energies

MDPI

*Article*

# The Transition of Dutch Social Housing Corporations to Sustainable Business Models for New Buildings and Retrofits

**Wim Lambrechts [1,*], Andrew Mitchell [2], Mark Lemon [2], Muhammad Usman Mazhar [3], Ward Ooms [1] and Rikkert van Heerde [1]**

[1] Faculty of Management, Open Universiteit, 6401 DL Heerlen, The Netherlands; ward.ooms@ou.nl (W.O.); rvanheerde@hotmail.com (R.v.H.)
[2] School of Engineering and Sustainable Development, De Montfort University, Leicester LE1 9BH, UK; andrew.mitchell@dmu.ac.uk (A.M.); mlemon@dmu.ac.uk (M.L.)
[3] Department of Management, Nottingham Business School, Nottingham Trent University, Nottingham NG1 4FQ, UK; muhammadusman.mazhar@ntu.ac.uk
* Correspondence: wim.lambrechts@ou.nl

**Abstract:** Social housing corporations play an important role in society as they provide affordable and good-quality housing for vulnerable citizens. Yet, the sector has to deal with the historical legacy of a high number of old and poorly insulated buildings. While research into the processes that drive or hinder business model innovation in this sector is scarce, this paper draws upon multiple qualitative case studies of social housing in the Netherlands to identify critical success factors for the transition to sustainable business models for new buildings and retrofits. Results show that there are four key attributes for a successful transition process: collaboration (both with supply chain partners as well as other social housing associations); continuous innovation; vision; and the role of the government (including subsidies and fiscal regulations). While economic performance was an important boundary condition, sustainability was not always seen as a strategic organizational objective, a finding that might be explained through considering the legacy of social housing corporations. Furthermore, a number of barriers were identified including the need for customer acceptance, a lack of support from the construction sector and government and macroeconomic factors such as increased construction costs.

**Keywords:** social housing corporations; transition; retrofit; sustainable business models



**Citation:** Lambrechts, W.; Mitchell, A.; Lemon, M.; Mazhar, M.U.; Ooms, W.; van Heerde, R. The Transition of Dutch Social Housing Corporations to Sustainable Business Models for New Buildings and Retrofits. *Energies* **2021**, *14*, 631. https://doi.org/10.3390/en14030631

Academic Editors: Sang Hoon Kang and Ignacio Mauleón
Received: 19 November 2020
Accepted: 22 January 2021
Published: 26 January 2021



## 1. Introduction

Sustainability has become one of the biggest societal challenges of the 21st century. Related issues are characterized by their increasing complexity and uncertainty, and are often referred to as 'super wicked problems' [1]. Organizations worldwide have become aware of the need to foster sustainability, e.g., by focusing on the sustainable development goals (SDGs). Within the business context, the growing attention paid to the subject has led to an exponential growth into research on sustainable business models (SBM) [2,3]. These models try to incorporate sustainability within the business model canvas [4] providing an array of possibilities to integrate it into the activities connected to value creation, value delivery and value capture. SBMs integrate social and/or environmental value, instead of focusing solely on economic value. In doing this, the models search for long term sustainability solutions that take account of multiple stakeholders [5]. In a European context this is exemplified by the new Green Deal and the pursuit of climate neutrality by 2050 [6]. Highlighted within this strategy are the need for more energy efficient buildings and the clear objective to leave 'no one behind', both of which are central to this article which will focus on the transition towards SBMs in the context of social housing corporations (SHC). This type of organization, also referred to as social housing associations or social housing societies, can be described as "privately owned, nonprofit organizations executing

a public task" [7] (p. 314). As a large sector (owning one-third of the total housing stock in the Netherlands [7]), with high volumes of historical housing units, it has to deal with challenges concerning energy efficiency and retrofitting at scale [8].

As such, in light of sustainability, SHCs play an important social and societal role by providing affordable and good-quality housing for vulnerable citizens, as well as an environmental role regarding energy efficiency and the use of low-carbon building materials and contributing to the public policy targets relating to sustainability and the circular economy. However, the sector has to deal with the historical legacy of a high number of old and poorly insulated buildings, which result in high levels of heating-related $CO_2$ emissions [9]. In the Netherlands, which provides the case context for this study (cf., [10]), the upgrading of 2.2 million buildings will contribute to $CO_2$ reduction at global and regional scales. Research into the processes that drive or hinder business model innovation in this sector is scarce; therefore, this paper aims to identify critical success factors for the transition of SHCs to sustainable business models (SBMs) for new buildings and retrofits. While different interpretations and variations of SBM are presented in the literature (e.g., [2]), we conceptualize them, in the context of social housing, as those that aim at tackling urgent environmental issues, thereby acknowledging that the social and environmental dimensions are intertwined and cannot be isolated from each other. Depending on the specific context (e.g., new buildings or retrofit), the focus can thus be set on integrating sustainability criteria; the optimization of energy use (e.g., through renewable sources) and the reduction of energy consumption (e.g., through retrofitting older buildings). Further specifications of SBMs are presented in the literature review.

Although the potential contribution of SHCs to sustainability transitions is clear, such corporations still seem to be slow to deliver sustainable outcomes. On the one hand, this can be explained by the historical legacy of old(er) buildings [8], which pose specific challenges for energy use. On the other, these organizations have a reputation for inefficiency and financial scandal [7]. In order to become more efficient and to provide social and sustainable housing that contributes to (inter)national objectives (e.g., European Green Deal; Dutch goals on circularity), social housing needs to adopt sustainable business models.

The research presented in this paper draws on multiple qualitative case studies within the social housing sector. A theoretical understanding of sustainable business models, derived from the literature, is given before discussing the methodological issues, associated with the case studies, and presenting the research findings. The final sections discuss these findings and the associated conclusions.

## 2. Literature Review

### *2.1. Transition to a Sustainable Business Model*

A business model describes what value an organization wants to deliver, how it creates and delivers that value and how it can (l)earn from it [4]. A sustainable model (SBM) delivers significant positive impacts on society and the environment and/or reduces negative impacts through the way in which an organization and its value chain creates and delivers value [2]. Bocken et al. [2] describe eight archetypes of SBMs, as presented in Table 1.

As hybrid organizations (cf., [11],) providing a service with a social character, social housing corporations (SHC) fall under the organizational archetype 'repurpose the business for society/environment' [2]. However, attributes of other SBMs might also be at the core of SHC operations, such as the circular economy approach to building and demolition ('creating value from waste'), renewable energy ('renewable and natural process substitution'), energy conservation ('maximization of material and energy efficiency') and crowdsourcing ('develop scale-up solution') [2]. Our research focuses on elements from different SBMs that appear within SHC. Table 1 provides examples of how these SBMs could be operationalized within the SHC context.

**Table 1.** Sustainable business model (SBM) archetypes in social housing corporations.

| Group | Archetype | Definition | Examples of Operationalization in SHC |
|---|---|---|---|
| Technological | Maximize material and energy efficiency | "Do more with fewer resources, generating less waste, emissions and pollution" [2] (p. 48) | Transformation in energy efficiency through retrofitting; zero carbon emission buildings |
| Technological | Create value from 'waste' | "The concept of 'waste' is eliminated by turning waste streams into useful and valuable input to other production and making better use of underutilized capacity" [2] (p. 49) | Circular buildings; ecodesign buildings |
| Technological | Substitute with renewables and natural processes | "Reduce environmental impacts and increase business resilience by addressing resource constraints 'limits to growth' associated with nonrenewable resources and current production systems" [2] (p. 50) | Installing solar photovoltaic panels for energy use; innovative renewable energy solutions |
| Social | Deliver functionality, rather than ownership | "Provide services that satisfy users' needs without having to own physical products" [2] (p. 50) | - |
| Social | Adopt a stewardship role | "Proactively engaging with all stakeholders to ensure their long-term health and well-being" [2] (p. 51) | - |
| Social | Encourage sufficiency | "Solutions that actively seek to reduce consumption and production" [2] (p. 52) | Sensitizing tenants to reduce energy consumption |
| Organizational | Repurpose the business for society/environment | "Prioritizing delivery of social and environmental benefits rather than economic profit (i.e., shareholder value) maximization, through close integration between the firm and local communities and other stakeholder groups. The traditional business model where the customer is the primary beneficiary may shift" [2] (p. 53) | SHC as social enterprise organization, with social impact as primary objective |
| Organizational | Develop scale-up solutions | "Delivering sustainable solutions at a large scale to maximize benefits for society and the environment" [2] (p. 53) | Collaborate with stakeholders to increase (energy) efficiency and innovative approaches |

The process of transition to a sustainable business model has been categorized in different stages, which, according to Long et al. [12] are sequential; however, with the possibility to skip towards more advanced phases. Visser [13] (in Ref. 12) describes five overlapping stages that organizations go through, namely: (1) defensive; (2) charitable; (3) promotional; (4) strategic; and (5) transformational. Where organizations in the defensive phase are only dealing with sustainability on an ad hoc basis, those in the transformative phase use business model innovations to address the causes of unsustainable practices in a more systematic manner. Van Tilburg et al. [14] identify four business model phases: (1) inactive; (2) reactive; (3) active and (4) proactive. In the inactive phase, organizations see sustainability primarily as a government task, whereas in the reactive stage they draw upon their reputation to support their focus on sustainability. Both of these stages are associated with traditional business models. In the active phase, organizations develop characteristics of SBMs where sustainability is seen as an opportunity and a driver for innovation. In the proactive phase, the transformation is complete and sustainability is assimilated into the core of the business model. In accordance with these phases, Schaltegger et al. [15] describe three strategies of organizations when dealing with SBM: (1) defensive; (2) accommodative; (3) proactive.

