Designing trust: how strategic intermediaries choreograph homeowners’ low-carbon retrofit experience

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ABSTRACT
In the Netherlands, as in other European countries, the uncertain, fragmented character of the low-carbon retrofit market hampers a transition towards sustainable housing. Connecting homeowners to supply-side actors of low-carbon retrofit procedures, products and technologies in ways satisfactory to homeowners forms an important, challenging task. Service design for the benefit of a customer-centric perspective might be a solution. This paper investigates the potential role of strategic intermediaries as agents of change located between supply-side actors and homeowners. It asks how strategic intermediaries choreograph low-carbon retrofit experiences of homeowners through the design of a ‘customer journey’. Trust is a crucial determinant. This paper distinguishes between three customer-journey designs in which, depending on the role envisioned for homeowners, a different trust relation is foregrounded: a private design envisions homeowners as passive consumers who trust in the expertise offered by the intermediary; a civic design envisions homeowners as engaged consumer-citizens who trust their neighbours as reliable service representatives; and a public design envisions homeowners as critical customers who trust in the retrofit technologies and products offered. This implies an important role for policy actors in realizing ways for scaling up and institutionalizing all three low-carbon retrofit customer-journey designs on a national level.

KEYWORDS
houses; market transformation; middle-out; retrofit; service design; strategic intermediaries; sustainable buildings; trust

Introduction
All across Europe, energy transitions towards a low-carbon society are set in motion. As buildings account for 40% of the European Union’s energy consumption and 36% of its CO2 emissions, policy concerns about the energy efficiency of the built environment are rising (European Commission, 2016). Residential property represents a significant majority of the built environment, and the low-carbon retrofit of Europe’s current residential property, which entails the refurbishment of homes by installing, among others, roof, floor and/or cavity-wall insulation, triple-glazed windows or solar panels, has become a major challenge in the transition towards sustainable housing. All across Europe, ‘new governance’ networks are rolled out by local authorities, large building companies and property (real estate) developers to realize large-scale low-carbon retrofit projects for rental properties and commercial real estate (Van der Heijden, 2016). However, upgrading the existing owner-occupied housing stock remains difficult and entails a different approach. In the Netherlands, 70% of the 3.4 million owner-occupied homes have an energy label C or lower, which indicates that the energy performance of privately owned homes is in need of improvement. Still, on an annual basis, only 3% of Dutch homeowners undertake two or more low-carbon retrofit measures (Bouwend Nederland, 2016).

There are different reasons for the slow uptake of low-carbon retrofit measures by homeowners. Challenges include satisfaction with the existing conditions of the dwelling (Mahapatra & Gustavsson, 2008), a highly variegated housing stock, disruption and inconvenience to households, undesirable payback periods for many energy-efficiency strategies and lack of households’ interest in energy efficiency (Galvin, 2014; Wilson, Crane, & Chryssochoidis, 2015). Moreover, the retrofit market displays ‘a balkanized character’ (Karvonen, 2013, p. 564): it forms a fragmented, uncertain industry of various procedures, (micro-enterprise) providers and products (Clarke, 2006; Owen, Mitchell, & Gouldson, 2016).
If homeowners are interested in reducing their carbon footprint by installing retrofit measures, it is difficult to navigate the low-carbon retrofit options: improved products enter the market frequently, experts generate new claims and innovative technologies develop continually. In such a balkanized landscape, supply-side actors – such as contractors, installers, product manufacturers, local authorities and energy cooperatives – often feature as ‘a barrier, rather than as enabling mediator’ (Risholt & Berker, 2013, p. 1029) owing to their lack of knowledge (Galvin & Sunikka-Blank, 2014) and their ‘weak engagement’ (Bartiaux, Gram-Hanssen, Fonseca, Ozoliņa, & Christensen, 2014, p. 534; Gram-Hanssen, 2014) with the demands, desires and experiences of homeowners.

The reluctance of homeowners in combination with the balkanized character of the retrofit market implies the importance of connecting homeowners to supply-side actors of low-carbon retrofit procedures, products and technologies in ways that work out well for all parties involved. This paper argues that ‘strategic intermediaries’ (Medd & Marvin, 2007, p. 321) are important actors located in the middle that can help realize this. The Netherlands has seen the emergence of such strategic intermediaries that mediate between homeowners and supply-side actors. Their mediation implies three services:

- the assessment of the best possible longer-term low-carbon retrofit strategy for homeowners
- the identification of potential low-carbon suppliers and technologies best suited to the demands, wishes and experiences of homeowners and the physical properties of the dwellings
- reaching mutual agreement about the roles and responsibilities of supply-side actors and homeowners during the low-carbon retrofit process

On the basis of a qualitative study of the ‘service design’ (Zomerdijk & Voss, 2010) offered by frontrunners among Dutch strategic intermediaries, this paper analyzes how these intermediaries attempt to choreograph low-carbon retrofit experiences of homeowners through the design of a ‘customer journey’. Customer journeys are a relatively new phenomenon in the Dutch low-carbon retrofit sector, which has only recently shifted towards acknowledging the importance of service design (RVO, 2014). The aim of customer journeys is to engage homeowners with supply-side actors relevant for realizing a (more) energy-efficient home.

