	New doors and carpet, living room refurbishment, garden landscaping, basement tanked, new bathroom and kitchen ventilation systems.
Catherine	Female	30–39	2 adults, 1 child	New kitchen and bathroom, re-plastered, re-floored, garage converted, garden landscaped, driveway added.
Alex	Male	30–39	2 adults, 1 child	Extension, new boiler, double glazing, underfloor heating, kitchen and bathroom, fireplace, driveway, and garden landscaped.
Sam	Male	30–39	2 adults	New kitchen and bathroom, redecorated, new boiler, changed window layout.
Paul	Male	40–49	2 adults, 2 children	Garage conversion and new boiler.
Mary	Female	40–49	1 adult	Insulated walls and ceilings, tanked basement, new kitchen.
Louise	Female	40–49	2 adults, 2 children	Insulated basement, new boiler, new radiators, new wiring, double glazing, new kitchen, replastered walls.
Joseph	Male	70–79	1 adult	New boiler, electrical work, new fittings, new window, changed layout
Cheryl	Female	70–79	1 adult	New roof, repaved the driveway, new patio, double glazing.
Chris	Male	40–49	2 adults, 2 children	Property extension with shower room, utility room, home office, changed layout of kitchen and living spaces.
David	Male	60–69	2 adults	Total refurbishment when purchased, most recently refurbished the kitchen.

[a] Names have been changed to protect interviewees' anonymity.

fine-grained naturalistic enquiry [48]. We recruited interviewees through social media using purposive sampling and selected interviewees who were 1) owner-occupiers; 2) who lived in the Otley area; and 3) had recently carried out significant home renovations. None of the interviewees had used government grants to help fund works to their homes. Focusing on interviewees who had self-funded renovations enabled us to consider the decision-making processes for people who are broadly 'able-to-pay' for retrofit. Further, following other research into home renovations and energy efficiency [13,28], it is not common for households to separate energy retrofit from broader home renovation. By sampling for those who have done amenity renovation recently and exploring how energy measures were or were not undertaken, we get a clearer understanding of real social relations surrounding energy performance interventions. As we outline above, owner-occupiers account for 63 % of housing tenure in the UK [6] and this sector poses particular challenges for retrofit advocacy [49]. Respondents self-identified as having done 'significant renovations', so as not to exclude any work with a pre-defined list. Moreover, other studies have highlighted the value of linking energy retrofit with general household renovations [12,50]. The value of this link stems from the tendency of householders to not distinguish between the two types of work [13]. In addition, considering retrofit in the context of other types of renovation helps to understand the strongly social, symbolic, and emotional context that home improvements take place in [12].

Our interviewees represent a mix of household compositions and ages. However, all interviewees were from white British backgrounds and examining the impact of social relations for participants from non-white backgrounds is a key avenue of future research. Similarly, due to our focus on owner-occupiers, results are less likely to be relevant for people living in rented accommodation, those in social housing, or those suffering from fuel poverty. Nonetheless, the common themes we have uncovered across interviewees sheds light on how social relations shapes decision-making over home-works.

Two researchers were primarily responsible for conducting interviews and the preliminary data analysis. We provided interviewees with a basic questionnaire covering their backgrounds and asked to summarise the renovations they had done to confirm their suitability for the project. The wider research team continuously reflected on interview processes and our findings to inform the analysis process. We analysed the interview transcripts on NVivo, using the three groups of social relations that Hargreaves and Middlemiss defined. Relations of particular importance in the data were relations with friends and family, tradespeople, and relations associated with gender. We report on each of these below. We also used an additional category: the relational nature of money, developed through data analysis and in our reading of Zelizer. We also place particular emphasis on the dynamic nature of social relations and how they change over time throughout our results, as this was a frequently occurring characteristic of our interviews.

The case study we discuss in this paper is part of an ongoing project that is seeking alternative business models to accelerate retrofit in the UK. This has included running workshops and interviews with 13 representatives from building organisations, local councils, contracting companies and financing bodies. In the workshops we summarised our findings from interviews with homeowners and outlined our theoretical framework. We then discussed potential delivery models that recognised and limited the need for homeowners to undertake new relational work. We hosted the workshops in September 2022 and are in the process of analysing this data. Nonetheless, we have included some preliminary findings from these discussions in the implications for retrofit policy section.