Defensive strategies are focused on regulation compliance and can be linked with the defensive or reactive phases described above. Accommodative strategies are focused on the integration of sustainability with the existing business model, by making alterations albeit without changing the system (or business model) itself. These strategies can be linked to the promotional and active phases as described above. Proactive strategies aim at full integration of sustainability into the organization, e.g., by redesigning the business model and can be linked to the proactive and transformational phases described above.

Long et al. [12] synthesize the different approaches, as described in the literature, into a four-phase model, as depicted in Table 2 and Figure 1. Each of the four phases has specific characteristics regarding a number of key elements: sustainability vision; orientation on external developments; business case elements; transparency; reporting; stakeholders; supply chain approach; and dominant functional discipline [12,14]. For example, the characteristic 'vision on sustainability' ranges from 'none' in the inactive phase to 'holistic/strategic' in the proactive phase. These characteristics show how mature an organization is with respect to SBM. Furthermore, the elements as described in the 'active' and 'proactive' phases have been used as the basis for case selection and understanding the transition to a SBM in SHC.

**Table 2.** Synthesis of the key elements of the four-stage model of sustainable entrepreneurship based on [12,14].

| Key Elements | Phase | | | |
|---|---|---|---|---|
| | **Inactive** | **Reactive** | **Active** | **Proactive** |
| **Sustainability vision** | No | General statements | Focus on social contribution | Holistic, strategic |
| **External developments orientation** | No | Externally supplied, business, location | Market and products or services | Cosmopolitan, society |
| **Business case elements** | Costs, customers and legislation | Costs, customers, legislation and reputation | Costs, customers, legislation, reputation and identity | Costs, customers, legislation, reputation, identity and long-term continuity |
| **Transparency** | No | On request | Product and chain | Full transparency |
| **Reporting** | No, or only legally required reporting | Separate sustainability report | Sustainability report with focus on core themes and products | Integrated and interwoven with strategy |
| **Stakeholders** | Government, major customers | Government, customers, suppliers, some NGOs | Government, customers, suppliers, NGOs, employees | Society |
| **Supply chain approach** | No sustainable aspects | Codes of conduct for suppliers | Commitment and comprehensive codes of conduct | Cocreation |
| **Dominant functional discipline** | Implementation, legal affairs | Public affairs | Corporation communication and HR | Management and governance |

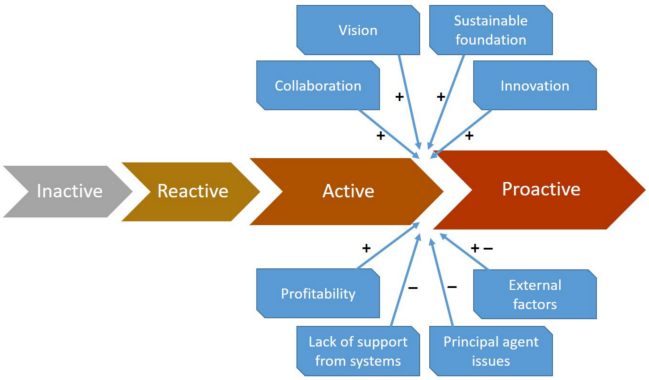


**Figure 1.** Conceptual model showing influencing factors having a positive (+) and/or negative (−) effect on the transition from the active phase to the proactive phase (based on [12]).

### *2.2. Sustainability in the Housing Corporation Sector*

With over 2.2 million homes, the Dutch social housing sector is the third largest in Europe, after the United Kingdom and France [16]. More than a third of the properties were built before 1980 [17]; by 2050 the entire housing stock should be energy-neutral [18] with every new-build home being close to this state in 2020 [19]. Investments in sustainability have long been held back by 'split incentives', a phenomenon whereby the landlord pays for home improvements that benefit the tenant, in terms of reduced energy costs. This has discouraged landlords from investing because they did not benefit personally [20]. The split incentive problem has been dealt with by legislation regarding the energy performance fee, which allows landlords to charge a monthly amount equal to the reduction in the energy bill [21].

Various sustainability initiatives are also being developed, such as encouraging tenants to save energy [22,23], circular and waste avoidance approaches to demolition [24] and zero-on-the-meter renovations [25]. However, the transition to sustainability is not progressing fast enough. Deep renovations aimed at saving energy are lagging behind [19,26] and housing corporations often still opt for demolition even though, in many cases, renovation is the more sustainable choice [27,28]. The corporations' ways of thinking, when making such investment decisions, are often not yet geared to the total cost of ownership [25]. Many still have a long way to go and the next section explores what this might entail.

### *2.3. Factors Influencing the Transition towards Sustainable Business Models*

The literature on sustainability integration and transition describes drivers and barriers for change (e.g., [29]). We acknowledge that certain factors might encourage sustainability integration, while other factors might hinder change processes. However, drivers and barriers might influence each other and change or shift over time; therefore, in line with the sustainability integration literature, we prefer to use the term 'influencing factors' that can be positive, negative, or both, depending on the time and context of the change process. Such a conceptualization of influencing factors aligns with the literature regarding human factors in sustainability change processes, e.g., [30,31].

Long et al. [12] describe six critical success factors that have an impact on the transition from the active/strategic phase to the proactive/transformational phase: (1) collaboration; (2) clear narrative and vision; (3) continuous innovation; (4) foundation of sustainability; (5) profitability; and (6) external events.

Collaboration, as the initial factor, suggests that partnerships with suppliers and other stakeholders are essential for the transition to a sustainable business model. Sustainability can only be achieved through changes in the thinking and behavior of all the stakeholders in a network. This is the only way to create a win-win-win situation in which organizations, society and the environment each benefit [32]. Collaboration with supply chain partners is essential to make the transition to a sustainable and circular building model [33,34].

Inadequate cooperation between stakeholders and housing corporations, however, often prevents the implementation of large-scale sustainability plans [35].

A vision and clear communication of this is essential for organizations that want to make the transition to sustainability, among other things because it motivates employees and underpins successful partnerships [12]. Organizations must create a culture of sustainability, among other things, by communicating commitment [36] and by including sustainability in the organization's mission and core values [36,37]. Stutvoet [25] mentions a high level of ambition as an essential condition for the energy transition of housing corporations. The lack of a vision, for example through reliance on short-term investment decisions, can on the other hand hinder the sustainability transition [38]. In addition, a clear vision to mobilize people and resources can help overcome conflict between economic and environmental objectives in large-scale renovation projects [39].

The third critical success factor that Long et al. [12] identify is continuous innovation. Organizations that want to adopt a sustainable business model must be constantly improving and innovating. Experimentation is crucial for business model innovation [40] and housing corporations cannot innovate on their own, reinforcing the importance of collaboration and partnership. An intensive innovation process is required in the construction sector to achieve the necessary cost reductions to renovate homes to energy-neutral standards on a large scale [19]. The construction sector is conservative; traditional methods and earning models are adhered to [41] and the project-based approach to the sector prevents learning and collaboration between stakeholders and stands in the way of innovation [42]. Experimentation is one of the most important innovation skills, because it helps organizations to overcome inertia [43].

The need for a sustainable foundation is Long et al.'s [12] fourth foundation, i.e., sustainability as core to an organization's culture and the starting point for its actions. This is in line with various studies including [44,45] arguing that the transition to a sustainable business model requires a radical change in how an organization operates. However, some housing corporations do not seem to be changing their way of working because it would take too much effort [46], and, given the often radical and transformative nature of a business model, change in housing corporations' [12] human factors will play a central role but is often problematic. Organizational culture is key to the successful implementation of sustainability activities and strategies [30,47], and it is expected that the strong focus of housing corporations on availability and affordability will make this foundation more difficult to achieve [11].

Environmental benefits alone do not provide sufficient incentive to get sustainability initiatives off the ground [48]; they must also be offset by economic benefits. Long et al. [12] mention profitability as a critical success factor but this can conflict with the environmental and social orientation of sustainable business models [3]. Because they have no profit motive, housing corporations are 'hybrid' organizations that operate in an area of tension between the government, the market and society. Their core task is to build and maintain affordable rental housing for low-income households [11]. As a result, corporations must always find a balance between availability (construction), affordability (rent moderation) and quality (sustainability). In addition, deep renovations aimed at saving energy must result in lower living costs for the tenant [49]. For many housing corporations, this is the main driver for renovations aimed at $CO_2$ reduction [50]. These renovations are often technically feasible but difficult to realize economically [51].

The last success factor Long et al. [12] mention are external events, which are both a critical success factor and a barrier. Government, market, and society are the main external influences on housing corporations [52]. For practical reasons, the present research is limited to government and its (in)ability to act as a catalyst for innovation through subsidies, regulation and standardization [53]. For SHCs it can also act as a hindrance e.g., an increasing tax burden is an important factor for housing corporations [10,52]. For example, in the Dutch social housing sector, if more than 50 houses are let for a rent on or below the threshold for eligibility for rent allowance, a landlord levy (*verhuurderheffing*)

must be paid to the Dutch Tax and Customs Administration. The levy is a percentage of the value of the rented houses. It limits the investment capacity of corporations at the expense of investments in sustainability [25,54].

Besides success factors, Long et al. [12] also describe three main barriers to a transition from the active to the proactive phase: (1) lack of support from systems; (2) principal agent issues; and (3) external events. The first barrier, a lack of support from systems, refers to the problems caused by external partners (e.g., government; suppliers) not being willing to engage in the sustainability efforts of the focal company. Principal agent issues refer to the inability of sociotechnical systems to support innovation towards SBM. The third barrier, external events, is an example of how a driver can become a barrier, as described above [12].

In order to test which factors influence the transition to a SBM for new construction and renovation projects in SHC, this research uses the conceptual model shown in Figure 1 although it is possible that organizations may skip steps in their transition to sustainability. For practical reasons, this possibility is not visualized, in accordance with Long et al. [12].