This paper shows how, through the design of customer journeys, these intermediaries aim to develop connections between supply-side actors and homeowners. The argument presented here is that trust is of particular importance in uncertain contexts such as the low-carbon retrofit market. Trust can become ‘a barrier as much as an enabler to change’ (Bellaby, 2010, p. 2653) and can be fragile and hard to generate and maintain. This paper distinguishes between three customer-journey designs in which, depending on the role envisioned for homeowners, a different trust-relation is foregrounded:

- **Private customer-journey design:** envisions homeowners as passive consumers who trust in the expertise offered by the intermediary
- **Civic customer-journey design:** envisions homeowners as engaged consumer-citizens who trust their neighbours as reliable service representatives
- **Public customer-journey design:** envisions homeowners as critical customers who trust in the retrofit technologies and products offered

This implies an important role for political and policy actors in realizing ways for scaling up and institutionalizing all three low-carbon retrofit customer-journey designs on a national level.

The paper is structured as follows. The next section introduces the theoretical framework on the role of strategic intermediaries, service design and trust in a low-carbon retrofit market. The third section explains the basic touch points of a low-carbon-retrofit customer-journey design and presents the differences in the three customer-journey designs. The final section discusses the findings and their implications in light of the transition to sustainable housing.

**Strategic intermediaries and service design**

The fragmented character of the low-carbon retrofit market and the policy focus on reducing energy consumption (especially in Western Europe) has created space for intermediary organizations to specialize in the development and management of the energy demand of households (Nolden, Sorrell, & Polzin, 2016). Medd and Marvin (2008, p. 282) emphasize the intentionality of intermediaries and introduce the notion of ‘strategic intermediaries’. These strategic intermediaries play an important role in ‘the governance of choice’ (Rohracher, 2009, p. 1481) by ‘enrolling and aligning supply-side and demand-side actors [through] facilitating dialogue, providing guidance, bridging gaps, advocating reform, or pioneering novel forms of interaction’ (Moss, 2009, p. 1481).

In the Netherlands, with the aim to guide and craft the low-carbon retrofit experience of homeowners positively, strategic intermediaries engage in ‘service design’ for the benefit of a more customer-centric perspective in the low-carbon retrofit market. Service design refers to:
A key characteristic of this service is that it is designed to engage customers ‘by creating emotional connections through engaging, compelling, and consistent contexts’ (Zomerdijk & Voss, 2010, p. 68). Contexts are made out of physical and relational elements in the experience environment. It includes the physical setting (e.g. shop or dwelling), market actors and any social interactions with other customers and/or service representatives.

Specifically, these contexts can be staged as part of the design of a so-called ‘customer journey’: a series of touch points that involves all activities, encounters and events linked to the delivery of a low-carbon retrofit service from the perspective of a customer (Patricio, Fisk, Falcão e Cunha, & Constantine, 2011). These touch points occur whenever a customer ‘touches’ a strategic intermediary, across various channels and moments in time (Zomerdijk & Voss, 2010, p. 74). Throughout their journey among touch points customers are sent cues that influence their experience and intensify engagement and emotional connections, such as trust.

Designing trust is crucial as the retrofit market forms a fragmented, uncertain industry of various procedures, providers and products (Karvonen, 2013). Through customer journeys, homeowners become linked to different expert systems and commercial actors who are relevant for realizing a (more) energy-efficient home. Studies on homeowner retrofit have shown that homeowners are reluctant to retrofit due to different reasons: no clarity in economic savings (Galvin, 2014), lack of social values among relevant stakeholders such as non-governmental organizations (NGOs), public authorities (Bartiaux et al., 2014), the fear of disruption and inconvenience (Fawcett, 2014), the fear of not being in charge (Galvin & Sunikka-Blank, 2014), lack of knowledge among building professionals (Owen et al, 2014; Risholt & Berker, 2013), a minor compatibility with the everyday practices of households living afterwards in the retrofitted home (Gram-Hanssen, 2014; Judson & Maller, 2014; Vlasova & Gram-Hanssen, 2014), and a questionable reputation of the construction industry in many European countries.

