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Local sustainability initiatives: innovation and civic engagement in societal experiments

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ABSTRACT

Local sustainability initiatives are studied from two scholarly perspectives: the perspective of sociotechnical innovation, which relates to the capacity of bottom-up initiatives to contribute to the development of sociotechnical alternatives; and the perspective of civic engagement which relates to the capacity of citizens to organize themselves in order to pursue community goals. This paper argues that taking both these perspectives into account overcomes the problem of being too instrumental or the problem of neglecting the role of technology and innovation in local initiatives. The perspective of sociotechnical innovation presents different types of innovation pursued by local initiatives: the creation of new technology, the application of existing technology and the development of social innovation. Furthermore, innovations might diffuse over wider society by: replication, scaling up, and translation. In turn, civic engagement may take the shape of: the strengthening of social capital, the formation of social movements, and the substitution of functions and services. The insights from literature are illustrated and qualified by applying them in the context of concrete local initiatives. Finally, local initiatives will be portrayed as social contexts that are successful in gathering actors with different motivations and world views and that may contribute to the democratization of innovation.

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1. Introduction

In recent years, an increase in local initiatives started by citizens or public interest groups that involve the use and development of new technologies can be observed (cf. Bulkeley & Castán Broto, 2013; Celata & Sanna, 2014; De Moor, 2013; Toffler, 2013). Different labels have been used to denote such initiatives, but here we will use the notion of 'local sustainability initiatives' (LSIs) to refer to a heterogeneous set of cases, including: services that allow the online sharing of products such as tools and cars (Botsman & Rogers, 2010, 2011; Schor, 2014); community gardens that allow the growing of food for private or

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commercial purposes (Holland, 2004; Naylor, 2012; Vercauteren, Quist, Van Bueren, & Veen, 2013; White & Stirling, 2013); repair cafés where broken household appliances can be fixed (Charter & Keiller, 2014; McGrane, 2012; Rosner, 2014); waste reduction schemes (Robbins & Rowe, 2002); energy cooperatives that produce electricity locally (Arentsen & Bellekom, 2014; Devine-Wright & Wiersma, 2013; Hisschemoller, 2012; Purтик, Zimmerling, & Welpе, 2016; Walker & Devine-Wright, 2008; Walker, Hunter, Devine-Wright, Evans, & Fay, 2007); and initiatives that encompass a wide range of activities like transition towns (Smith, 2011; Feola & Nunes, 2014) and eco-villages (Boyer, 2015; Höflechner, 2011; Marselis, Avelino, Quist, & Pesch, 2017). These kinds of initiatives can be seen as contributions of civil society to sustainability transitions, giving rise to an increasing research interest into the potential role of LSIs in sustainability transitions and related institutional changes (Barnes, Van Laerhoven, & Driessen, 2016; Bernauer, Gampfer, Meng, & Su, 2016; Chu, Anguelovski, & Carmin, 2016; Forrest & Wiek, 2014; Magnani & Osti, 2016).¹ This research interest follows the assumption that LSIs are expected to be effective in experimenting the alternative social and economic practices, because they are more flexible than complex bureaucratic institutions (Frantzeskaki et al., 2016, p. 44).

Existing literature on local LSIs appears to predominantly focus on the social, economic and political aspects of transitions, neglecting the attention for how to stimulate the uptake of sustainable technologies – the original goal of the sustainability transition framework (Geels, 2002; Rotmans, Kemp, & Van Asselt, 2001). Indeed, literature on civil society initiatives generally tends to overlook the role of technology (Hess, Breyman, Campbell, & Martin, 2008), apart from the study of the way that information technology is used to support the establishment and maintenance of civil society initiatives (Castells, 2015; Kelly Garrett, 2006). An exception is the David Hess's notion of *technology- and product-oriented social movements* (Hess, 2005; also see Pacheco, York, & Hargrave, 2014), which 'may be seen as currents with broader [social movements], in general their mode of action involves less emphasis on the politics of protest and more on building and diffusing alternative forms of material culture' (Hess, 2005, p. 516). They do so by taking over activities that are generally linked to private-sector firms. The merger of civil society initiatives and sociotechnical change raises some conceptual puzzles, that relate to different logics of reproduction and diffusion (Casas-Cortés, Osterweil, & Powell, 2008). We aim to address these puzzles by describing LSIs upon the basis of two perspectives. We call the first of these the perspective of *sociotechnical innovation*, and it relates to the capacity of bottom-up initiatives to contribute to the development of sociotechnical alternatives; the second perspective is that of *civic engagement*, and it relates to the capacity of citizens to organize themselves to collectively fulfil certain needs. These two perspectives will be respectively described in section two and three.