4. Results: social relations and household decision-making

4.1. Friends and family shaping renovations

Relations with friends and family played a variety of roles in the

renovation process, both shaping the need to carry out renovations and the ways in which they were carried out. Interviewees spoke about renovating their homes to change the use of space, increase comfort, or fix broken items. Such renovations create and maintain relations with meaningful others such as friends and family:

"We wanted to incorporate the kitchen and the dining room, so it was more open plan living. It suited what we do socially, so when we have friends around for board games, we can interact with them rather than going into separate rooms. And then because when we moved when our little boy was still quite small, it meant that just for safety, we could see where he was at all times."

(Catherine)

Similarly, Chris – who also had young children at the time that they undertook the renovations – noted that they changed the layout of their home to create a "nice, big, open family space".

In renovations where energy-efficiency was improved, it was discussed in the context of improving comfort and health for the family rather than purely for energy-efficiency or economic utility. For example:

"My ex was asthmatic, and he really struggled with heating upstairs, I struggle with it more since he's left, but at the time I didn't. And I was probably thinking about the kids too much, with them being warm."

(Anne discussing insulating her house)

"Why am I doing it? because we want to enjoy the house, my kids are grown up, but I've got grandkids, and when visitors come, you don't want that loss of pressure. In a family environment, I think it's essential."

(Michael discussing getting an efficient boiler and hot-water tank)

"When I saw about the heat efficient glass, which was behind the actual promotion, I'd never heard of it before….it's probably as good idea to have that because I'm always cold. I work in the NHS and it's so hot on the wards, I come home and it's like coming into Siberia."

(Cheryl discussing her decision to put in new windows)

Relations with family and friends were dynamic and changed through time, which influenced renovation decisions. For example, Anne, who would usually do more DIY, felt the need to employ tradespeople to do the work due to family pressures on her time, Diane, Louise and Chris were motivated by the changing needs of their families. Meanwhile Alex noted that renovations were about adapting the house to their growing family's needs.

"[B]ecause of us having a two-and-a-half-year-old at the time, and then planning on having another, so that meant that really we had to do things quicker"

(Anne)

"Having a child with growing needs, you kind of have to change your layout to work really"

(Diane)

"We recognize this ultimately is a three-bed property, if we want to have two kids, or maybe more, who knows, and still maintain the possibility of having grandma and grandad to stay in a guest bedroom, we're going to need a bigger house. So, was never about making it a completely like you know, child friendly, although it is obviously, family space. You know, it was more about making it comfortable, something we can enjoy, something, you know, that that meets that 10 year objective."

(Alex)

Overall, relations with friends and family were a major motivation for carrying out renovations. These relations changed through time as families shifted from one life stage to another, and such changes influenced households' ability and desire to carry out renovations. In a sense, the renovation that people engaged in were merely an extension of the relational work they were doing within their intimate relationships. This shows renovation to be a product of family and friend relations, and people engaging in renovation as part of the ongoing relational work around those relationships.

4.2. Doing relational work with tradespeople

Interviewees discussed relations with various agencies and communities such as financial institutions, government schemes, third-party websites, and advice services. Relations with tradespeople emerged as the largest influence on renovation decisions.

Significant additional relational work was required to establish trust between interviewees and tradespeople. Most interviewees relied on social relations with friends, family, and their community to build relations of trust, feeling it was safer to use tradespeople that had been recommended to them by personal connections. Note here that people are engaged with tradespeople in relationships of service provision, but they are sometimes accessed through more intimate relationships. Tradespeople were also accessed through more distant connections; for instance Diane, Catherine, Julie, Sam, Louise, David and Alex all used recommendations from non-intimate connections on community Facebook pages to find tradespeople. Note that given we recruited our sample through Facebook, our participants were already engaged with – and established networks – on this platform.

"You have to have an instinct about it and do the research because that tells you if what they're saying is true and if you can trust them… I've absolutely used Facebook loads of times to cross-reference recommendations for [tradespeople]." (Louise)

Some interviewees used third-party websites such as Which?, Trusted Traders and trustatrader.com to find tradespeople. However, interviewees tended to use these websites as a last resort when they could not get a personal recommendation, and several people found them to be unreliable:

"We got a decorator to decorate a couple of bedrooms and the hall, stairs and landing. We found him on trustatrader.com, and he had loads of positive reviews, and he was crap….that website is open to abuse because of false reviews. So, its credibility goes, which is why now, I'd rather just put something on Facebook, and see how many people suggest the same name."