## 3. Methods and Materials

### 3.1. Methods

The aim of this paper is to explore the influencing factors that drive or hinder sustainability transitions in SHCs, with a specific focus on business model innovation. In line with the study of Long et al. [12], we investigate whether the defined critical success factors also apply within a different context. Qualitative case-based research is suitable for exploring how and why something occurs in a specific context [55]. Based on several criteria for inclusion (see Section 3.3. Data collection), a final sample of three SHCs and ten key respondents was selected. The interviewees have different backgrounds and profiles and include managers, project leaders and strategic advisors, and triangulation is achieved by gathering additional data from secondary sources. The specific context of our study are sustainable housing corporations in the Netherlands, which is a relevant choice, given the specificities and importance of SHC, owning one-third of the total housing stock in the Netherlands [7]. The three case studies were approached and data was collected in the second half of 2019. A semistructured interview protocol was drafted based on Long et al. [12] (see Section 3.2). In line with comparable research approaches [56], interviewees were asked for consent to record the interview and use it for research purposes. After the interviews, a word-by-word transcription was made which was sent, upon request, to the interviewees to check for inconsistencies. All information was anonymized and no organizations or interviewees can be identified from the information and quotes used in this article.

### 3.2. Operationalization

The operationalization of the constructs at the core of this study was largely based on Long et al. [12] (in their article referring to Refs. 2, 14). As such, the topics to consider whether an organization is in a (pro)active phase of sustainability transition, are vision of sustainability; business case elements; transparency; reporting; stakeholders; supply chain approach, and dominant functional discipline. Two questions relating to the constructs 'transparency' and 'reporting' were modified, because the original version was not specific enough. Transparency is equated with the exchange of knowledge and experience in the field of sustainability. The original construct 'external orientation' has been merged with the construct 'stakeholders', because both constructs show strong similarities [14]. The question posed by Long et al. [12] about the construct 'dominant functional discipline' explicitly concerns the vision and long-term plans of the organization. This question has therefore been added to the construct 'vision' and replaced by a question that fits better with the construct 'dominant functional discipline'.

SBM archetype constructs have been operationalized based on the work of Bocken et al. [2]. Where needed and appropriate, a rephrasing of interview questions was made

in order to provide a better fit with the housing corporation sector. For example, by insulating a building, energy consumption is reduced. The housing corporation pays for this investment by asking for a rent increase or an energy performance fee (in the case of zero-on-the-meter homes). This falls under the archetype 'maximization of material and energy efficiency'. Of the eight archetypal business models, 'stewardship' has been omitted because although SHCs may make agreements with suppliers about the origin and production of building materials, it is unlikely that stewardship is actually a business model for them.

The third cluster of constructs operationalized for this study concern the factors influencing change processes. Here, the critical success factors as presented by Long et al. [12] were revised in light of the context of this study and its specific focus on SHCs. The first construct concerns 'supply chain collaboration'. A great deal of research has been undertaken into cooperation between supply chain partners, for example into the relationship between supply chain cooperation and performance [57,58], the failure of supply chain cooperation [59] and its establishment [60]. However, in order to make cooperation between housing corporations and supply chain partners measurable, a scale is needed that accounts for the degree of cooperation. Simatupang and Sridharan [61] designed a collaboration index that makes this possible and is based on three elements; 'information sharing', 'decision synchronization' and 'incentive alignment'.

The construct 'vision on sustainability' has been operationalized in line with Long et al. [12] whereas the construct 'continuous innovation' needed further specification within the context of SHCs. It is not the housing corporations themselves that build and renovate houses; they are the client and in this sense are (or should be) the primary drivers of innovation. Bocken et al. [2] mention collaborative models such as crowdsourcing and open innovation as the way in which like-minded organizations can bring about radical innovations. Experimentation is one of the most important innovation skills [43] and as such, the operationalization of this construct is focused on the ways in which housing corporations are engaged in innovation.

The construct 'profitability' also needs specific attention within the context of housing corporations which have no profit motive; profitability is therefore not anticipated as a critical success factor for them in the transition to a SBM. Housing corporations do however have other strategic considerations for applying a SBM, and, to identify these, this study also draws on insights presented by Lüdeke-Freund et al. [62].

The operationalization of the construct 'sustainable foundation' is difficult, as Long et al. [12] did not unambiguously define the term. Rather, they make a link with aspects of change management, such as proactive leadership and the aspirations of the company, while the supporting argumentation for doing so is lacking. It is clear that human factors play an important role; employees must have sustainability in their DNA [10]. Other studies refer to organizational culture as one of the most important human factors that influence a sustainability transition [30,31]. The research presented here therefore draws on the operationalization of Verhulst and Boks [30] to consider a sustainable foundation to the organizational culture.

The final construct 'external factors' has been operationalized in line with Long et al. [12]. All of the operationalized constructs and the interview questions of this study are presented in Appendix A, Tables A1–A3.

### 3.3. Data Collection

For case selection, 'purposive sampling' was applied on the basis of two concepts which enhance the robustness of the selection. The first was the phase of transition to a SBM for the housing corporation, and the second related to the SBM archetypes of Bocken et al. [2]. SHCs that carry out projects which could be classified under one of these archetypes were approached for participation. An initial selection was made based on an internet search and information derived from the Association of Social Housing Corporations (AEDES), such as their sustainability benchmark. Potential participants were

approached by telephone or email, provided with details about the research and a request to participate in the study. Respondents included (project) managers who were responsible for renovation and new construction projects and/or sustainability within the organization, strategic advisors, managers and directors (see Table 3).

**Table 3.** Case characteristics.

| | Size | Interviewed | Main Achievements |
|---|---|---|---|
| Corporation A | L (10,000–25,000 houses) | – Director<br>– Project manager<br>– (Former) real estate and development manager | – Energy-generating high-rise apartment blocks<br>– Zero-on-the-meter new construction, both single-family houses and apartments<br>– Isolation challenge |
| Corporation B | L (10,000–25,000 houses) | – Director<br>– Strategic advisor<br>– Real estate management advisor | – Zero-on-the-meter renovation of 39 single-family houses<br>– Uses GPR for calculation of environmental impact projects<br>– Raw materials bank constructed for new construction project |
| Corporation C | XL (>25,000 houses) | – Strategy and advice manager<br>– Senior strategy and advice advisor<br>– Real estate advisor | – First zero-on-the-meter renovation of high-rise buildings in the Netherlands<br>– Honorable mention in the circular category of 2019 concrete prize<br>– Isolation challenge |
| Corporation D (not included) | M (5000–10,000 houses) | – Manager housing and management (formerly real estate) | – Zero-on-the-meter renovation of high-rise apartment block using Bludgeon fuel cell |

Whether the organizations approached were in the proactive phase was assessed based on the constructs used by Long et al. [10] following Van Tilburg et al. [14]. Publicly available documents such as annual reports and business plans were also analyzed for the study. It is conceivable that housing corporations will also apply (elements of) the SBM archetypes in the active phase [12]. Based on the data collected during the interviews, it was once again determined whether these organizations met the two criteria for inclusion in the study. On this basis, one case was excluded from the study. After one interview, the researchers decided not to approach any further respondents within this corporation.

Semistructured interviews were the main source of primary data, were intended to gain in-depth insights from key stakeholders and were supplemented with company documents, such as annual reports, business plans, visitation reports and documentation from a regional partnership of housing corporations. For each case that was finally included, three respondents were interviewed. Given the specific context and topic under study (i.e., the variety of transition phases, as well as the characteristics of business model archetypes), the methodological approach for this study, which combined interview data and the systematic analysis of relevant documentation, was more appropriate than other, multicriteria methods such as the Spanish Integrated Value Model for Sustainability Assessment (MIVES), e.g., [63,64] which integrate quantitative and qualitative data, which could usefully emerge from the present study.

### *3.4. Data Analysis*

After the interviews were transcribed, the data was analyzed in a data matrix using Microsoft Excel, for which the operationalized constructs were used for the coding process. This led to a data matrix with approximately 600 data points. By processing the data in a data matrix, the comparison of the cases was facilitated. Furthermore, intercoder reliability was enhanced by checking the data analysis by two other researchers and comparing the

interpretations based on the operationalized constructs. The analysis took place in two stages. First, on the basis of the transition phases and the application of SBM archetypes, it was checked whether the cases met the criteria for inclusion in the research. It should be noted that the study by Long et al. [12] does not provide any concrete guidelines for the number of characteristics that need to be met in order to be considered 'proactive' in terms of sustainability transition phase. Three out of four corporations met six out of seven for the transition phase and were included in the study on this basis. For these cases, sustainability is a pillar of their policy, it forms an integral part of the business model in new-build and renovation projects. Moreover, all knowledge gained was shared with fellow corporations who see society as a whole to be a stakeholder, create value for their tenants together with their supply chain partners, and have a board that determines sustainability strategies. The interviewees themselves regarded the reporting as inadequate, particularly because the insight into achieved $CO_2$ reduction was still largely lacking. As a result, the reporting was mainly limited to that requested by stakeholders such as AEDES (e.g., for their sustainability benchmark) and municipalities (in connection with performance agreements).

The fourth housing corporation met only three of the seven criteria for the transition phase and could not be described as being in the 'proactive' transition phase. Regarding the application of the seven SBM archetypes, two corporations scored seven out of seven. It should be noted that the application of the business model of 'creating value from waste' is still in its infancy although the corporations in question have plans for a circular approach to demolition and/or new construction. The business model of 'delivering functionality over ownership' was also being applied sparingly; mainly because corporations had sufficient resources to make the investment themselves. One housing corporation met six of the seven criteria, because it had no specific project focusing on circular building. The fourth corporation scored four out of seven, again not enough to be considered proactive and to be included in the study.

Subsequently, the data relating to the factors influencing the sustainability transition were analyzed. Given the deductive approach of the study, 'pattern matching' was applied to compare the empirical findings with the theoretical expectations. Factors that were not predicted from the literature were coded and categorized, and included when they were mentioned by at least two respondents, in accordance with Long et al. [12].