Trust is widely studied in the social sciences (Misztal, 1996). In this paper, the definition of Bellaby (2010, p. 2615) who argues that ‘trust is a feeling or belief that someone (or some institution) will act in your best interest’ is adopted. Varman and Costa (2008, p. 148) argue that in markets ‘trust is a salient feature [and a] norm that is strongly present in relational exchanges’. The theoretical importance of the concept of trust has been steadily increasing as an explanation of how coordination between actors is possible when uncertainty about the qualities of products is high (Bellaby, 2010; Fligstein & Dauter, 2007). Despite trust being lauded as an important feature of both social and market exchange, the question of how it is generated is a strikingly understudied topic in the field of low-carbon-retrofit markets.

This paper answers that question by studying how strategic intermediaries choreograph low-carbon retrofit experiences of homeowners through the design of a ‘customer journey’. A private, civic and public customer-journey design are discerned which each contain a specific number of touch points at which service representatives and homeowners meet in pre-structured ways. In the empirical section of this paper, these customer-journey designs are analyzed along the lines of their touch points and the ways in which trust is designed is shown to depend on the role envisioned for homeowners in the low-carbon-retrofit process.

**Research approach**

In this study, customer-journey designs developed by three strategic intermediaries were selected as ‘maximum variation cases’ (Flyvbjerg, 2006, p. 230). This case study selection was based on an evaluation report of the so-called Blok voor Blok (‘housing-block to housing-block’) programme (RVO, 2014). The programme, which is one of the showpieces of the Dutch Energy Agreement for Sustainable Growth (2013), included 14 pilot projects throughout the Netherlands aimed at realizing large-scale energy saving in the existing, residential environment. In these projects, governments and market actors teamed up to develop innovative approaches for domestic low-carbon retrofit. Blok voor Blok was an essential role to strategic intermediaries as go betweens between the production and consumption of low-carbon-retrofit products and services. It ended in 2014, but the strategic intermediaries who were qualified in Dutch policy discourse as ‘frontrunners’ and having developed the most ‘innovative’ approach within low-carbon-retrofit markets continued their work (RVO, 2014). Common to their approach was service design and, more specifically, customer-journey design.

The aims of this study are to compare the customer-journey designs of these intermediaries and to explore the possibilities for upscaling them so that large(r) sections of the Dutch residential dwelling stock could be retrofitted in future. Two in-depth sessions with service providers and products (Karvonen, 2013). Through customer journeys, homeowners become linked to different expert systems and commercial actors who are relevant for realizing a (more) energy-efficient home. Studies on homeowner retrofit have shown that homeowners are reluctant to retrofit due to different reasons: no clarity in economic savings (Galvin, 2014), lack of social values among relevant stakeholders such as non-governmental organizations (NGOs), public authorities (Bartiaux et al., 2014), the fear of disruption and inconvenience (Fawcett, 2014), the fear of not being in charge (Galvin & Sunikka-Blank, 2014), lack of knowledge among building professionals (Owen et al, 2014; Risholt & Berker, 2013), a minor compatibility with the everyday practices of households living afterwards in the retrofitted home (Gram-Hanssen, 2014; Judson & Maller, 2014; Vlasova & Gram-Hanssen, 2014), and a questionable reputation of the construction industry in many European countries.

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representatives responsible for the design of the customer journeys within these intermediaries were organized. In these sessions, the service representatives shared detailed information on the design of their customer journeys, i.e. their ambitions, customer relationship management system, use of specific data, marketing strategies and collaboration with actors in the field.

The research approach also included a document study of various internal reports, communication material and websites of intermediaries, 13 in-depth interviews with service representatives of these intermediaries involved in the design and delivery of customer journey services, and 43 observations at touch points of customer journeys rolled out as part of local residential approaches throughout the Netherlands (e.g. energy gatherings, neighbourhood team-meetings, technical inspections of dwellings and shops for sustainable housing). This ethnographic fieldwork was undertaken over a period of 16 months (2016–17). Field notes and interview transcripts were iteratively collected and analyzed.

Taken together, these multiple qualitative data sources were used to triangulate the findings and provide an in-depth understanding of the similarities and differences in customer-journey designs. As such, the research approach established internal validity as it ensured a high level of congruence between the analytical perspective and the used data. As the case studies were selected on the basis of maximum variation criteria within the small setting of the Dutch market for low-carbon retrofit, external validity was ensured to a certain degree: findings can be generalized across this Dutch setting, but if other national market settings vary considerably this will not be possible.

**Findings and analysis**

This paper argues that customer-journey designs can be differentiated according to the role homeowners are envisioned to play in the low-carbon-retrofit process and, subsequently, the kind of trust-relation foregrounded in the customer-journey design. As noted above, a private customer-journey design envisions homeowners as passive consumers who trust in the expertise offered by the intermediary, a civic customer-journey design envisions homeowners as engaged consumer-citizens who trust their neighbours as reliable service representatives, and a public customer-journey design envisions homeowners as critical customers who trust in the retrofit technologies and products offered. Before analyzing the three different designs, a sketch is presented of the main characteristics that all customer-journey designs share.