(Alex)

"I'd use things like your British Gas local heroes type things…or trustatrader for smaller jobs. For the bigger jobs…we generally went on local recommendation…the Otley Facebook group is pretty active…even if you don't post them yourself, you can always search for somebody in the last couple of weeks who will have asked for a render, a plasterer, a builder or whatever. So we use that generally, because I've had a couple of leaks from the roof, and I used the likes of trustatrader…to find somebody to fix the roof. And the people that have turned up, have not been great. So all the sites that profess to review people, I am not a fan. I don't believe in them…because the ones that I'm sure genuinely are reviewed and properly vetted, are unavailable all the time. And then in the background there are loads of people who are available who aren't as well reviewed. So we had a couple of people come and fix the roof, none of which were willing to come back afterwards to fix follow up problems…So that's why I would always go for local recommendations, because you usually get a good feel. People don't tend to lie to their neighbours."

(Sam)

When deciding to use a tradesperson, a variety of other methods were used to build trust. Some interviewees, such as Chris and Louise drew on personal connections from family members in similar industries to inform hiring decisions. In the absence of personal connections, employing local businesses was important for some interviewees. For instance, Catherine and Nicole noted that the fact that their tradespeople had a physical presence ("*a door that I can go and knock on*") in their community. The importance of a community presence was also important for David – who retrained as a joiner – and noted that he was lucky to work in a "close-knit community, where I tend to know everyone". This sense of being 'known' in the community, helped David foster trust with prospective customers and mean that many of his recommendations came from word of mouth.

Brand recognition was another way that homeowners sought tradespeople. For instance, Paul relied on the fact that his plumber came from a reputable brand, while Joseph chose a boiler brand with certified technicians, reassuring them during the installation process and for future maintenance issues. How tradespeople presented proposals also had an impact on fostering trust with homeowners and Catherine liked the fact that her contractors had invested in technology:

"He came with like a laptop and a design program and took lots of precise measurements and drafted up, a bit like a VR, we could spin the room round. That has quite an impact on you. Because you think, 'oh wow', they've took it seriously and they've invested time and technology in it, rather than Bob with a sketch pad just quickly sketching it out."

(Catherine)

Once work commenced, qualities such as tidiness, reliability, good communication and interpersonal skills were often cited as important qualities which shaped relations between households and tradespeople.

"[I]t was the lines of communication, you know, he would always keep us informed about what was happening, what was going on, what we needed to do. He'd let us know if there was anything unexpected. What kind of costs there were."

(Paul)

"The building contractors were careless, disrespectful, untrustworthy, they were lying to us, didn't show up when they said they would…"

(Alex)

Again, time was significant in relations with tradespeople and past experiences were likely to influence future interactions. Where households had good experiences with tradespeople in the past, they were highly likely to go to them again, interviews Diane, Catherine, Julie, Michael, Louise, Nicole, Anne, Alex and Paul all used tradespeople that they had previous engagements with. Conversely, for interviewees who had had negative experiences, it was difficult to negotiate relations of trust into the future.

"Jeez, you just don't know who to trust these days, the workmanship, they just don't care."

(Nicole)

"You have to be so wary about people and you have to be so careful about what their specialism is."

(Louise)

Paul noted how a better relationship with a tradesperson they had hired more recently had made him feel that "in retrospect, you kind of realise that you've been taken advantage of, to an extent". Conversely, after building trust with different tradespeople Paul now hired the same contractor "90% of the time".

To summarise, relations with tradespeople were marked by a distinct lack of trust and households used various techniques to assess the reliability of tradespeople. Building relations with tradespeople took considerable relational work, which frequently involved taking recommendations from friends and neighbours, or searching further afield if necessary. These relations were influenced by people's past experiences, and bad experiences with one tradesperson could have implications for their interaction with the industry in the future.

4.3. Gender shaping the renovation journey

Relations associated with social identity also influenced how people renovated their homes. Gender was the main theme in the data, however social identities associated with age, physical ability, locality, and being a single-parent household were all identified as potentially having an influence on renovations.