### *3.5. Methodological Issues*

During the research a case study protocol was used to increase reliability and serve as a guideline during the interviews which were recorded and transcribed. The reliability was further safeguarded by presenting the detailed interview transcripts to the respondents; four out of ten responded to this opportunity but none had substantive comments and one respondent turned out to have left employment in the meantime. All data were anonymized and the use of multiple data sources (triangulation) increased construct validity. As discussed in the previous sections, existing literature was used to operationalize the various variables.

Internal validity is enhanced by the theoretical and conceptual grounding of the study in the existing body of knowledge, as well as the detailed operationalization based on previous (validated) studies. Data triangulation contributes to the validity of the study, and was achieved by collecting primary (interviews) and secondary (reports; yearbooks; websites) data. External validity, or generalizability, of this study is enhanced by the case selection. While there is a wealth of studies linking innovation to affordable social housing in other contexts [8,65,66], this paper focused on the situation in the Netherlands. By extension, it is argued that the application of conceptual models, such as that of Long et al. [12] to specific, and unique, cases is key to the development of a deeper and broader knowledge base. All organizations investigated in this study are Dutch SHC, providing homogeneity of the sample and assuring intercase comparison. Sample homogeneity and comparability was further enhanced by only selecting medium-sized and large housing

corporations in the same area (the Utrecht housing market region). In order to preclude widely differing financial possibilities from biasing the results, only corporations that were financially sound according to the assessment framework of the Netherlands authority for housing corporations (Authoriteit Woningcorporaties) and the guarantee fund for social housing (Waarborgfond Sociale Woningbouw) were investigated. These frameworks set requirements for the loan-to-value, solvency and coverage ratio of housing associations and the financial positions were assessed on the basis of the most recent annual reports. Furthermore, the selection based on the AEDES sustainability benchmark ensures an objective scope and classification of the cases. Although specifically grounded in the Dutch context, the findings have meaning for international contexts as well, in line with Long et al. [12].

## 4. Results

In this section, empirical findings are presented using anonymized quotations from the interviews. Table 3 provides characteristics of the individual cases used in the study. After the first interview with Corporation D, the researchers decided not to include this corporation in the analysis because, as discussed above, it did not meet the participation criteria by being partly reactive with respect to sustainability. The reason given for this was limited organizational capacity and the corporation was the smallest of the four chosen for the study.

### 4.1. Collaboration

Housing corporations are service providers. They do not build and renovate their houses themselves, but commission a construction company to do so. By definition, this means that they cannot apply a SBM on its own but depend on what is done elsewhere in their supply chain. The data showed that all the corporations interviewed in this study tried to involve the entire chain when they started a new construction or renovation project. While there has been a clear shift from traditional commissioning (a comprehensive specification and award based on price) to result-oriented collaboration (a functional request in which sustainability is an important criterion) there was no high-quality collaboration with the supply chain partners on the scale suggested by Simatupang and Sridharan [61]. Information was widely shared, but there was limited joint decision-making and hardly any proportional distribution of costs, benefits and risks. The corporations tried to place the risk with the market as much as possible. Nevertheless, all respondents mentioned cooperation as crucial, both with supply chain partners and with fellow corporations through the distribution of costs, benefits and risks. In 2018, corporations in the Utrecht region, affiliated in the Regioplatform Woningcorporaties Utrecht (RWU), started on a joint trajectory encouraging innovation, climate adaptation, energy generation, energy savings, energy storage, as well as circularity. The front-runners were taking the initial risks through pilot projects with innovative solutions. In the event of a successful pilot all information was shared and scaled up making collaboration, joint learning and risk sharing central to this process.

> *We cannot do this alone, suppliers cannot do it alone and contractors and consultants cannot do it alone. We really need to do that together (Corporation A).*

> *We can only do this by working together in the supply chain, learning from each other and stimulating each other (Corporation B).*

> *What we have done in recent years is to try to extend that chain of suppliers further and further, so that we can also enter into direct dialogue with the supplying industry, so that we can also put our question clearly in the spotlight there (Corporation C).*

In addition to sharing knowledge, cooperation with other corporations had a clear financial advantage through the creation of economies of scale. By offering the market the prospect of large assignments, they were also more inclined, and able, to innovate. The large scale on which successful innovations could be applied helped to reduce costs.

*We're really putting our money where our mouth is. Collaboration, bundling and how we can [...] bring the parties together to make this scaling up possible and take smart things out of the market and then scale them up (Corporation C).*

### 4.2. Vision

The housing corporations united in the RWU have jointly developed an overarching vision for sustainability. Their goal is a $CO_2$-neutral housing stock by 2050 and, under this umbrella, they are developing their own sustainability policies and strategies. Five respondents stressed the importance of having a vision for sustainability and referred to four related functions. One of the corporations interviewed 'raised the bar' by stating in its business plan that it wants to be $CO_2$ neutral as early as 2035. This vision served as both a motivator and means of communication towards stakeholders.

*But we want [...] to show that at least we're not going to sit back. 2050, that's so far away, then you can also say we'll wait and see what's happening around us and then hook on. No, by bringing that deadline forward, we show that we really want to take steps now (Corporation A).*

The second attribute of vision related to the long-term perspective that housing corporations need to have given the nature of their business. This was considered necessary in order to make the sustainable choices and achieve the specific ambition of carbon neutrality.

*We have very 'slow' products [housing]. They last 50 years, that's different from a packet of bread. So, we need a consistent course of action (Corporation B).*

*We focus very explicitly on the very long term and are critical of intermediate goals in the shorter term that may conflict with that goal in the longer term (Corporation C).*

Furthermore, it was argued that a vision serves as a binding agent and encourages corporations to work better together.

*At the city level, we are very active in bringing the Utrecht corporations together in the vision on sustainability. So to let it not be the vision of an individual corporation, but the joint vision of the Utrecht corporations (Corporation C).*

The final function of a vision identified was the need to convince residents of the importance of sustainability so that they can be engaged in the transition process.

*That is always an art, to get residents enthusiastic for it [transition to sustainability] (Corporation A).*

Four out of nine respondents indicated that their housing corporation had difficulty convincing tenants of the need to make their homes more sustainable. How the vision was expressed and what effect this had on tenants, however, falls outside the scope of this study. Finally, one respondent did indicate that they found a vision could be an 'empty gesture' if not actively supported by the corporation.

### 4.3. Continuous Innovation

The empirical findings of the research support the view that continuous innovation is a critical success factor for achieving a sustainability transition. Respondents were unanimous about the need for innovation and indicated that their corporations were committed to driving that innovation for sustainability transition. However, the state of the art was still seen as inaccessible with the costs of sustainability perceived as too high. These costs need to be reduced so that solutions can be applied on a larger scale.

*We need solutions that aren't there yet. We're asking for something that isn't there yet (Corporation C).*

*I really think that we're still ahead of that innovation curve, so really innovating is incredibly important so that we can scale up successfully later. And we would like to contribute to that (Corporation C).*

The housing corporations have tried to initiate this innovation in different ways; firstly, by bringing supply chain partners together, as described in Section 4.1. They also tried to challenge market parties to come up with creative and innovative solutions, for example by writing 'challenges'. Finally, they experimented through small-scale pilots which could be scaled up when deemed successful.

> *We've just been putting a lot of effort into innovations and experiments lately. And really the next step is to work on that upscaling. So we are now very much looking at how we can organize this upscaling (Corporation A).*

> *[It is] stated in the coalition agreement that we are the starter motor, so that we can get the innovation going. Then we can get the production going, so that the costs go down, then you make it affordable. Maybe also for the private individual. Therein lies another huge task (Corporation B).*

> *The corporate sector has an important role to play in posing open demand to the market. And we have an important role in society to drive that innovation, because we are the party par excellence to do so. So part of our social task . . . is to drive innovation in the construction industry. We can do that because we have the size and the know-how to be able to do an experiment for once (Corporation C).*

### 4.4. Profitability

Eight out of nine respondents indicated that their housing corporations were more focused on social and environmental benefits than economic ones. They interpreted sustainability as a social responsibility of corporations and indicated that they have an intrinsic motivation to invest in the process. While the tenant's interests came first, sustainability was recognized as an important contribution to affordability which was one of the three core pillars of housing corporations (see Section 4.5). The corporations therefore want to control or reduce the housing costs alongside contributing to the comfort of the houses and thus to the wellbeing of their tenants. The ninth respondent argued for economic benefits, in preference to social and environmental ones, in order to ensure the continuity of the organization and to be able to offer housing to people on low incomes into the future.

> *Stakeholders and society as a whole are certainly an important argument for us to invest in sustainability. .... Taking care of the earth, the environmental lens. The moral side is certainly one of them. The latter two are stronger than the business side (Corporation A).*

> *The great thing is, if you invest smartly, you can kill two birds with one stone. You can do something for the environment and for your tenant's wallet. And that's what I would like to invest in as a corporation (Corporation C).*

> *There is a clear intrinsic motivation to invest in sustainability as well. We really see this as part of our task (Corporation C).*

However, finances are an important precondition because the economic sustainability of the organization must not be compromised. Social money must be handled responsibly while ensuring broader sustainability objectives are met.

> *We have a duty to handle our money very efficiently and effectively, because every euro we don't spend on something else can be spent on that public housing task. Ultimately, that's what it's all about, that money has to flow back to that public housing task. There is a social component in this and a sustainability component. In order to be able to do that, we must also be able to operate in an economically sound manner. Otherwise it just stops (Corporation C).*

The fact that the economic 'bottom line' does not come first was also demonstrated by the fact that all the corporations interviewed indicated that they had carried out projects with a high sustainability ambition where they knew that the internal rate of return requirement would not be met.