The presence of these two perspectives explains the conceptual ambiguity noted above, but also entails another challenge: Seeing LSIs exclusively from the perspective of innovation or from the perspective of civic engagement also overlooks some key qualities. A singular focus on innovation might result in instrumental tendencies, in the sense that these initiatives are only assessed for their diffusion potential. Such instrumental tendencies can also be recognized in the increasing interest in processes of 'co-production' or 'co-creation' between society on the one hand and policy, science and innovation on the other hand (Frantzeskaki & Kabisch, 2016; Irwin, 1995; Kullenberg & Kasperowski,

2016; Swedlow, 2012). The focus is on how such processes may create institutional and policy arrangements that are more effective from a policy perspective on the one hand and more legitimate from a democratic and an epistemological perspective on the other hand. However, such an instrumental stance of experts and decision-makers may contradict the motivations of members of these initiatives and as such can give rise to distrust, reducing the willingness of initiative members to communicate with decision-makers – even jeopardizing the wider set of societal benefits that these initiatives bring.

We should also add that the two perspectives build on distinct traditions of literature that in many cases are highly heterogeneous in themselves. This heterogeneity is reflected in similar concepts that are named differently across academic fields. Moreover, these perspectives show both overlap and tension, complicating attempts to develop a coherent understanding LSIs. Because of the different logics that are intrinsic to these two perspectives, they cannot be integrated into a coherent, singular framework. At the same time, the overlap between the approaches as well as their internal overlap also excludes the establishment of a multi-dimensional framework. As such, this paper will sketch out the different logics of reproduction of the two perspectives in an analytical fashion, with the aim of doing justice to the dialectical relation between the need for institutional change and the internal motivations of social initiatives. To further illustrate and qualify the analyses based on literature, we will explore how the different logics of innovation and engagement play out in two city-based LSIs on sustainable development in section four. These initiatives are Repair Cafés from Delft, Schiedam and The Hague and the local energy collective of Vogelwijk Energie(k) from The Hague. These empirical explorations

In section five we present further reflections; the question dealt with is how to develop a constructive vision on LSIs that overcomes the problems posed by a one-dimensional approach. These initiatives bring together actors with different motivations and world views, and as such they may constitute new kind of public space that allows the ‘democratization of innovation’.

2. Sociotechnical innovation: local initiatives as places for change

The perspective of *sociotechnical innovation* concerns the contribution of small groups to the development of new sociotechnical practices. The point of departure here is that socio-technical innovations are the outcome of an evolutionary process in which a variation environment provides a range of sociotechnical alternatives from which a selection environment determines which options become successful. This evolutionary framework (see Dosi & Nelson, 1994; Lambooy, 2005; Nelson, 1995; Nelson & Winter, 1977; Rip, 1995; Rip & Kemp, 1998) is based on Joseph Schumpeter’s idea of innovation as ‘creative destruction’ (Schumpeter, 2000), and attributes the failure to develop successful sustainable innovations to the dominance of a sociotechnical constellation of both societal institutions and technical infrastructures. This constellation is called the ‘sociotechnical regime’, and it most basically denotes a strict alignment between the variation and the selection environment, so that path-breaking alternatives are not introduced or selected (Geels, 2002; Pesch, 2015b; Schot & Rip, 1997).

To resolve this ‘lock-in’, the production of alternatives has to be sheltered from regime pressures. A safe context, called a ‘sociotechnical niche’, has to be created to nurture and test new sociotechnical options (Kemp, Schot, & Hoogma, 1998; Raven, 2005; Smith, 2006;

Smith & Raven, 2013). Such a niche may take different shapes, including R&D laboratories, subsidized demonstration projects, or small market niches (Raven, Heiskanen, Lovio, Hodson, & Brohmann, 2008; Schot & Geels, 2008). To an increasing extent, LSIs that involve novel sociotechnical practices are also seen as niches (Boyer, 2015; Dóci, Vasileiadou, & Petersen, 2015; Monaghan, 2009; Ornetzeder & Rohracher, 2013; Seyfang & Haxeltine, 2012; Seyfang & Longhurst, 2013; Seyfang & Smith, 2007).