**Basic touch points of a low-carbon-retrofit customer-journey design**

Six touch points make up all customer-journey designs analyzed in this paper: at each touch point homeowners engage with service representatives and/or other stakeholders (i.e. construction and installation professionals, contractors, energy experts, neighbours) (Figure 1):

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**Figure 1.** Customer-journey design with six basic touch points.
• Catching the attention of homeowners is essential. Therefore, sensitizing homeowners about energy savings, creating financial insight into energy consumption or advertising the benefits of low-carbon homes in terms of comfort and well-being constitute the first step of all customer-journey designs. To ensure this, intermediaries collaborate with local actors. The step, Collaboration with local actors, matters as an entry point to developing trust among homeowners. However, the types of local actors differ and so does the way in which local actors are enrolled into the customer-journey design.

• When homeowners respond to the various sensitizing efforts, the next step is to provide them with advice tailored to their personal wishes, particular energy usages and the physical properties of their dwelling. At this touch point, intermediaries attempt to deepen their relation with homeowners by offering them different types of expertise through various types of interactions with service representatives.

• Homeowners are confronted with many variables that have to be considered when trying to find the most suitable tender for selected retrofit measures. The kind of products available, the physical properties of the dwellings, and the hourly wages of contractors are just a few examples of the factors that have to be taken into account but which are difficult for homeowners to assess. Furthermore, information concerning subsidies and tax benefits for retrofit measures that are available at national and local levels is difficult to find and not easily accessed in the case of low information and communication technology skills of homeowners. At this touch point, strategic intermediaries create transparency, or a feeling of transparency, by unlocking access to preselected national and local contractors and providing guidance to possible financial benefits in various ways.

• Within all customer-journey designs the actual installation of retrofit measures is undertaken by selected contractors. At this touch point, the service representatives take a step back and the communication, planning and actual work itself is left in the hands of contractors. As a result, during the installation the degree of involvement of service representatives tends to be low, although different customer-journey designs differ in this respect.

• After installation of new retrofit products and technologies, it is necessary to check if these have been implemented correctly and to the satisfaction of homeowners. Also, financial matters have to be finalized and the retrofit process itself can be evaluated together with homeowners. The benefits of evaluation work both ways: for homeowners, it ensures the proper instalment of a retrofit measure and provides answers to any remaining questions; for intermediaries, it ensures feedback on their own assistance and on the service of the providers with whom they work, and therefore the possibility to improve their customer-journey design. The evaluation touch point might help to deepen their trust relation with homeowners. However, the object of the evaluation differs for each customer-journey design.

• After this evaluation, service representatives ask homeowners to share their insights and experiences with peers, so these peers might become inspired to retrofit their home as well. This is done through various communication channels.

Three customer-journey designs

Despite a common basic structure, the strategic intermediaries studied in this paper design their customer journeys differently. On the basis of empirical research, private, civic and public customer-journey designs are discerned in which a different trust relation is foregrounded, depending on the envisioned role of homeowners in the low-carbon-retrofit process (Figure 2).

Private customer-journey design

In a private customer-journey design all choices, calculations and planning are undertaken before the customer journey is rolled out in a locality. This involves extensive negotiations about the use of products and materials, between the intermediary and contractors, but also with local governments and energy cooperatives. In a private customer-journey design these negotiations are hidden: it is considered information that could ‘burden’ homeowners and therefore not disclosed to them.

To sensitize homeowners, the authority of local governments or the social embeddedness of local energy cooperatives is deployed to present the private intermediary as a trustworthy option for homeowners who are interested in retrofitting measures. Essential to the private customer-journey design is the organization of an ‘energy gathering’ in a particular locality – a neighbourhood or a small town. These energy gatherings have a standard set-up in each locality: information on energy savings is presented and a customized overview of retrofit measures suitable for the local housing stock is given. With the help of digital data – through Google Earth or Cyclomedia – the type of local housing stock is charted beforehand and used to find typical houses that can be used as examples during the energy gathering. This leads homeowners to assume that the intermediary is knowledgeable about the local housing stock.
The second touch point of the private customer-journey design provides tailored advice through personal consultation. When interested, homeowners are assigned a service representative who discusses possible retrofit measures tailored to their dwelling on the basis of information the homeowner provides about their dwelling and energy consumption, but also through tools such as Google Earth or the real estate register. Moreover, a technical inspection of the dwelling might be planned by a service representative specialized in technical expertise in order to finalize the tailored advice. During the technical inspection, the service representative not only checks the physical features of the dwelling but also advises specific products and answers any questions homeowners might have. Taking away doubts, ignorance and anxieties is a main part of their job when visiting homeowners at home; again the aim is to unburden the homeowner. As a service representative explains:

I always put together an advice by negotiating people’s reasons, their doubts and by what is actually possible in their residence. […] So, it is important that we win their trust […] if we make people feel good about something, if they trust us, then the chance increases of them purchasing a retrofit measure.