*It was already clear at the time of the project assignment that it was becoming expensive. That it really was a substantial investment. And during the definition phase, it became even more expensive than expected beforehand. [...] And then we said that we would stick our necks out for once. We'll do it anyway (Corporation B).*

*So we did the next 40 houses, even though we knew that our return requirement would not be met there. That's fine. For such a one-off experiment, that's totally okay. It's a tuition fee that you pay in order to be able to make other choices (Corporation C).*

### 4.5. Sustainable Foundation

None of the interviewees mentioned sustainability as an explicit core value but was seen as complementary to two of the three non-negotiable pillars mentioned by all corporations, namely affordability (controlling housing costs through energy savings) and quality (sustainability contributes to living comfort). Sustainability does not contribute explicitly to the third pillar, availability (sufficient housing). As far as the organizational culture is concerned, no clear pattern emerged from the respondents' answers. In fact, the respondents from the individual housing corporations did not give a uniform picture of their own organizational culture.

*We have three core tasks, availability, affordability and quality. And sustainability is mainly in the affordability and quality of the homes in my view (Corporation C).*

### 4.6. External Factors

The housing corporation sector is highly regulated, meaning that the government has an influence on the transition to SBMs. Interviewees interpreted this as both a positive and negative influence, at both national and local level. They considered that the government's influence could be divided into four categories, namely: (1) financial aspects; (2) regulations; (3) vision and policy; (4) role in sustainability transition. In terms of finance, the government can be both an incentive and an obstacle. The corporations interviewed all make use of subsidies and tax schemes that stimulate sustainability. While six respondents mentioned these as essential, one disagreed, arguing that corporations can borrow money cheaper than other institutions and can therefore do so without subsidies. One of the respondents argued in favor of converting the landlord levy into an investment levy, but the expectation that levies and an increasing tax burden would have a negative impact on the sustainability transition of housing corporations was not supported by the data. No other respondents indicated that they would be hindered by levies or an increasing tax burden.

*Subsidies can make the difference between something that is feasible and something that is not (Corporation A).*

*There are many corporations where it is no problem at all to pay the landlord levy. They wouldn't invest much more if they didn't have to pay it. In terms of capacity of the organization or in terms of necessity (Corporation B).*

The government stimulates sustainability by means of regulations in the field of building requirements, for example, nationally through a building decree and the environmental performance buildings, and locally by setting sustainability requirements for area development. However, all these regulations focus on new construction, which is a relatively small part of the total sustainability task of housing corporations. There are no specific sustainability policies for renovations in the housing sector. The revised energy performance of buildings directive may change this but has not yet been discussed. Respondents therefore saw the current role of government in this area as limited.

*You may also have a building code for existing buildings, but it does not include sustainability requirements so much (Corporation B).*

*I think there should be a lot more attention for retrofits. [...] A lot more needs to be done there. The 1% of new construction we do each year is on the whole negligible (Corporation C).*

Six out of nine respondents blamed the government for a lack of vision and/or inconsistent policy, suggesting that more attention was given to short election- oriented time scales than to the long term. There was also much criticism about making housing natural- gas-free (the alternative to the central heating boiler does not reduce $CO_2$ emissions as long as the heat source is not sustainable) for individual homes and for the neighborhood approach.

> *A simple example, until not long ago there was a STEP subsidy [incentive scheme for energy performance]. It was abolished quite suddenly. That did cause us problems. [...] Then there came a new scheme that was terminated quite abruptly, the RVV [landlord levy reduction scheme]. That makes it difficult for us, that kind of ambiguity. To us, seen from a distance, it looks like ad hoc decisions (Corporation A).*

> *There are more and more subsidies, so they try to trigger everyone, but I sometimes miss the actual vision (Corporation B).*

> *If the municipality focuses on making a neighborhood free of natural gas and loses sight of the perspective of $CO_2$ neutrality in the long term, then you sometimes have a very complicated conversation (Corporation C).*

Opinions were divided on the role of government in the sustainability transition. At the local level, according to most respondents, the government acts as a booster, among other things by making performance agreements with corporations, and as a facilitator bringing the appropriate parties together. On the other hand, three respondents called the municipalities' ambitions unrealistic, one stating that there was a lack of knowledge while another called the municipality slow and bureaucratic. In particular, with the national government launching the social debate on sustainability, respondents claimed that this showed a higher level of ambition than at the local level.

> *You can also see that the national government is only just starting to meet the Paris objectives for 2050, but locally you often see that the municipality wants to be climate-neutral as early as 2030. They also realize that this may not be very realistic, but they do pursue that ambition. They want us to achieve this by means of performance agreements (Corporation B).*

> *At the moment, there is simply too little knowledge at the municipality, really in-depth knowledge (Corporation C).*

> *Within these performance agreements, you see of course that they look at how the sustainability ambition can be included. So this is a unique instrument for the housing corporation sector. This also means that the housing corporation sector in general is taking steps faster than others (Corporation C).*

### *4.7. Other Factors*

Four other factors were mentioned by at least two respondents, all of them described as obstacles. Four respondents saw the whole construction sector as still very traditional and as barrier. As a result, innovation is difficult to get off the ground with the real innovation occurring in startups that unfortunately are not yet able to scale up to deliver the volume that corporations need. There is also a need to industrialize renovation projects.

> *The construction is organized very conservatively anyway. We are still building houses like they were built 100 years ago, while all other things have been solved industrially. So why isn't that happening yet? (Corporation A).*

> *The companies that think very circularly or apply innovation in this are often small startups. They have not yet proven themselves or are not yet able to deliver on a large scale, so they are not yet really linked to the slightly larger construction companies (Corporation B).*

The same four respondents also mentioned the rapid increase in construction costs as an obstacle which slows down the transition to a fully sustainable housing stock.

*Construction costs have risen very rapidly in recent years, and still do, so an expensive investment becomes even more expensive (Corporation C).*

The energy performance fee (EPF) that may be applied to zero-on-the-meter housing is, in theory, a way of circumventing the problem of split incentives. However, five respondents indicated that the EPF involves a problematically high administrative burden. One respondent did support this argument and remarked that this administrative process should be easy to automate and four others noted that the EPF led to higher housing costs for the tenant.

*Practice shows that the extra costs you have to incur for this, both in investment and management, makes it not really an interesting business case (Corporation C).*

*People who do not have an EPF are better off in terms of housing costs. This is not such a good idea for the tenant (Corporation C).*

The final limiting factor was considered to be the tenant, and four respondents, working for two housing corporations, indicated that gaining support among tenants is difficult. One respondent from the third housing corporation, however, indicated that this was not a problem and no clear explanation for this difference emerged from the data.

*For many residents, sustainability does not play a role (Corporation A).*

*Unfortunately, at the first flat, we were going to do that, the support for the energy solution was not achieved, so in the end we just did a traditional label-B renovation (Corporation A).*

*Also in our projects we generally have no problems at all with the consent of tenants (Corporation B).*

## 5. Discussion

The results presented in the previous section support the theoretical expectations, outlined earlier in the paper; namely that cooperation, continuous innovation, vision and external factors all play a critical role in the transition of housing corporations to a sustainable business model. While this reinforces the validity of the findings of Long et al. [12], they also refute the suggestion that continuous innovation would be less critical in a less competitive context. While such innovation appears to be very important in the housing corporation sector, it is conceivable that the motivation for it differs by sector. Where innovation is essential for commercial companies to achieve a sustainable competitive advantage [67], housing corporations seem to need innovation, above all, to reduce the cost level of their renovations in order to achieve their social objectives [8].

The critical success factor, collaboration, has no clear link to change management literature [12]. For housing corporations, cooperation in the area of sustainability is essential, because in this way they can learn from each other and create economies of scale. Meehan and Bryde [68] conclude that there is a positive link between the sharing of knowledge by housing corporations and a sustainable procurement policy, which is important, given the fact that housing corporations are not producers but buyers. In addition, cooperation by housing corporations with supply chain partners can lead to mutual benefits [22]. Analyzing the role of sustainable procurement and sustainable supply chain management, e.g., [69] might be an interesting avenue for further research in the context of social housing corporations.

The importance of a clear and powerful vision is amply described in the change management literature e.g., [70,71]. For the housing corporation sector, too, vision appears to be an important instrument for achieving a transition to sustainable business models. The functions of a vision mentioned by the respondents (as a motivator, means of communication and binding agent) are in line with earlier research into the importance of vision in large renovation projects [39].

Furthermore, the results describe both a positive and a negative role played by government. Laukkanen and Patala [53] argue that regulation and standardization can be a catalyst for change, however this is only supported to a limited extent by the results.

Strict sustainability requirements apply to new buildings, but not yet to renovations. The refurbishment of existing property is by far the largest part of the sustainability task of housing corporations. As a result, the influence of government regulation remains limited. Laukkanen and Patala [53] also mention subsidies as a catalyst, an observation that is supported by the results of this study. Given the current context (e.g., lack of construction innovation), it is virtually impossible for housing corporations to have a sound business case without subsidies. Nor was an expected negative effect from the government confirmed, namely the effect of increasing pressure from taxes and levies [10]. Although this is certainly the case, the respondents did not mention this as an obstacle to sustainability. The predominantly negative attitude of the respondents towards the government in terms of vision and policy was not predicted. However, this finding is in line with what Laukkanen and Patala [53] identify as the difference in desired 'time frame' between politicians and companies with a lack of long-term regulation leading to uncertainty and short-term investments.