Several interviewees spoke about how their identity as a woman shaped their renovation experience. For instance, Cheryl noted that it was 'difficult' trust tradespeople when getting quotes, arguing:

"I would rather go on recommendation. But even then, with recommendations because there's no man around, they think they can cut corners or take a fancy job here. That's what I found being female."

Nicole also felt that tradespeople treated her differently because she was female:

"Because I'm a female… I just think if I had had you know, my other half, or another half here, erm, it would have progressed things" … "I said to him don't you rip me off cause I'm a woman. I feel really wary now, about everything."

Mary (the third interviewee in a single-woman household) seemed to avoid these challenges by almost entirely relying on trained friends, building on existing – and trusted networks – for advice on renovating her property. In addition, for Mary, watching and learning trades from her father gave her confidence to undertake work by herself, although she did turn to friends when she needed help for more 'taxing jobs'.

Anne, meanwhile, said that she felt 'manly' for doing a lot of DIY:

"As a woman I have quite a lot of DIY skills and I wish I had a lot more" … "I do sometimes feel like a bit of a manly sum of my single friends."

(Anne)

For Anne, being female, and the relations associated with becoming a mother, influenced the meaning of renovations and whether it is seen as an emotional or a financial investment. Again, these meanings can change through time as people transition to motherhood and other life stages:

"I think because I was the female and planning on having another child, I was very much in that, perhaps fantasy world? Happily ever after sort of thing. I'm sure from my husband's point of view it was very much about the financial"

(Anne)

In short, social identity influenced the way that people interacted with others, the way they saw themselves, and their meanings and motivations for the renovation. Again, these relations change over time, such as during the transition to motherhood.

4.4. Money for renovations is different

Relations associated with money emerged from the data as a major influence on renovation decision-making. As we would expect from research on the sociology of money [9,51,52], people spent money differently depending on where it came from and the meaning they attached to it. Most interviewees showed a strong preference to use savings or inherited funds for renovations rather than use loans or finance. For instance, Cheryl noted that she 'always' funded work through their savings, and that using savings was 'the way [they were] brought up'. The wish to use savings was linked to attitudes around debt with several interviewees noting their wish to avoid loans to do renovate their homes.

"My father always said that the heaviest thing you can hang around your neck is debt. And he was right. So I was brought up [with] the ethos, 'if you didn't have it, you saved up'."

(Joseph)

"We wanted to do it all the proper way. Sorry, the 'proper way' which is you don't get it unless you can afford it, rather than getting everything on loans and paying for it afterwards, and paying, two or three times more back. I think because we both had that put into us from being children, and our parents were very much of that opinion as well … we both felt very strongly about that"

(Anne)

"I believe in saving up to do it, you know, you don't just take out a loan. That's my opinion"

(Julie)

Significantly for retrofit, an aversion to government energy-efficiency incentives can be influenced by a lack of trust in the nature of the transaction and media of exchange, with one interviewee preferring simpler measures:

"I can't remember the details of it exactly, but it was something like that the government, do they take an equity stake in your house or something? I can't remember quite how it works. Either way, I was like, we're not doing that, no chance!" … "I quite liked the photo-voltaic feed in tariff because it was quite simple."

(Alex – discussing retrofit incentives)

Louise was similarly cautious about government schemes and felt that they were overly complicated with onerous conditions. As a result, she was reluctant to engage with these policies, despite wishing to 'future-proof' her property and maintain its value as an investment. Chris meanwhile, felt that the incentives weren't sufficient to actively pursue environmental retrofits, especially if decisions were made around immediate financial needs.

"If there were two properties side-by-side and they were both identical, everything was exactly the same but one was more environmentally friendly you would choose that one…but it's very rarely that that's the case. Normally, in the current climate, if you've got two identical properties and one is more green than the other, it's also more expensive because you're paying off future savings."

(Chris)

Timing was also a significant in with the context of social relations of money. For example, Julie only had the funds to do renovations due to her time of life, changing relations, and changing priorities around what she decided to spend money on. Catherine and Alex had both received inheritance from the passing of a close relative and decided to spend that money on renovations, so they had something tangible to show for it. According to Catherine:

"when you get some money through, you feel like you've got to have something to show for it in a way, rather than something that's more disposable."

Similarly, Julie the noted how the way she spent money changed over time:

"We couldn't have done this earlier in our lives, there's no way, because you spend much more money on your social life, and that's absolutely the right order."