2.1. Innovation in local initiatives

In their role of niches, LSIs have created valuable learning experiences about their functioning and desirability (cf. Geels, Berkhout, & van Vuuren, 2016; Pesch, Vernay, van Bueren, & Pandis Iverot, 2017; Quist & Tukker, 2013; Turnheim et al., 2015). These ideas have been taken up by Seyfang and Smith (2007) – who deploy the notion of ‘grass-roots innovations’, introduced by Gupta et al. (2003) – to describe ‘networks of activists and organizations generating novel bottom-up solutions for sustainable development; solutions that respond to the local situations and the interests and values of the communities involved’ (p. 585).

Innovation includes both technical and social elements, making any separation into a sphere of technology and a sphere of use an artificial one. However, in order to classify different types of innovation in local initiatives, we propose a differentiation between initiatives that develop *new technology*, initiatives that predominantly apply *existing technology*, and initiatives that are engaged in *social innovation*. For the development of new technologies, we can primarily think of ‘makerspaces’ that involve forms of digital fabrication, such as 3-D printing and hackerspaces (see Smith, Hielscher, Dickel, Soderberg, & van Oost, 2013), but we also think of bottom-up manifestations in the domain of the sharing economy, such as car-sharing (Schor, 2014). In most cases, LSIs appear to apply technologies that have already been developed elsewhere, so their innovative potential lies in their engagement with new patterns of using and producing these technologies – which might lead to substantial changes within the initiative itself. The innovative capacity of initiatives may also pertain to social matters only, in which case we can talk of ‘social innovation’ meaning that the ‘social dimension is an object of innovation itself’, in which the social dimension pertains to issues like social relations, normative and cultural structures, and methods to fulfil societal needs (Avelino et al., 2015, also see Pol & Ville, 2009; Van der Have & Rubalcaba, 2016). Social innovation initiatives include experiments with different socio-economic structures, usually on a local scale, based on social instead of mere financial goals, such as alternative monetary systems, entrepreneurial networks, ecovillages, and other alternative modes of consumption and production, or decision-making procedures. The general aim of these initiatives is to provide convincing alternatives to predominant institutionalized practices that are seen as societally and ecologically disruptive (Bulkeley & Castán Broto, 2013; Sahakian, 2014).

2.2. Diffusion routes: replication, upscaling and translation

The ontology of innovation that underlies this dimension of LSIs creates a basic tension. The evolutionary approach assumes that sociotechnical alternatives have the intrinsic propensity to *diffuse* over wider society. After all, in evolutionary processes, the survival of the

variations depends on their success of being adopted by the selection environment. LSIs however may not have the aspiration to contribute to the further dissemination of the alternative they foster (Hargreaves, Hielscher, Seyfang, & Smith, 2013). Indeed, Seyfang and Smith (2007, p. 593) observe that niches may have two types of benefit: ‘One values the niche for its own sake (intrinsic benefits), the other as a means to an end (diffusion benefits)’. This distinction can also be articulated as one between ‘simple niches’ (not seeking regime change) and ‘strategic niches’. In practice, these two forms of benefits may overlap: actors may have different motivations to partake in an initiative, leading to various orientations about future goals.

Intrinsic benefits are addressed in the next section on civic engagement, but here we emphasise the role of LSIs as manifestations of niches that nurture grassroots innovations for which three main diffusion routes are generally recognized (Boyer, 2015; Seyfang, 2010; Seyfang & Longhurst, 2016; Smith, 2007): first, niches can *replicate* or spread practices through a network of dedicated activists; second, grassroots practices can be *scaled up* or expanded beyond a committed activist core to a broader group of individuals; third, actual regime change involves the *translation* of practices from niche to regime, which includes the adoption of a grassroots practice at higher institutional levels and complementary changes in the adopting institution.

LSIs typically relate to a given spatial context, as they are based on face-to-face interaction and revolve around local concerns and characteristics. This obviously has important ramifications for their diffusion potential. Unlike conventional spaces for innovation, the diffusion of innovations pursued by LSIs is not intended to serve the goal of geographical or economic expansion – the clearest example of scaling up. Instead, diffusion typically takes place via the replication of ideas and practices, either by inspiration or by the influence of ‘trans-local’ networks or organizations. Furthermore, the activities of LSIs may be translated in the shape of policies or business strategies (Hasanov & Zuidema, 2018). Ideas and insights from initiatives are then ‘captured’ by the broader institutional system. There is a threat in that, as we will see in our discussion of civic engagement, as such a capture neutralizes the expression of societal concerns, while this is one of the main reasons for people to get involved in an initiative (see Pel & Bauler, 2015; Smith, 2007).