The finding of Long et al. [12] that profitability and a sustainable foundation are critical success factors for the transition are also not supported by this research. That profitability is not a critical factor appears to be inherent to the nonprofit character of the housing corporation sector, where social objectives such as availability, affordability and quality are central [11]. Respondents, in line with Swan [50], indicate that the housing costs of their tenants are perhaps the most important driver for making their homes more sustainable. However, this study shows that economic performance is an important precondition for the successful transition to a SBM. This is in line with Long et al. [12], who state that "economic performance can be considered to be a precondition for the successful transition to business models for sustainability" (p. 91). Nor is it surprising that the respondents do not mention a sustainable foundation as a critical success factor because housing corporations have a strong focus on their core tasks of building, maintaining and renting affordable housing for people with a small budget [11]. This focus is prompted in part by the new housing law that came into force in 2015, as a result of which the activities that housing corporations are allowed to develop in addition to their core tasks are severely restricted [72].

In addition to the critical success factors identified by Long et al. [12], the research also identified a number of barriers; the first of which is conservatism in the construction sector. This is not new; innovation in the construction sector is slow [73], the sector is fragmented [34,74] and construction companies have a primary focus on their profit margin and their own products, rather than on cooperation and maximizing value [34]. The energy performance fee (EPF) should make the zero-on-the-meter business case viable and solve the split-incentive problem, but the strict regulation around the EPF often negates these benefits. The administrative burden was a problem for several participants in this study. These two factors, together with the aforementioned inconsistent government policy and the lack of government vision, are examples of what Long et al. [12] call a lack of support from wider systems. The housing corporations in the study also appear to suffer from this. Rising construction costs are a macroeconomic development over which housing corporations have little influence. The fact that construction costs have been rising sharply for years and that this has had a negative effect on the earning capacity of housing associations is confirmed by, among others, the housing association authority [75].

The final barrier identified by several respondents was the attitude of their tenants towards sustainability. This finding is complementary to Laukkanen and Patala [53], who found that a lack of customer acceptance hinders socially oriented business model innovations. More specifically, Tokede et al. [76] argue that energy-neutral homes are still far from being widely accepted by consumers.

Many of the barriers described are in line with previous research reported by Hoppe [77], pointing towards lack of trust, lack of support by tenants, and financial feasibility as barriers for the adoption of innovative energy systems in Dutch SHC. In order to turn

barriers into drivers for energy transition, social innovation is needed [78]. The specific context of SHC, being privately owned but fulfilling a public task, thus (partly) dependent of governmental support and/or regulations [7], might have consequences regarding their transition towards SBM, as they experience diminishing financial support [79,80]. In this particular context, it might be interesting to explore approaches in countries where SHCs are less dependent on governmental support, thereby focusing on tenant-adapted and step-by-step approaches for renovation, e.g., [81].

## 6. Conclusions

The aim of this study was to gain insight into the factors which influence the transition of social housing corporations to a sustainable business model. The findings from Long et al. [12]'s research in the Dutch food industry were tested in a different context, namely that of the Dutch housing corporation sector. The results of this research partly support the findings of Long et al. [12] with four of the six critical success factors applying in the context of housing corporations. The importance of collaboration and continuous innovation is unanimously confirmed with the transition task being so large and complex that no corporation can do it alone. Cooperation with supply chain partners, fellow housing corporations and stakeholders is indispensable. Innovation is also key because, with the current state of technology, it will not be possible to have a completely $CO_2$-neutral housing stock by 2050; the costs are too high. Innovation must therefore reduce costs in particular. It is important to experiment with new techniques and to challenge the market to come up with innovative solutions. The costs are still such that subsidies and tax schemes, supported by appropriate regulations, are essential to support the business case for sustainability and, to this extent, the government is a critical success factor. However, the results show that the role of government is complex and acts as both a success factor and a barrier.

While the government has an important role to play in the public debate and in bringing parties together inconsistent policy and a lack of vision can make sustainability more difficult for social housing corporations. The importance of a clear sustainability vision is partly supported by the results; it can connect people, motivate them and serve as a powerful means of communication, but not every respondent considered this as important. Economic performance is not a motive for housing corporations, but a precondition, and as a consequence they are less likely to have sustainability in their DNA. Sustainability does not yet seem to have penetrated into the core values and organizational cultures of the corporations.

In addition, five possible barriers emerge from the data analysis. In addition to the mixed role of government, discussed in the previous section, these are conservatism in the construction sector, the administrative burden surrounding the energy performance fee, rising construction costs and poor customer acceptance. However, an unambiguous picture does not emerge. For example, where one housing corporation has difficulty convincing tenants of the need for sustainability, this is not the case for another. The same applies to the administrative burden surrounding the energy performance fee. Some respondents see this as problematic, while others see it as a side issue. As regards the construction sector and the increased construction costs, while both are mentioned by only four respondents, there are no opposing views. While conservatism in the construction sector seems to slow down the pace of innovation it should also be noted that corporations make little use of the innovative capacity of startups. Increased construction costs seem to hamper the speed with which sustainability is achieved and make it more difficult to meet the precondition of economic performance.

The results of this study state that, as Long et al. [12] observe, the transition to a SBM depends on several internal and external factors. In this respect, this study finds that there is a considerable overlap between the critical success factors and barriers described in both studies. Commercial companies in the food industry appear to be influenced in part by the same factors as housing corporations in the semipublic sector. However, a causal relationship between a successful transition and the critical success factors described

cannot be established based on qualitative research. This also applies to the significance of the findings and additional quantitative research would help make this possible. Partly because of the small sample in this study it cannot be concluded that what applies to the case study housing corporations will apply across the sector, let alone to other types of nonprofit organization. Housing corporations operate between government, market and society [11], an unusual position for organizations in the Netherlands. It is conceivable that another type of not-for-profit organization will be influenced by other factors. Likewise it is conceivable that, for housing corporations in other areas of work, with a different composition of home ownership, the results will deviate from this study. The applicability of the critical success factors and barriers for other contexts can only be confirmed by additional research.

The operationalization of the cooperation factor also needs to be considered. The collaboration index designed by Simatupang and Sridharan [61] may be more suitable for quantitative research and reference has been made to the potential integration of the approach adopted for this study with more holistic, multicriteria, decision-making and evaluation methodologies such as MIVES [63,64]. Moreover, this index focuses on supply chain collaboration, while the results of the research presented here suggests that collaboration with, for example, fellow corporations is also important. In addition, there seems to be coherence between the various critical success factors. Whether this is the case could then be investigated through additional quantitative research which also explores how the variables interact. Finally, a more focused review of the housing association literature and sustainability and the effects of the energy performance fee has yet to be carried out. Whether such a fee is actually a solution to the split-incentive problem is also an interesting subject for follow-up research.

**Author Contributions:** Conceptualization, W.L. and R.v.H.; methodology, W.L. and R.v.H.; validation, W.L. and W.O.; formal analysis, W.L., A.M., M.L., M.U.M., W.O. and R.v.H.; investigation, W.L. and R.v.H.; data curation, W.L. and R.v.H.; writing—original draft preparation, W.L., A.M., M.L., M.U.M., W.O. and R.v.H.; writing—review and editing, W.L., A.M., M.L., M.U.M., W.O.; supervision, W.L. and W.O. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements.

**Informed Consent Statement:** Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

**Data Availability Statement:** The datasets presented in this article are not readily available because they are confidential. Requests for information about the datasets should be directed to wim.lambrechts@ou.nl.

**Acknowledgments:** We thank the editors and the four anonymous reviewers whose comments and critical reading helped improve and clarify this manuscript.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Constructs and interview questions to assess transition phase to sustainability.

| | Constructs | Operationalization | Questions | Reference |
|---|---|---|---|---|
| Four-phase model | Vision on sustainability | Holistic, strategic | How important is sustainability for your organization?<br>What is your definition of sustainability?<br>What is the role of sustainability within your organization?<br>What business objective serves sustainability?<br>What is your organization's vision on sustainability and what are its long-term plans? | [12,14,36] |
| | Business case elements | Costs, customers, legislation, reputation, identity, continuity | To what extent is sustainability part of your business model? | [12,14] |
| | Transparency | Complete openness | To what extent does your organization share knowledge about and experiences with sustainability with other organizations? | [12,14] |
| | Reporting | Sustainability integrated with strategy | How does your organization report on sustainability? | [12,14] |
| | Stakeholders | Company | How does your organization see its social position in the field of sustainability? | [12,14] |
| | Supply chain approach | Cocreation | How do you see the role of suppliers in sustainability? | [12,14] |
| | Dominant functional discipline | Management and governance | Who determines the sustainability policy within your organization? | [12,14] |

**Table A2.** Constructs and interview questions to assess application of sustainable business model based on [2].

| | Constructs | Operationalization | Questions |
|---|---|---|---|
| Eight archetypes of a sustainable business model | Efficiency | Energy demand of dwellings (e.g., insulation and low temperature heating) and material consumption (e.g., modular construction, prefabricated) | Is your organization trying to maximize the efficiency of materials and energy consumption? If so, how? |
| | Waste | Circularity and reuse of materials (e.g., urban mining) | Is your organization trying to create value from waste? If so, how? |
| | Substitution | Renewable energy (e.g., solar panels, wind generation, residual heat) | Is your organization trying to use renewable energy and natural processes? If so, how? |
| | Functionality instead of ownership | Supplier remains owner and guarantees performance (lease structures for solar panels, white goods, etc.), partial economy (cars, etc.). | Does your organization focus on the delivery of functionality instead of a product? If so, how? |
| | Sufficiency | Energy advice to tenants, awareness, insight into consumption, renovating instead of demolishing (life extension) | Is your organization trying to encourage (energy) efficiency? If so, how? |
| | Repurpose for society/environment | Nonprofit, focused on social benefits | Does your organization prioritize social and environmental benefits over economic ones? If so, how? |
| | Scalable solutions | Searching for economies of scale in order to maximize social benefits (e.g., through collaborative approaches, open innovation and crowdsourcing). | On what scale does your organization take sustainable initiatives? |