(Representative of a private customer journey)

Whereas extensive information and various types of expertise are deployed to offer homeowners tailored advice, this is different during the third touch point of the customer journey where suitable tenders have to be selected. Intermediaries shoulder the burden with homeowners by preselecting tenders from certified contractors only. This creates an ‘illusion’ of choice within a safe environment, as an service representative explains:

I think our strength lies in the fact that we offer [tenders by] three contractors who each offer a different product brand and compete with each other. We imply openness in the market, but that freedom of choice is also an illusion of course. At this moment we do not work with product sheets with specific product information in our tenders, because our principle is that our pre-selection of providers is very good and our warranty is uniform.

(Representative of a private customer journey)

Another implication of omitting information on tenders is that homeowners do not engage in a contract relation with the supplier of a retrofit product or technology but with the intermediary who also provides warranty service for the used products.

When it then comes to the installation of retrofit measures, service representatives take a step back and leave the work to the contractors. Yet, when problems or miscommunications do arise between homeowners and supply-side actors, homeowners can contact service representatives and they immediately become active again to ensure a quick fix to the problem:

We mostly do operational things. […] Sometimes it is a bit of a struggle back and forth between the demand-side and the supply-side. You want to keep both satisfied so you have to ensure that it remains a smooth process.

(Representative of a private customer journey)
As part of the evaluation a technical specialist is sent to perform a technical audit of the installation of the measure(s). The experience of service representatives is that this ‘neutral’ audit service is greatly appreciated by homeowners: ‘it gives them the confidence that the work is done properly’ (representative of a private customer journey).

Finally, homeowners are asked to review their experience on the basis of a five-star review system. The reviews are then showcased on the website of the intermediary. Unsatisfied customers are interviewed and information retrieved from these interviews is shared within the organization to improve the customer-journey design (Figure 3).

Civic customer-journey design

In the civic customer-journey design, homeowners are provoked to become part of a community formed through collective retrofitting. A touch point is created in which homeowners are sensitized about the benefits of energy saving in general, and where they can participate in a dialogue of learning and doing. They are invited not only to retrofit their own home but also to reflect on the retrofit experiences of their neighbours.

Collaboration with local actors is also used as an entry point, but not necessarily through institutionalized actors such as local governments. Rather, the civic intermediary initiates a voluntary ‘neighbourhood team’ of local residents. To find volunteers the civic intermediary collaborates with local citizen initiatives. Members of the team form the service representatives and homeowners in a specific locality are triggered to think about energy saving or the potential of insulation through personalized contact with their voluntary neighbours. In order to sensitize homeowners, the neighbourhood team organizes ‘awareness actions’ in the neighbourhood, such as a collective visit to an exemplar, retrofitted house of a neighbour or an excursion through the neighbourhood with a thermal camera and an energy specialist to spot the most common heat leaks. The face-to-face commitments undertaken by the neighbourhood team during this touch point are to a large extent made possible by backstage work undertaken together with a ‘neighbourhood supervisor’, employed by the civic intermediary, who provides community-building expertise, offers communication material and predesigned formats for awareness actions, and allocates modest financial support if necessary.

To provide tailored advice during the second touch point, the neighbourhood team organizes a collective purchase action for a specific retrofit measure, e.g. photovoltaic (PV) panels, in response to previous awareness actions. The neighbourhood team preselects one or two suitable contractors and negotiates a collective deal for the neighbourhood. As most houses in a neighbourhood are typically alike in design and set-up, only one exemplary house of a neighbourhood team member is inspected in order to provide tailored advice for all

Figure 3. Civic customer-journey design.
homeowners in the neighbourhood. For each type of retrofit measure, the intermediary provides default request forms that the neighbourhood team can use when approaching contractors for tenders. Neighbourhood volunteers do often get stuck, though: the default formats do not provide the assistance they need in selecting contractors and when judging tenders. In their role as service representatives, these volunteers desire advice and steering as the following empirical vignette from a neighbourhood team gathering on PV panels illustrates:

Chairman: The main difficulty is finding out what will be the most favorable tender, because it is a huge market with all kinds of parties and products. Are there differences in quality between contractors?

Team member 1: perhaps [the civic intermediary] can assist us with that?

Chairman: When we select a couple of contractors, we can ask [the civic intermediary] for advice about which contractor we should do business with […] and on what basis the best tender should be selected.

Team member 2: So, next week let’s ask for a list of contractors then.