3. Civic engagement: the self-organizing capacity of local communities

The second perspective on LSIs is that of *civic engagement*, which refers to the way in which citizens organize themselves to collectively pursue a specific set of goals. By such engagement, local residents have the capacity to actively endorse concerns and values they share. As such, this form of engagement invokes an Aristotelian account of citizenship in which actors are members of a political community that constitutes its own identity by joint action (Cunningham, 2011). We distinguish three types of civic engagement: (1) engagement that contributes to social capital supporting the dominant societal and institutional system; (2) engagement that manifests itself as activist criticism against dominant societal patterns and practices; and (3) engagement that is intended to provide goods and services that are traditionally provided by the public or the private sector.

Civic engagement has been the subject of a longstanding tradition of research, at least dating back to Alexis de Tocqueville (1835–1840/2004) who in the 1830s wrote about the

‘propensity of Americans for civic association’, by which he meant how citizens collectively followed societal, political, and cultural goals outside of the main institutional frameworks. The study of civic engagement has branched off in many different directions, creating considerable terminological and conceptual heterogeneity. Although the contribution from more recent literature is acknowledged, we make use of more seminal academic work here as this helps to create an ideal-typical understanding of the different analytical dimensions of civic engagement.

This ideal-typical understanding is also necessary because of the complexity that results from the way in which new digital technologies allow for more efficient forms of self-organization (De Waal, 2012; Fløttum, Gjesdal, Gjerstad, Koteyko, & Salway, 2014; Gil de Zúñiga, Jung, & Valenzuela, 2012), and the creation of global networks, giving rise to the ‘trans-local assemblage’ of LSIs (McFarlane, 2009). At the same time, the shape of civic engagement also seems to be influenced by the uptake of neo-liberal policies, which pertain to the increased mobility of capital, information, and people on the one hand (Bauman, 2000; Castells, 1997; Giddens, 2002) and the privatization of goods and services on the other hand. These developments in the social and institutional system motivate citizens to collectively explore new directions (cf. Scott, Redmond, & Russell, 2012).

3.1. Building social capital

Civic-based social groups that aim to create material and social benefits outside of the dominant institutional frameworks of state, market and civil society organizations contribute to the strength of the *social capital* of a society. Putnam (1995) defines social capital as the ‘features of social organizations such as networks, norms, and trust that facilitate actions of cooperation for mutual benefit’ (p. 67). In *Bowling alone* (2001), Putnam describes the decline of traditional forms of civic engagement in the second half of the twentieth century, bringing about a reduction of social capital. These traditional forms of engagement usually involved activities related to churches, schools, or local politics, or related to groups such as professional organizations – including labour unions –, sports clubs, and literary societies.

Social capital can work as a glue for society, creating social cohesion, and it helps to establish the interconnection between members of civil society and formal institutions in the domains of politics and economics, nurturing trust in these institutions. Not only does social capital help to connect society to institutions, it *may* also help to create connections inside society itself. This capacity needs to be qualified, as social collectives are not always oriented towards *bridging*, which relates to networks that aspire to build relationships with people who are outside of our typical social circle, but often are oriented towards *bonding*, which refers to networks that are based on commonality (Putnam, 2001; also see Agger & Jensen, 2015).

3.2. Social movements

LSIs usually appear to have the aspiration to strengthen inclusive forms of social capital (Birch & Whittam, 2008; Ghose & Pettygrove, 2014; Holland, 2004; Robbins & Rowe, 2002). However, it has been observed in several studies that engagement, for instance in