In summary, people attach different meanings to money depending on their social relations, attitudes, trust, and emotions. People's relations with money changed through time, for example due to changes in the meaning of their social relations and priorities over what to spend money on as people get older. Money was not completely fungible, instead, the meanings people attached to money had a significant impact on the way it was spent.

5. Discussion

5.1. How social relations influence renovation decision-making

We began our analysis using Hargreaves and Middlemiss's [7] framework, and extended this to include relations associated with money and to consider the influence of time on the different types of relations. The inclusion of money was motivated by the recognition that home renovation is expensive, and that decisions around it are likely to be associated with money in some way. We found that money for renovation was spent differently, according to where it came from and what time of life people were in. Timing was especially significant in the context of home renovations. This is possibly because renovations occur periodically and are dependent upon larger sums of money that come from more diverse sources compared to everyday energy use.

From a relational perspective, economic activity is based in the establishment and maintenance of meaningful social relations [8,9]. Family money is infused with the norms of how parents and children care for [and transmit values between] each other, and what it means to be a family [53]. Renovations in our research were generally motivated by a desire to continue or improve social relations with others, and the relational work that we saw tended to be understood as a product of friend and family relations. Where energy-efficiency was improved, it was often discussed in the context of improvements to comfort or health rather than purely energy-efficiency or economic utility. This complements Maller et al.'s [27] findings that narratives of energy-efficiency are only pursued when they are compatible with household practices.

Building trust with tradespeople was a vital element of the renovation process, relating to Hargreaves and Middlemiss's 'agencies and communities'. One of the goals of relational work is to establish trust [51], and significant relational work was required to establish relations of trust between homeowners and tradespeople. According to Bandelj [54] relational work becomes more prominent in uncertain and ambiguous transactions because the situation is less standardized and requires greater negotiation over the nature of the relationship. The retrofit sector is characterised by a high degree of uncertainty due to widespread concern about placing trust in tradespeople and difficulty negotiating the variety of products available [37]. Our respondents used different approaches to establish relations of trust at different stages of the process. Like DeWilde [37], we found that people tend to use interpersonal mediators of trust, such as recommendations from family, friends, and their community during the initial stages of finding tradespeople. Community Facebook groups were a particularly popular source of recommendations. Wider research indicates that this could be because neighbours often live in the same types of houses suffering from similar problems, have similar socioeconomic backgrounds and feel connected by a sense of proximity [55]. In addition, online forums can provide good sources of new information, experiences, and perspectives [56].

When deciding which tradesperson to use, interviewees cited factors such as interpersonal skills, having a physical presence in the community, or investing in technology as important for building trust. This was due to the impression of professionalism that these elicited in the homeowner. Wherry's [57] identifies 'relational sites', as important for making sense of a deal, especially for individuals with a potentially discreditable character (such as tradespeople). The physical space (aesthetics, location) of the transaction and 'dynamic interpretation of the actors making sense of the deal' shape 'relational sites', influencing how people engage with the transaction. In the context of our case study, interviewees responded better to store fronts, which reinforced an impression of professionalism and the sense that tradespeople could personally respond to questions and issues. Wherry [57] highlights how paying close attention to social roles and the physical characteristics of the site of exchange is important for generating viable transactions. This supports Owen et al.'s [39] findings that non-technical skills, such as communication and information sharing, are important in the installation and diffusion of energy-efficient technologies.

In terms of relations associated with social identity, women are often conceived as carers in a heteronormative home space [58]. These relations of care can create gendered differences in the meanings of renovations, as demonstrated by the differences in renovation motivations between interviewee Anne and her husband. Gender also shaped relations between homeowners and tradespeople, with some female interviewees feeling that they had been taken advantage of because there was no male presence in the household. Power plays a role in relational work and actors assess the value of exchange partners based on existing cultural hierarchies such as gender, race, or class [31]. As we spoke with people who had already undertaken renovations, it is difficult to get a sense of how far these dynamics dissuade homeowners from undertaking retrofit. Nonetheless, the female interviewees did express reluctance to engage with certain tradespeople, while they indicated that their gender shaped how they thought – or their belief about how others perceived their opinions about – renovations. This speaks to recent research into gendered responses to energy technology. Mechlenborg and Gram-Hanssen [59] have found that "PV systems reproduce a conventional symbolic and embodied connection between masculinity and technology". Their interview data indicates that while male interviewees generally took control of sourcing and managing new technologies, women were responsible for adapting household practices to new technologies [59]. This research suggests that different relational expectations and the need to do different types of relational work to negotiate appropriate retrofit transactions could affect various social groups. Although the extent that similar gendered dynamics influence engagement with retrofit policy is an area for further research.