**Table A3.** Constructs and interview questions related to organizational change.

| | Construct | Operationalization | Questions | Reference |
|---|---|---|---|---|
| Factors influencing organizational change | Supply chain collaboration | Information exchange<br>Decision synchronisation<br>Incentive alignment | How do you exchange information with chain partners?<br>How is the decision-making process conducted?<br>How are costs, risks and benefits shared? | [61] |
| | Vision on sustainability | Holistic, strategic | How important is sustainability for your organization?<br>What is your definition of sustainability?<br>What is the role of sustainability within your organization?<br>Which business objective serves sustainability?<br>What is your organization's vision on sustainability and what are its long-term plans? | [12,14,36] |
| | Continuous innovation | Open innovation<br>Collaborative models<br>Experiment | In what way is your organization engaged in innovation? | [2,43] |
| | Profitability | Strategic motives for sustainability initiatives | To what extent does your organization invest in sustainability because of its desire to improve its 'bottom line' (cost reduction, risk reduction, profit margin, reputation, attractiveness as an employer, etc.)?<br>To what extent does your organization invest in sustainability because stakeholders and society as a whole demand it?<br>To what extent does your organization invest in sustainability for moral reasons and a belief that this is the right thing to do? | [62] |
| | Sustainable foundation | Organizational culture | What are the core values of your organization?<br>Is sustainability part of these core values?<br>What are the main characteristics of your organizational culture? | [30] |
| | External factors | Government | What role does the government play in your transition to a sustainable business model? | [82] |

## References


1. Levin, K.; Cashore, B.; Bernstein, S.; Auld, G. Overcoming the tragedy of super wicked problems: Constraining our future selves to ameliorate global climate change. *Policy Sci.* **2012**, *45*, 123–152. [CrossRef]
2. Bocken, N.M.; Short, S.W.; Rana, P.; Evans, S. A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.* **2014**, *65*, 42–56. [CrossRef]
3. Dentchev, N.; Baumgartner, R.; Dieleman, H.; Jóhannsdóttir, L.; Jonker, J.; Nyberg, T.; Rauter, R.; Rosano, M.; Snihur, Y.; Tang, X.; et al. Embracing the variety of sustainable business models: Social entrepreneurship, corporate intrapreneurship, creativity, innovation, and other approaches to sustainability challenges. *J. Clean. Prod.* **2016**, *113*, 1–4. [CrossRef]
4. Osterwalder, A.; Pigneur, Y. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*; John Wiley & Sons: Hoboken, NJ, USA, 2010.
5. Geissdoerfer, M.; Morioka, S.N.; De Carvalho, M.M.; Evans, S. Business models and supply chains for the circular economy. *J. Clean. Prod.* **2018**, *190*, 712–721. [CrossRef]
6. European Commission. The European Green Deal. Available online: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en (accessed on 21 December 2020).
7. Veenstra, J.; Koolma, H.M.; Allers, M.A. Scale, mergers and efficiency: The case of Dutch housing corporations. *J. Hous. Built Environ.* **2017**, *32*, 313–337. [CrossRef]
8. Crilly, M.; Lemon, M.; Wright, A.J.; Cook, M.B.; Shaw, D. Retrofitting homes for energy efficiency: An integrated approach to innovation in the low-carbon overhaul of UK social housing. *Energy Environ.* **2012**, *23*, 1027–1055. [CrossRef]
9. Kaveh, B.; Mazhar, M.U.; Simmonite, B.; Sarshar, M.; Sertyesilisik, B. An investigation into retrofitting the pre-1919 owner-occupied UK housing stock to reduce carbon emissions. *Energy Build.* **2018**, *176*, 33–44. [CrossRef]
10. Boelhouwer, P.; Priemus, H. Demise of the Dutch social housing tradition: Impact of budget cuts and political changes. *J. Hous. Built Environ.* **2014**, *29*, 221–235. [CrossRef]
11. Nieboer, N.; Gruis, V. The continued retreat of non-profit housing providers in the Netherlands. *J. Hous. Built Environ.* **2016**, *31*, 277–295. [CrossRef]

12. Long, T.B.; Looijen, A.; Blok, V. Critical success factors for the transition to business models for sustainability in the food and beverage industry in the Netherlands. *J. Clean. Prod.* **2018**, *175*, 82–95. [CrossRef]
13. Visser, W. *CSR 2.0: Transforming Corporate Sustainability and Responsibility*; Springer: Berlin/Heidelberg, Germany, 2014.
14. Van Tilburg, R.; Van Tulder, R.J.M.; Francken, M.; Rosa, A. *Realising Sustainable Entrepreneurship*; The Partnerships Resource Centre (PrC): Rotterdam, The Netherlands, 2012.
15. Schaltegger, S.; Lüdeke-Freund, F.; Hansen, E.G. Business cases for sustainability: The role of business model innovation for corporate sustainability. *Int. J. Innov. Sustain. Dev.* **2012**, *6*, 95–119. [CrossRef]
16. Scanlon, K.; Arrigoitia, M.F.; Whitehead, C. *Social Housing in Europe*; Wiley Blackwell: Oxford, UK, 2015; pp. 1–12.
17. AEDES, Association of Housing Corporations. Hoe Ontwikkelt de Woningvoorraad van Woningcorporaties zich? [How Does the Housing Stock of Housing Corporations Develop?] The Hague. 2017. Available online: https://tinyurl.com/y3rryj8k (accessed on 30 June 2019).
18. Schilder, F.; Van Middelkoop, M.; Van den Wijngaart, R. *Energy Saving in the Housing Stock*; Planbureau voor de Leefomgeving: The Hague, The Netherlands, 2016.
19. Visscher, H.J. The Progress of Energy Renovations of Housing in the Netherlands. In Proceedings of the World Sustainable Built Environment Conference (WSBE17): Transforming Our Built Environment through Innovation and Integration: Putting Ideas into Action, Hong Kong, China, 5–7 June 2017.
20. Faber, A.; Hoppe, T. Co-constructing a sustainable built environment in the Netherlands—Dynamics and opportunities in an environmental sectoral innovation system. *Energy Policy* **2013**, *52*, 628–638. [CrossRef]
21. Van Hal, A.; Coen, M.; Stutvoet, E. Energy performance fee to cover investments in the energy efficiency of affordable housing: The Netherlands. In *Affordable Housing Governance and Finance*; Routledge: Abingdon, UK, 2018; pp. 243–258.
22. Boerenfijn, P.; Kazak, J.; Schellen, L.; van Hoof, J. A multi-case study of innovations in energy performance of social housing for older adults in the Netherlands. *Energy Build.* **2018**, *158*, 1762–1769. [CrossRef]
23. Mazhar, M.U.; Kaveh, B.; Sarshar, M.; Bull, R.; Fayaz, R. Community Engagement as a Tool to help deliver Smart City Innovation: A Case Study of Nottingham, United Kingdom. In *European Council for an Energy Efficient Economy (ECEEE) Summer Study Proceedings 2017*; ECEEE: Stockholm, Sweden; Presqu'île de Giens, France, 2017.
24. Cramer, J. The transition towards sustainable cities: The Dutch experiences. In *Eco-Cities: Sharing European and Asian Best Practices and Experiences*; Konrad Adenauer Stiftung: Singapore, 2014; pp. 169–177.
25. Stutvoet, E. Energy transition: Embrace complexity. In *A+ BE| Architecture and the Built Environment*; TU Delft: Delft, The Netherlands, 2018; pp. 1–348.
26. Filippidou, F.; Nieboer, N.; Visscher, H. Are we moving fast enough? The energy renovation rate of the Dutch non-profit housing using the national energy labelling database. *Energy Policy* **2017**, *109*, 488–498. [CrossRef]
27. Thomsen, A.F. Paradigm shift or choke? The future of the Western European housing stock. In Proceedings of the Housing: The Next 20 Years-CCPHR Conference 2010, Cambridge, UK, 16–17 September 2010.
28. Konstantinou, T.; Dimitrijević, B. Sustainable refurbishment for an adaptable built environment. Sustainable and Resilient Building Design. In *Reviews of Sustainability and Resilience of the Built Environment for Education, Research and Design*; TU Delft Open: Delft, The Netherlands, 2018; pp. 207–227.
29. Lozano, R. Are Companies Planning their Organisational Changes for Corporate Sustainability? An Analysis of Three Case Studies on Resistance to Change and their Strategies to Overcome it. *Corp. Soc. Responsib. Environ. Manag.* **2013**, *20*, 275–295. [CrossRef]
30. Verhulst, E.; Boks, C. Employee empowerment for sustainable design. *J. Corp. Citizsh.* **2014**, *55*, 73–101. [CrossRef]
31. Verhulst, E.; Lambrechts, W. Fostering the incorporation of sustainable development in higher education. Lessons learned from a change management perspective. *J. Clean. Prod.* **2015**, *106*, 189–204. [CrossRef]
32. Antikainen, M.; Valkokari, K.; Korhonen, H.; Wallenius, M. Exploring networked innovation in order to shape sustainable markets. In Proceedings of the ISPIM Conference Proceedings, Helsinki, Finland, 16–19 June 2013.
33. Lambrechts, W.; Gelderman, C.J.; Semeijn, J.; Verhoeven, E. The role of individual sustainability competences in eco-design building projects. *J. Clean. Prod.* **2019**, *208*, 1631–1641. [CrossRef]
34. Leising, E.; Quist, J.; Bocken, N. Circular Economy in the building sector: Three cases and a collaboration tool. *J. Clean. Prod.* **2018**, *176*, 976–989. [CrossRef]
35. De Leeuw, L.; Groenleer, M. The regional governance of energy-neutral housing: Toward a framework for analysis. *Sustainability* **2018**, *10*, 3726. [CrossRef]
36. Stoughton, A.M.; Ludema, J. The driving forces of sustainability. *J. Organ. Chang. Manag.* **2012**, *25*, 501–517. [CrossRef]
37. Crews, D.E. Strategies for implementing sustainability: Five leadership challenges. *SAM Adv. Manag. J.* **2010**, *75*, 15.
38. Matschoss, K.; Heiskanen, E.; Atanasiu, B.; Kranzl, L. Energy Renovations of EU Multifamily Buildings: Do Current Policies Target the Real Problems? In Proceedings of the ECEEE 2013, Stockholm, Sweden, 3–8 June 2013.
39. Hunt, M.; de Laurentis, C. Sustainable regeneration: A guiding vision towards low-carbon transition? *Local Environ.* **2015**, *20*, 1081–1102. [CrossRef]
40. Chesbrough, H. Business model innovation: Opportunities and barriers. *Long Range Plan.* **2010**, *43*, 354–363. [CrossRef]
41. Boo, E.; Dallamaggiore, E.; Dunphy, N.; Morrissey, J. How innovative business models can boost the energy efficient buildings market. *Int. J. Hous. Sci. Appl.* **2016**, *40*, 73–83.