the field of community gardens, has not extended to other societal practices, nor has it led to wider patterns of social inclusion (Hinrichs & Kremer, 2002; Kingsley & Townsend, 2006). An explanation for this is that citizens not only organize themselves to support the socio-institutional constellation, but also to *criticise* the dominant socio-economic system. Indeed, LSIs often seem to challenge mainstream practices by providing viable alternatives (Seyfang & Smith, 2007; Smith, Fressoli, & Thomas, 2014). As such, these initiatives also share characteristics with *social movements*, which provides an additional way to look at LSIs (Hess et al., 2008). Social movements are understood here as initiatives that mobilize resistance to existing power structures, and which can be categorized according to their identity, adversary and societal goal (Castells, 1997, p. 71; also see Benford & Snow, 2000). Social movements are usually based on a narrative in which there is a clearly identifiable opponent that is considered to thwart the movement's goals. This narrative not only provides a story-line that is recognizable to all its members, but also bonds people emotionally (Jasper, 1998; Pesch, Correljé, Cuppen, & Taebi, 2017). Closely aligned with this interpretation of social movements is the way in which they forward 'narratives of changes' (Avelino et al., 2017; Wittmayer et al., 2015), which can be seen as the discourses and story-lines used to argue for societal change, but also to provide legitimization and guidance to this process of change.

In their role as social movements, LSIs challenge dominant systems, and as such take an ambivalent stance towards the propensity to strengthen social capital. Moreover, the strong role of a common identity might negatively affect the capacity to bridge differences between social groups (cf. Smith et al., 2014). This exclusionary tendency might not be as strong in LSIs as these usually only share a limited number of traits with social movements. Still, even as relatively limited manifestations of social movements, LSIs may effectively illustrate the viability of alternative socio-economic practices and lifestyles.

3.3. Substitution of functions

LSIs provide certain public and private goods and services, and as such bear a more functional character than conventional initiatives like for instance sports clubs. This aspect of civic engagement can be characterized as the *substitution* of the production of goods and services. This functional aspect can be seen as a response to the globalizing economic system that is to a large extent driven by neo-liberal paradigms. While the welfare state is reducing its supply of services, new technologies allow initiatives to step in more easily. This role builds on an entrepreneurial spirit that relates to what Hajer (2011) calls the 'energetic society'. This follows the higher level of general education, wider patterns of emancipation, and modern ICT that allows the effective organization of civic participation. The paradox is that these forms of civic engagement usually are a strong form of critique on neo-liberalism, while at the same time their success may reduce the negative effect of neo-liberal policies (Blanco, Griggs, & Sullivan, 2014; Ghose & Pettygrove, 2014; McClintock, 2014; Williams, Goodwin, & Cloke, 2014).

Renewable energy, locally produced food, shared goods and services, and so on, are products and commodities that are reckoned to be insufficiently provided by existing state and market structures. LSIs are then basically alternative platforms to fulfil certain needs through the development and application of new technologies, a feature that is not yet substantially taken up in research (cf. Hess et al., 2008; Hisschemöller &

Sioziou, 2013). De Moor (2013) sees such new citizens' initiatives as a new wave of collective cooperation in Western Europe. In pre-modern times, cooperation was established in forms such as guilds, water boards, local commons and beguinages. From the end of the eighteenth century, these forms of collective action were put under pressure, partly due to the advent of the free market and the centralization of management. Society no longer organized itself, but people left the pursuit of collective interests to governmental or semi-public organizations such as cooperatives, trade unions and charity organizations (Pesch, 2014) and later since the 1980s increasingly to companies and 'the market'. Because of the decline of the welfare state, citizens now have to collectivise again to fulfil societal needs. LSIs can be seen as symptomatic of this movement of taking over tasks from the market and the state.

4. Sustainable innovation in the Repair Cafés and Vogelwijk Energie(k)

The two previous sections identified two perspectives of LSIs that subsequently also gave rise to categorisations of sociotechnical innovations, diffusion routes and patterns of civic engagement. With that, the different logics of reproduction and diffusion can be mapped out, which will be done by applying our findings to the cases of Repair Cafés and Vogelwijk Energie(k), which have been researched extensively for the Glamurs project. These cases have been studied using different methods, including a social network analysis, 18 in-depth interviews with members and interested non-members from both the Vogelwijk Energie(k) initiative and the three Repair Cafés. Moreover, focus groups have been organized, as well as backcasting workshops in which future trajectories of sustainable development have been discussed. The results from these activities are reported elsewhere (Spekkink, Quist, Leising, & Pesch, 2016). Admittedly, two cases cannot cover the full range of patterns that may emerge in LSIs, but their study will contribute to more qualified insights about the way in the two perspectives play out in social reality.