Relations associated with money also influenced renovation decision-making. Money is not completely fungible and is spent differently depending on where it comes from and the meaning we attach to it [31]. For example, several households showed an aversion to debt for reasons such as wanting to do things the "*proper way*" and "*I believe in saving up*". According to Wherry [57], collective moral codes can shape attitudes towards debts, shutting off courses of action and shaping perceptions of available options. This matters because properties that exist "prior to and outside of the financial decision structure" influence decisions [60]. Other factors such as mistrust in the nature of the transaction or the media of exchange can create relational mismatches [31]. Interviewees Alex and Louise demonstrated this mistrust through their reluctance to engage with retrofit financing.

As we have discussed throughout, each of these factors were seen to change considerably over time, with our respondents' histories and future aspirations shaping decision-making [61]. Wherry [57] discusses how meaningful timing such as the birth of a child or the death of a loved one, and the shifting of people from one life stage to another, influence household's social relations and budgeting decisions. For example, interview Julie was only able to carry out renovations due her children growing older and a shift away from spending money on her social life. Whereas for interviews Catherine and Alex, the passing of a close relative had left them with inheritance that had strong sentimental and

emotional attachments which they wanted to spend on something significant and tangible. Essentially, people's social relations, how money comes into their possession, and the meanings they subsequently attach to them are dynamic and change through time; each has profound implications on how people view and so spend their money and what they decide to do in their homes.

5.2. Implications for retrofit policy

Current policy approaches tend to rely on applied behavioural research to inform retrofit policies, these approaches are appealing to policymakers as they provide a range of personal and contextual drivers and barriers that can act as effective policy levers [12]. Relational approaches which shift the focus of policymaking from influencing individual practices towards mediating relationships is both practically and ethically more challenging [8]. However, describing more realistic accounts of the social context in which people make decisions could provide valuable insights into the development of more effective retrofit interventions [12]. This approach would help tackle some of the wider contextual challenges to retrofit discussed above, such as a lack of trust in the industry, and poor engagement with homeowners.

Our interview data has shown that social relations influence when people get work done on their homes and the type of renovations that they pursue. For our interviewees, these considerations outweighed reasons of pure economic rationality or energy efficiency. As such energy efficiency is unlikely to be pursued unless it is compatible with current or anticipated household practices. This suggests that in many cases, the provision of finance is likely to enable retrofit instead of driving demand [19]. This supports Rosenow and Eyre's claims [38] that energy-efficiency policy ought to promote the wider benefits of retrofit such as improvement in comfort and health, rather than narratives of economy and efficiency. Bundling wider renovation work or home improvements with retrofit interventions could increase the uptake of energy-efficiency improvements through the recognition that improving people's experience of the home is a key motivator for renovations [62].

Building trust in both tradespeople and financial institutions is critical to advancing retrofit programmes. A relational approach shows that trust is built through recommendations from friends, families, and neighbours. Community-based approaches that make use of existing social networks and trusted messengers could be particularly beneficial for promoting retrofit programmes and increasing the public acceptability of proposals [40,63]. The 'relational site' of the transaction was also important: factors such as having a physical presence in a community, good communication and a professional appearance were important in creating viable matches for some homeowners. For instance, workshop discussions with representatives from local councils has underlined the benefit of having a physical hub during area-based retrofit programmes in Leeds. Similarly, representatives from local energy companies supported the expansion of one-stop-shops (such as RetrofitWorks in Manchester or 'Cosy Homes Oxfordshire') to support homeowners in undertaking retrofit. These hubs or 'one-stop-shops' act as a point of contact for residents, limited the amount of new relational work needed to identify trusted tradespeople and manage the building process. The potential benefits of these hubs speaks to Brown's [64] argument that policy should pay attention to the alternative business models and intermediaries that can create a customer interface that effectively engages people.