42. Beerepoot, M.; Beerepoot, N. Government regulation as an impetus for innovation: Evidence from energy performance regulation in the Dutch residential building sector. *Energy Policy* **2007**, *35*, 4812–4825. [CrossRef]
43. Weissbrod, I.; Bocken, N.M. Developing sustainable business experimentation capability—A case study. *J. Clean. Prod.* **2017**, *142*, 2663–2676. [CrossRef]
44. Stubbs, W.; Cocklin, C. Conceptualizing a "sustainability business model". *Organ. Environ.* **2008**, *21*, 103–127. [CrossRef]
45. Schaltegger, S.; Lüdeke-Freund, F.; Hansen, E.G. *Business Cases for Sustainability and the Role of Business Model Innovation: Developing a Conceptual Framework*; Centre for Sustainability Management (CSM), Leuphana Universität: Lüneburg, Germany, 2011.
46. Hall, M.; Purchase, D. Building or bodging? Attitudes to sustainability in UK public sector housing construction development. *Sustain. Dev.* **2006**, *14*, 205–218. [CrossRef]
47. Baumgartner, R.J. Organisational culture and leadership: Preconditions for the development of a sustainable corporation. *Sustain. Dev.* **2009**, *17*, 102–113. [CrossRef]
48. Van Hemel, C.; Cramer, J. Barriers and stimuli for ecodesign in SMEs. *J. Clean. Prod.* **2002**, *10*, 439–453. [CrossRef]
49. Economidou, M. Overcoming the split incentive barrier in the building sector. In *Joint Research Centre, Institute for Energy and Transport, Workshop Summary*; Publications Office of the European Union: Luxembourg, 2014.
50. Swan, W.; Ruddock, L.; Smith, L. Low carbon retrofit: Attitudes and readiness within the social housing sector. *Eng. Constr. Archit. Manag.* **2013**, *20*, 522–535. [CrossRef]
51. Azcarate-Aguerre, J.; Konstantinou, T.; Klein, T.; Steensma, S.; Guerra-Santin, O.; Silvester, S. Investigating the business case for a zero-energy refurbishment of residential buildings by applying a pre-fabricated façade module. In Proceedings of the ECEEE, Stockholm, Sweden, 29 May–3 June 2017.
52. Mullins, D.; Milligan, V.; Nieboer, N. State directed hybridity?–the relationship between non-profit housing organisations and the state in three national contexts. *Hous. Stud.* **2018**, *33*, 565–588. [CrossRef]
53. Laukkanen, M.; Patala, S. Analysing barriers to sustainable business model innovations: Innovation systems approach. *Int. J. Innov. Manag.* **2014**, *18*, 1440010. [CrossRef]
54. Veenstra, J.; Allers, M.; Garretsen, J. *Evaluation Landlord Levy*; COELO: Groningen, The Netherlands, 2016.
55. Yin, R.K. Case study methods. In *Handbook of Complementary Methods in Education Research*, 3rd ed.; Routledge: New York, NY, USA, 2006; pp. 111–122.
56. Lambrechts, W.; Caniëls, M.C.; Molderez, I.; Venn, R.; Oorbeek, R. Unraveling the Role of Empathy and Critical Life Events as Triggers for Social Entrepreneurship. *Front. Psychol.* **2020**, *11*, 3054. [CrossRef]
57. Vereecke, A.; Muylle, S. Performance improvement through supply chain collaboration in Europe. *Int. J. Oper. Prod. Manag.* **2006**, *26*, 1176–1198. [CrossRef]
58. Cao, M.; Zhang, Q. Supply chain collaboration: Impact on collaborative advantage and firm performance. *J. Oper. Manag.* **2011**, *29*, 163–180. [CrossRef]
59. Fawcett, S.E.; McCarter, M.W.; Fawcett, A.M.; Webb, G.S.; Magnan, G.M. Why supply chain collaboration fails: The socio-structural view of resistance to relational strategies. *Supply Chain Manag.* **2015**, *20*, 648–663. [CrossRef]
60. Emmett, S.; Crocker, B. *The Relationship-Driven Supply Chain: Creating a Culture of Collaboration Throughout the Chain*; Routledge: Abingdon, UK, 2016.
61. Simatupang, T.M.; Sridharan, R. The collaboration index: A measure for supply chain collaboration. *Int. J. Phys. Distrib. Logist. Manag.* **2005**, *35*, 44–62. [CrossRef]
62. Lüdeke-Freund, F.; Massa, L.; Bocken, N.; Brent, A.; Musango, J. *Business Models for Shared Value*; Network for Business Sustainability: South Africa, 2016; Available online: https://sustainablebusinessmodel.org/2016/11/29/business-models-for-shared-value/ (accessed on 29 November 2016).
63. Pons, O.; De la Fuente, A.; Aguado, A. The use of MIVES as a sustainability assessment MCDM method for architecture and civil engineering applications. *Sustainability* **2016**, *8*, 460. [CrossRef]
64. Pujadas, P.; Pardo-Bosch, F.; Aguado-Renter, A.; Aguado, A. MIVES multi-criteria approach for the evaluation, prioritization, and selection of public investment projects. A case study in the city of Barcelona. *Land Use Policy* **2017**, *64*, 29–37. [CrossRef]
65. Van Bortel, G.; Gruis, V.; Nieuwenhuijzen, J.; Pluijmers, B. *Affordable Housing Governance and Finance: Innovations, Partnerships and Comparative Perspectives*; Routledge: Abingdon, UK, 2019.
66. Reindl, K.; Palm, J. Energy efficiency in the building sector: A combined middle-out and practice theory approach. *Int. J. Sustain. Energy Plan. Manag.* **2020**, *28*, 3–16.
67. Lubit, R. The keys to sustainable competitive advantage. *Organ. Dyn.* **2001**, *29*, 164–178. [CrossRef]
68. Meehan, J.; Bryde, D.J. Procuring sustainably in social housing: The role of social capital. *J. Purch. Supply Manag.* **2014**, *20*, 74–81. [CrossRef]
69. Lambrechts, W. Ethical and Sustainable Sourcing: Towards Strategic and Holistic Sustainable Supply Chain Management. In *Decent Work and Economic Growth*; Leal Filho, W., Azul, A., Brandli, L., Salvia, A.L., Wall, T., Eds.; Encyclopedia of the UN Sustainable Development Goals; Springer: Berlin/Heidelberg, Germany; Available online: https://link.springer.com/referenceworkentry/10.1007/978-3-319-71058-7_11-1 (accessed on 18 November 2020).
70. Kotter, J.P. *Leading Change: Why Transformation Efforts Fail*; Harvard Business Press: Boston, MA, USA, 1995.
71. Whelan-Berry, K.S.; Somerville, K.A. Linking change drivers and the organisational change process: A review and synthesis. *J. Chang. Manag.* **2010**, *10*, 175–193. [CrossRef]

72. Hoekstra, J. Reregulation and Residualization in Dutch social Housing: A critical Evaluation of new Policies. *Crit. Hous. Anal.* **2017**, *4*, 31. [CrossRef]
73. BIS. *Supply Chain Analysis into the Construction Industry: A Report for the Construction Industrial Strategy*; BIS Research Paper 145; Department for Business, Innovation and Skills: London, UK, 2013.
74. Zuhaib, S. Attitudes and approaches of Irish retrofit industry professionals towards achieving nearly zero-energy buildings. *Int. J. Build. Pathol. Adapt.* **2017**, *35*, 16–40. [CrossRef]
75. Housing Association Authority. Sector Image 2018. The Hague. Available online: https://www.ilent.nl/documenten/rapporten/2018/12/07/sectorbeeld-2018 (accessed on 18 December 2020).
76. Tokede, O.; Sloan, B.; Wamuziri, S. Zero-carbon housing–state-of-the-art review. In Proceedings of the FutureBuild Conference, Bath, UK, 4–6 September 2013; pp. 2–4.
77. Hoppe, T. Adoption of innovative energy systems in social housing: Lessons from eight large-scale renovation projects in The Netherlands. *Energy Policy* **2012**, *51*, 791–801. [CrossRef]
78. Hoppe, T.; De Vries, G. Social innovation and the energy transition. *Sustainability* **2019**, *11*, 141. [CrossRef]
79. Gruis, V.H.; Nieboer, N. Social housing investment without public finance: The Dutch case. *Public Financ. Manag.* **2006**, *6*, 122–144.
80. Hartmann, A.; Reymen, I.M.; Van Oosterom, G. Factors constituting the innovation adoption environment of public clients. *Build. Res. Inf.* **2008**, *36*, 436–449. [CrossRef]
81. Mjörnell, K.; Femenías, P.; Annadotter, K. Renovation Strategies for Multi-Residential Buildings from the Record Years in Sweden—Profit-Driven or Socioeconomically Responsible? *Sustainability* **2019**, *11*, 6988. [CrossRef]
82. Dawson, P.M. *Organisational Change: A Processual Approach*; Paul Chapman Publishing: London, UK, 1994.