(organisation)

However, the civic intermediary chooses not to provide names of suitable contractors, as a neighbourhood supervisor explains:

We want to enthuse more than we want to steer. […] We do not offer lists with contractors and providers because we cannot guarantee that they will deliver good quality service and products. I can bring volunteers in contact with volunteers from other localities who already have experience with contractors and with judging tenders. But, in principle they have to sort it out themselves.

(voice over)

When this hurdle is taken and a choice for one or two contractors has been made, the neighbourhood team organizes a gathering where the ins and outs about PV panels are shared with neighbours and a collective purchase deal is presented. Often contractors are present as well to clarify the tender and answer questions personally. Notwithstanding the collective purchase trajectory, each homeowner individually enters into a contract with the contractor. Trust in the neighbourhood team’s experience and a sense of responsibility has to ensure that the homeowner feels (s)he is selecting the right contractor. Meanwhile, in the background, an interactive and personalized neighbourhood website, designed by the intermediary and managed by both the neighbourhood team and neighbourhood supervisor, is used to keep neighbours up to date of ongoing retrofit actions and to announce (new) neighbourhood actions. In sum, within the civic customer-journey design, providing tailored advice often blends in with providing a suitable tender.

During the planning and installation of the retrofit measure(s), service representatives take a step back, similar to what happens in a private customer-journey design. However, the possibility to contact service representatives when problems or miscommunication arrives is not part of the civic customer-journey design. Here, homeowners are left to deal with contractors on their own. Again, service representatives struggle with their role in this process, as the following comment made in a neighbourhood team gathering shows:

In my role as a neighborhood team-member I do feel responsible for what happens in this neighborhood, but on the other hand we did our part in selecting the best contractor to the best of our knowledge, from there on it is out of my hands I guess.

(organisation)

Representatives leave the technical audit of the installation measure and the financial audit up to the supply-side actor and the homeowner. Alternatively, a personalized neighbourhood website is offered as part of the service design. Homeowners can monitor the effect of the installation of the retrofit measure with personalized energy-use graphics on the website, which is linked to their smart meter. Furthermore, through the website, homeowners keep interacting with service representatives and their neighbours, get updates about other localities, and news updates about energy efficiency and energy issues in general. As such, the website and newsletter are meant to form a lifeline between the intermediary and the homeowners.

The evaluation forms a set-up for a potential new round of retrofit actions as the civic intermediary nudges homeowners to inspire their neighbours through all kinds of neighbourhood actions: collective results in terms of financial savings and energy savings are publicly lauded and celebrated in the neighbourhood through colourful posters and leaflets, the neighbourhood website and, occasionally, a neighbourhood festivity in which all locals are invited (Figure 4).

Public customer-journey design

In the public customer-journey design, the transition to sustainable housing is considered a public cause that homeowners can contribute to in their role as engaged customers. As a service representative explains:

We educate homeowners to become critical consumers which have to sort things out with the market. We do not want to subsume the market, but we do want the market to fulfill its tasks properly.

(organisation)
Support to homeowners if offered by referring to technical expertise, financial information and professional knowledge through a digital platform. Homeowners have the opportunity to expand their retrofit knowledge and competences and can make their own decisions at their own pace on the basis of various digital tools provided through the digital platform: an energy report of the home, a sun atlas for PV panels, an oversight of the available financial measures, a ready-to-use checklist when a technical inspection is done by a contractor etc. On the basis of these digital tools, homeowners decide what, how and when to retrofit, whether or not to hire professional help and what type of professional help they might need.

The public customer-journey design attempts to sensitize homeowners again differently, namely through an information campaign in the locality in which the digital platform is rolled out on behalf of a local or regional authority. A formal letter sent by the local administration introduces the digital platform to its residents. Furthermore, the arrival of the digital platform is accompanied by an online information campaign on local blogs, municipal websites and similar media. The tools are made available on the platform, e.g. the possibility to perform a short energy scan of one’s home by entering one’s address. During this touch point, face-to-face commitments are not part of the default set-up; homeowners are meant to engage with the digital tools on the platform.

If homeowners are interested in retrofitting their home, the digital platform offers the possibility to make use of an ‘online quick scan’ of their dwelling: a two-minute questionnaire produces a report that gives homeowners an idea of what retrofit measures are possible in their home, suitable to their living conditions and what the costs of these measures might be. This is done on the basis of the real-estate register data and Google Earth. Furthermore, detailed information about the peculiarities of various retrofit product and technologies can be consulted through links to governmental expert websites. If homeowners are not convinced by the online quick scan, they are directed to an independent energy specialist with whom they might consult about these products and technologies.