Different social groups have different renovation experiences and being attentive to the differences in motivations and relational work that occur across different social groups could help the development of more effective policies. This conclusion speaks to wider research which underlines the need to recognise complexity in the market. For instance, Sunikka-Blank et al. [45] argue that 'one-size-fits-all polices are insufficient to meet differences in social groups, and that more diverse policies are required to fit the needs of different groups of people. Meanwhile, others have asserted that understanding homeowners as a

heterogenous, rather than homogenous group will be critical for improving support to retrofit [13]. 'Market segmentation' approaches, which aim to understand the needs and desires of specific subsets of the population could be used to achieve the best results [13,63,65]. A relational approach offers a lens to understand the factors that shape this complexity and identify opportunities for intervention.

When it comes to finance, attention should be paid to the value people assign to different types of money. The scale of investment needed to reach net-zero commitments has led to calls to shift support measures from grants towards loans due to their ability to leverage larger sums of private funds per public fund spent [66]. However, debt adverse homeowners might impede the effectiveness of such a shift. Schleich et al. [67] found that homeowners may fail to respond to retrofit loan offerings because they intrinsically dislike being in debt. Moreover, Galvin [68] has also demonstrated that financial packages in Germany have tended to overstate potential savings, further deterring homeowners. Rising energy costs suggests that this risk is particularly pertinent and underlines the need for an approach that speaks to the reasons why and when people undertake work on their homes over financial incentives.

Finally, timing is an important factor in shaping when people decided to renovate, what work they decided to carry out, and the way in which they decided to do it. Research into 'trigger points' shows that there are certain points in people's lives where for practical and financial reasons, renovations are more important, affordable, attractive, and less disruptive than others [69,70] such as when properties are bought or sold, or when a boiler breaks down [19]. Our research indicates that there are potential relational 'trigger points' such as the transition to parenthood and the changing expectations around relations of care, or when inheriting a sum of money which has strong sentimental or emotional attachments. Offering retrofit information, incentives, and funding at specific times where renovations might be more meaningful, practical, or important to households could be particularly effective [71]. We are in the process of exploring how these delivery models could take shape with institutional stakeholders. Potential interventions include linking retrofit to non-energy related renovations, thereby recognising that energy efficiency is not a significant driver in people's reasons for undertaking works on their home. Further, policy that starts with social relations as the determinant of people's decision making would be more consistent with how decisions about home renovations are actually made.

6. Conclusion

Decarbonising the UK housing stock is essential if the country is to meet its climate commitments. However, progress towards this goal has been slow with low levels of engagement with government initiatives to retrofit homes. Research into why government interventions have not accelerated retrofit have noted the failure to account for organisation of the market and shortcomings in the dissemination of information about schemes. In addition to other barriers linked to technology performance; the cost for government and homeowners; and behavioural barriers [16]. For instance, policy makers have tended to conceptualise homeowners as 'rational actors', and prioritised the financial package [10]. The narrow conceptualisation of homeowners as 'rational actors' has resulted in simplistic policies that target (yet still have not solved) financial challenges around retrofit, with little consideration of wider contextual challenges. In the case of the Green Deal, Rosenow and Eyre [38] have argued that 'people were sold the loan instead of the car'. This paper offers insights into how to improve this conceptualisation of homeowner by adapting Hargreaves and Middlemiss's [7] research into the social relations of everyday energy use to examine household decision making around renovations. This relational approach has shown how renovations are not determined by rational isolated decision-makers, but profoundly influenced by dynamic relations with friends and family, agencies and communities, social identity, and money.

These findings speak to the limitations of current retrofit policy by highlighting not only the 'barriers to uptake' but also the realities of household decision-making. We consequently suggest that retrofit policies should be attentive to the actual reasons people choose to renovate their homes; how people develop trust; different social groups' unique experiences; and how these factors change through time. Retrofit programmes that capitalise on local social networks; are tailored to different social groups' needs; and are accommodating of the fact renovations are more feasible at different stages of people's lives, requires a good understanding of households, communities, and people's everyday lives. Our approach can be helpful in considering local retrofit policies by identifying how social relations shape decision-making in a particular setting. How wider areas of civil society and local governance (such as local councils or community organisations) could contribute towards creating retrofit programmes that are tailored to the needs of local populations, is therefore a key area of future research.

Funding

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

Acknowledgments

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