4.1. Innovation and engagement in Repair Cafés

Repair Cafés are freely accessible meetings that are organized several times a month (sometimes weekly), where people gather to fix broken objects and share knowledge and experience on repairing with each other, with support from volunteering specialists such as electricians, seamstresses, carpenters, and bicycle mechanics (<http://www.repaircafe.org>). Objects that are repaired include clothes, electrical appliances, bicycles, furniture, toys, etc. The number of Repair Cafés is still growing, not only in the Netherlands, but also abroad. The first Repair Café was organized in Amsterdam by Martine Postma in 2009 who is still leading the established foundation. By now there are more than 1200 Repair Cafés in 29 different countries. In our study we focus specifically on three Repair Cafés that are organized in our case study area (Rotterdam-Delft-The Hague). These include Repair Café Delft, Repair Café Schiedam, and Repair Café The Hague. Originally, the concept of Repair Café was invented as a way to reduce waste and to extend the lifetime of products. Moreover, it was intended to revive 'forgotten' technical skills that are required to repair broken down appliances. Over time, it became clear that the Repair Cafés also have a strong social function, such as avoidance of costs for

people with a low income, providing a place to meet and the improvement of social cohesion among volunteers and visitors.

In the case of Repair Cafés, it can be said that most of the types of innovation, diffusion and civic engagement can indeed be observed. There are different motivations and ambitions that underlie the activities of the people that run the Cafés. At the same time, not all types carry the same weight. For instance, the aspired innovation of repairable products can be seen as a technical innovation, but also extends into the aspiration of ending throw-away culture (cf. Pesch, 2015a), which can be classified as a social innovation. In turn, these two types of innovation serve the goal of diffusion by translation. What the actual contribution of Repair Cafés to this goal can be is hard to determine. Upscaling takes place by Repair Cafés that attract more visitors and grow, while replication happens when a local Repair Café starts meetings in other locations like happened in Delft and The Hague. Replication also takes place when Repair Cafés are started in other municipalities. Although this is especially facilitated by the national foundation of Repair Cafés, it may involve the support by other Repair Cafés in the vicinity. Repair Cafés may thus help to build up the necessary critical mass that facilitates societal and institutional transformation. To a large extent the goal of societal transformation can also be recognized in the role of Repair Cafés as social movements, which becomes better visible when looking at the entire Repair Café network. It consists now of hundreds of local Repair Cafés in the Netherlands, and it is currently quickly growing internationally with over 1200 Repair Cafés in 29 different countries. Also the other types of civic engagement are observable in this case, even though these are much more oriented towards the local scale. For instance, Repair Cafés contribute to social cohesion in neighbourhoods; while their core function – repairing broken products – can be seen as a clear example of substitution to buying products and revitalizing the function of repairing.

Attending different goals may give rise to tensions. For instance, a modular design that allows for repairing may contribute to the repetitious replacement of parts of a product. Instead of throwing away the whole product, just parts of an apparatus are conveniently discarded – not substantially changing the mentality of how people deal with broken appliances. Also, diffusion goals may be conflicting: after all, if the translation of repair cafés would be complete – an utopian ideal perhaps –, they would become largely redundant.

4.2. Innovation and engagement in Vogelwijk Energie(k)

Vogelwijk Energie(k) is an energy initiative in the Vogelwijk district of the Hague (<http://www.vogelwijkenergiek.nl/>). The Vogelwijk district is directly after the dunes and has around 2,000 households. It is one of the most popular quarters in the city to live. The initiative officially started in 2009 focussing on recommissioning an obsolete wind turbine owned by an energy company, which lifetime could be extended with four years. Since the end of 2014, the association has 250 members. A separate cooperative has been established for a solar roofs project at a local school that was started by the association and has the same board. The long-term goal of the association is to make Vogelwijk carbon-neutral by 2040, which is based on the ambitions by the City of The Hague. Because the residents of the Vogelwijk district are rather wealthy, have considerably strong investment power and good connections to professional networks, the initiative

wants to be a frontrunner in local sustainable energy production. This goal is pursued by instigating a range of energy projects, such as the development of solar roofs at two nearby schools, specifically for people that do not have the possibility to place solar panels on their own roofs. Other concrete projects are the insulation of houses, the use of led lights, the use of smart metres, and a plan to have shared electrical cars