Within the public customer-journey design, homeowners search for suitable tenders and supply-side actors themselves. It is up to individual homeowners to decide how many requests for tenders they set out. As the inspection of the dwelling is undertaken by supply-side actors, it is essential for the public intermediary to provide access to trustworthy suppliers of products and technologies. The digital platform provides assistance through a list of preselected ‘trustworthy’ supply-side actors. Trustworthy is explained as those providers that work according to the ‘quality requirements’ of the public intermediary organization, and are legally certified by formal authorities in the Dutch construction, insulation and installation industry.

During the installation of the retrofit measure(s), customers can retrieve technical and financial information from the digital platform that might help them in negotiations with supply-side actors. In line with the aim to
transform homeowners into critical customers, the digital platform offers detailed checklists for various retrofit measures that homeowners can use when they audit the installation of retrofit products or technologies together with supply-side actors.

Finally, homeowners are asked to review supply-side actors and grade them through an evaluation form so that future customers who make use of the public customer-journey design can make an informed choice for a trustworthy supply-side actor by taking into account the experiences and knowledge of experienced customers.

**Discussion and conclusions**

In the Netherlands, as in other Western European countries, the low-carbon-retrofit market is shaped by a fragmented, uncertain industry of various procedures, providers and products. In this ‘balkanized’ setting (Karvonen, 2013, p. 564), the demands, desires and experiences of homeowners are often neglected by supply-side actors, resulting in a slow uptake of low-carbon-retrofit measures by homeowners, and ultimately hampering the transition towards sustainable housing. Connecting homeowners to supply-side actors of low-carbon-retrofit procedures, products and technologies in ways that are satisfactory to all parties involved forms an important and challenging means towards realizing this transition.

The argument presented in this paper is that trust is of particular importance in contexts of uncertain settings such as a low-carbon-retrofit market. A ‘middle-out’ perspective (Janda & Parag, 2013) is used to investigate the potential role for ‘strategic intermediaries’ (Medd & Marvin, 2007, p. 321) as agents of change that are located in the middle, between the supply-side actors, on the one side, and homeowners, on the other. In the Netherlands, strategic intermediaries attempt to affect change ‘downstream’ (Janda & Parag, 2013) by choreographing low-carbon-retrofit experiences of homeowners through the design of a ‘customer journey’. As part of their service design, strategic intermediaries organize locality as an entry point, offer expertise, organize tenders and contracts, engage in varying degrees of involvement during the installation of a retrofit measure, evaluate the retrofit process together with homeowners, and ask them to inspire fellow homeowners. Aiming to engage homeowners with supply-side actors relevant for realizing a (more) energy-efficient home, trust is considered a crucial determinant in the service design they offer to homeowners.

Acknowledging the importance of trust is not unique to the Netherlands: studies on low-carbon-retrofit programmes in the UK have shown that ‘a strong consensus has arisen around the effectiveness of personal engagement […] and trusted messengers’ (Gillich, Sunikka-Blank, & Ford, 2017, p. 5).

However, particular trust relations can be foregrounded, depending on the envisioned role for homeowners in the retrofit process. This paper distinguishes three customer-journey designs: private, civic and public. When summarized for their trust-building activities in terms of both object (what is being trusted) and their relational dynamics (who is best suited to do the trust-building), the findings can be summarized as follows.

- In a private customer-journey design the homeowner is envisioned as a rather passive customer who does not want to be burdened with too much information. The customer journey is designed to make the low-carbon-retrofit experience as convenient as possible. A somewhat protective market shelter is offered in which trust in the offered expertise is an essential aspect of their service design. The preselection for specific products and contractors, and the calculations and negotiations underlying this preselection, are made invisible as it is considered information that could burden homeowners and obstruct a smooth low-carbon-retrofit experience. Instead, various types of expertise are deployed to offer homeowners tailored advice and personalized support throughout the retrofit process and remove any doubts, ignorance or anxieties homeowners might be experiencing. This might be a promising strategy as studies have shown that the most influential factor in purchasing decisions for high-involvement products (such as low-carbon-retrofit measures) is the salesperson’s general attitude (Matthews, Lynes, Riemer, Del Matto, & Cloet, 2017). Other studies show that homeowners are very much in need of supply-side actors who take their demands into account (Bartiaux et al., 2014; Gram-Hanssen, 2014). The private customer-journey design appears to do so, but this is still an ‘illusion’ of choice: specific products and contractors are preselected, so it is not always the case that the best option for the house is possible given the circumstances. If the private customer journey format does not offer all types of products, it is likely that less appropriate insulation material is installed in, for instance, the crawlspace, leading to a suboptimal low-carbon result and a dissatisfied customer in the long-term. This is one of the most important shortcomings of the private customer-journey design.