In Vogelwijk Energie(k) the further development of a technology is not the main goal of innovation. Existing technologies are adopted in order to increase the sustainability of the members of the initiative. Experimental ownership arrangements are the most fundamental novelty introduced by this initiative, which can nevertheless be seen as a type of organisational/institutional or social innovation. The diffusion of measures and providing information services to members is a major goal of the initiative. Moreover, all types of diffusion can be identified in this case. The initiative reaches wants to be a front runner and inspire others to take similar initiatives, which targets replication. While also efforts are focused on scaling-up the initiative by attracting more members though this is considered a complicated issue. Translation takes place by collaborating with other initiatives in local climate coalition and reaching out to authorities and energy companies. A similar diversity can be observed with regard to civic engagement. Vogelwijk Energie(k) contributes both to social capital and substitution of functions by producing renewable electricity and providing relevant information services to their members. By challenging existing structures and practices it can also be seen as a local social movement, but at the same time it is also part of a larger social movement on citizen-driven renewable electricity and sustainability in everyday life. Interestingly, there appears to be no hierarchy of goals and again, we emphasise that the initiative *both* reaches out *and* serves local needs.

Some ambiguities may be found in the way that the initiative has tried to reach out. For instance, the initiative is rather an exclusive one, which follows from Vogelwijk area being a high-end district; the cost of living prevents the possibility of a diverse population. The initiative attempted to include members from an adjacent urban district that is much poorer, in order to be more inclusive, but without success. Another issue is that Vogelwijk Energie(k) criticizes the bureaucratic sloth that characterizes the conventional implementation of policies. As such, in the early stages of development the initiative decided to refrain from any support by local authorities, not only to keep up their level of effectiveness, but also to set an example of showing the authorities how sustainable policies can be made. Recently, the initiative has come to cooperate more closely with the municipality, because it is felt that the initiative is robust enough to stay independent and because the municipality has become more effective itself in its sustainable policies.

4.3. Heterogeneity in theory and practice

What stands out from these empirical explorations is the plurality of ambitions and orientations. The categories for innovation and engagement that have been derived from literature prove to partly overlap and build on each other, even if they are theoretically contrastive. Indeed, these categorisations help to identify and characterize this heterogeneity: it compels one to analytically foreground a particular quality of the initiative without reducing its intrinsic complexity. LSIs not only blur conceptual boundaries, but also boundaries between different societal realms (Casas-Cortés et al., 2008).

Given this heterogeneity it is not easy to assess the contribution of LSIs to societal transformation. Some of the drivers for these initiatives are fully aligned with the ambition for institutional change, while other drivers target the creation of a space that is outside of existing dominant institutional contexts. How to guide the transformation process from initiatives to a wider institutional scale cannot be caught by general directives. Even in the context of singular cases, such a process might lead to internal conflicts. Moreover, the cases we study reveal that LSIs have developed their own approaches for reaching out to wider society and institutional domains. It also is important to respect the independence of initiatives to develop their own way of doing things, not only because it may create new effective social innovations, but also because it does justice to the fundamental autonomy of civil society to determine its own goals and practices.

5. Discussion: the need for plurality of local initiatives

This paper has introduced two perspectives for understanding LSIs. We have demonstrated that both perspectives highlight important qualities of the initiatives and both of them need to be addressed simultaneously if we wish to prevent an overly instrumental account of LSIs. The need for a more pluralistic approach comes from the novel features of these initiatives, which are mostly related to the role of technology in these initiatives. Not only are there strong explanatory reasons to emphasise the intrinsic plurality of LSIs, also their efficacy depends on their heterogeneity regarding goals and motivations.

This heterogeneous character of LSIs is partly secured by their non-committal nature, making them flexible enough to accommodate a plurality of motivations and visions. A LSI may only act as an attractive venue for pro-environmental behaviour if the threshold to join is relatively low (Martin & Upham, 2015). At the same time, the motivations to save money or to engage in societal protest do relate quite strongly to diffusion benefits: to increase the economies of scale, an initiative might have to increase its size; to really express a voice, an initiative would have to be visible.