- In a civic customer-journey design homeowners are addressed as engaged consumer-citizens rather than as passive customers. A civic customer-journey design
format is driven by the value that a transition towards sustainable housing on a national scale will require community participation in order to engender awareness, responsibility and civic engagement. Peers and neighbours are presented as reliable sources of information and support, and trust in neighbours is an essential aspect of the service design. Homeowners in a specific locality are triggered to think about energy saving or the potential of insulation through personalized contact with their neighbours. The civic customer-journey design is a promising strategy because, in the long run, civic customer-journey design might provide the positive social context needed for a large-scale transition towards a sustainable future (Gupta, Barnfield, & Hipwood, 2014; Parag, Hamilton, White, & Hogan, 2013). However, there are limits to how much civil society actors can achieve in a low-carbon retrofit market as the call for guidance in a vast landscape of retrofit contractors by a neighbourhood team of voluntary homeowners illustrated. This implies that continuous support is essential to ensure that these civic-minded homeowners acquire the support they need to progress, achieve their objective and to enrol in a network of collective learning (Seyfang, Park, & Smith, 2013).

- In a public customer-journey design, the transition to sustainable housing is considered a public cause that homeowners can contribute to in their role as critical consumers. Trust in the retrofit products and technologies is essential to the service design. The digital platform is designed to help homeowners educate themselves by highlighting technical and financial aspects of retrofit technologies and products in relation to the physical properties of the dwelling and the domestic energy consumption of the homeowner. In addition, the platform provides information on how to select a reliable, trustworthy contractor guiding homeowners with a list of legally certified contractors who work according to the appropriate quality requirements. Educated, well-informed consumers will most probably realize the most successful low-carbon retrofit measures in terms of optimizing the technical performance of their dwelling and realizing energy savings afterwards (Vlasova & Gram-Hanssen, 2014). However, whether this is a promising strategy in the transition towards sustainable housing remains to be seen. In general, the internet is still the most important source of information on the renovation process, and the public customer-journey design plugs into that. However, only already-conscious consumers or those who have knowledge in buildings and technical systems are successful in realizing retrofit options through this trajectory (Risholt & Berker, 2013). Those groups are not representative for the average homeowner, and thus this will make it difficult to ensure a transition to sustainable housing on a large scale.

It is clear that these three specific customer-journey designs cater to the demands of different types of homeowners. This is important as retrofitting homeowners are not the same (Haines & Mitchell, 2014; Munro & Leather, 2000). The private customer-journey design will most probably cater to the needs of homeowners who are afraid of disruption and inconvenience (Fawcett, 2014), while public customer-journey design is likely to cater to the demands of (tech-savvy) homeowners who want to be ‘burdened’ with information and be in charge throughout the process (Galvin & Sunikka-Blank, 2014). The civic customer-journey design will appeal to homeowners who are interested in energy savings and larger sustainable issues (Wilson et al., 2015).

Further research among homeowners is needed to provide insights in which groups of homeowners are motivated by what type of service design, how they respond to the customer-journey design and whether, indeed, these manage the low-carbon retrofit experience of homeowners satisfactorily.

**Policy implications**

It was argued here that strategic intermediaries and their service design are key actors in realizing a transition towards sustainable housing. Currently in the Netherlands this type of service design is rolled out in various localities, with strategic intermediaries creating local markets for low-carbon service design. This is problematic because the choice for rolling out either a private, a civic or a public customer-journey design will result in a specific type of low-carbon retrofit market in which homeowners are engaged in fundamentally different ways. For instance, if homeowners who do want to be burdened with information live in a locality where a private customer-journey design is rolled out, they have no other option for support available.

Furthermore, there is a danger that eventually only the most cost-efficient or easy-to-organize customer-journey design is institutionalized and scaled up. This will only address one type of homeowner in the low-carbon retrofit market in the Netherlands. Other types of homeowners will experience a mismatch between their demands and the customer-journey design available. The exclusion of the needs of other homeowners would greatly hinder a transition to sustainable housing.
To combat this, a set of strategic policy efforts is needed to scale up this type of service design to accommodate homeowners in their various differing roles as customer and the different types of support they require. This includes regulatory, financial and communicative instruments that would:

- coordinate the rolling out of all three customer-journey designs throughout the Netherlands – this would ensure a widely distributed offer of service design for homeowners
- facilitate cooperation among strategic intermediaries through learning networks – this would enable them to learn from each other’s service design, adopt best practices where possible and join forces where possible
- familiarize homeowners with this type of service design – policy-makers could link national and local subsidy programmes for sustainable housing with communication campaigns in which strategic intermediaries are introduced to the public

This implies an important role for national policy actors. In the Netherlands, this would be the Ministry of Economic Affairs, the Ministry of Infrastructure and Environment, the Association of Dutch Municipalities (VNG), as well as representatives of the Dutch building, installation and energy sectors. These actors have a role in developing, coordinating and securing these instruments in order to set the parameters for a low-carbon retrofit market in which all three customer-journey designs provide a function towards not only homeowners but also the public good, namely a transition towards sustainable housing.

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