Different people may be persuaded to join these initiatives, and citizens are given the opportunity to create insight over the way that they relate to these sociotechnical arrangements – basically incorporating the concern for innovation as part of a deliberative space. With that, LSIs can be seen as opportunities to ‘cultivate’ more democratic innovation processes as is expressed by Smith and Stirling (2016). The involvement of citizens in technology development may be seen as a way to exert influence over the trajectories of innovation. It is in this moment that civic engagement and sustainable innovation meet: LSIs can be featured as attempts for groups of individuals to gain control over their environment outside of the confines of prevalent institutional domains. This view aligns with the democratic need to define a *res publica*, or ‘public space’, which in political theory is generally portrayed to be a metaphorical space in which citizens collectively decide a common course, based on the values, concerns, and practices that characterize the identity of that group (Arendt, 1958; Habermas, 1999; Pesch, 2005).

The public space of LSIs encompasses more than just political ambitions. First, the public space spanned by these initiatives creates the possibility to act, allowing the pursuit of sustainability goals insufficiently accounted for in the main institutional domains. Second, this public space exceeds traditional realms of deliberative self-

governance, most notably regarding the development of technology, which is usually seen as belonging to the realm of industry and state. Seen as the commitment to innovation trajectories, LSIs react to the dominant loci of innovation in which the increase of efficiency can be seen as the main stimulus of developing new technologies, overruling societal demands for desirability.

It may be the core value of LSIs that they form a rich pallet of public spaces that explore different practices, identities, and trajectories, doing right to the normative plurality that should form the basis of both democracy and sustainable innovation (Cuppen, Pesch, Remmerswaal, & Taanman, 2016; Smith et al., 2014; Stirling, 2011, 2014), while at the same time finding out new tools and infrastructures that allow the expression and substantiation of this normative plurality.

Note

1. There also have been studies in large EU funded research projects under different terms like sustainable lifestyle initiatives (Glamurs project, www.glamurs.eu, Omann et al., 2015) social innovation initiatives (Transit project, www.transitsocialinnovation.eu), and community-based initiatives (Tess project, www.tess-transition.eu).

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References

- Agger, A., & Jensen, J. O. (2015). Area-based initiatives—and their work in bonding, bridging and linking social capital. *European Planning Studies*, 23(10), 2045–2061. doi:10.1080/09654313.2014.998172
- Arendt, H. (1958). *The human condition*. Chicago and London: University of Chicago Press.
- Arentsen, M., & Bellekom, S. (2014). Power to the people: Local energy initiatives as seedbeds of innovation? *Energy, Sustainability and Society*, 4(1), 1–12. doi:10.1186/2192-0567-4-2
- Avelino, F., Dumitru, A., Longhurst, N., Wittmayer, J., Hielscher, S., Weaver, P., ... Haxeltine, A. (2015). *Transitions towards 'new economies'? A Transformative social innovation perspective*.
- Avelino, F., Wittmayer, J. M., Pel, B., Weaver, P., Dumitru, A., Haxeltine, A. ... O'Riordan, T. (2017). Transformative social innovation and (dis)empowerment. *Technological Forecasting and Social Change*. Advance online publication. doi:10.1016/j.techfore.2017.05.002

- Barnes, C., Van Laerhoven, F., & Driessen, P. P. (2016). Advocating for change? How a civil society-led coalition influences the implementation of the forest rights act in India. *World Development*, 84, 162–175. doi:10.1016/j.worlddev.2016.03.013
- Bauman, Z. (2000). *Liquid modernity*. Cambridge: Polity.
- Benford, R. D., & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment. *Annual Review of Sociology*, 26, 611–639. doi:10.1146/annurev.soc.26.1.611
- Bernauer, T., Gampfer, R., Meng, T., & Su, Y.-S. (2016). Could more civil society involvement increase public support for climate policy-making? Evidence from a survey experiment in China. *Global Environmental Change*, 40, 1–12. doi:10.1016/j.gloenvcha.2016.06.001
- Birch, K., & Whittam, G. (2008). The third sector and the regional development of social capital. *Regional Studies*, 42(3), 437–450. doi:10.1080/00343400701874222
- Blanco, I., Griggs, S., & Sullivan, H. (2014). Situating the local in the neoliberalisation and transformation of urban governance. *Urban Studies*, 51(15), 3129–3146. doi:10.1177/0042098014549292
- Botsman, R., & Rogers, R. (2010). Beyond zipcar: Collaborative consumption. *Harvard Business Review*, 88(10), 30.
- Botsman, R., & Rogers, R. (2011). *What's mine is yours: How collaborative consumption is changing the way we live*. London: Collins.
- Boyer, R. H. W. (2015). Grassroots innovation for urban sustainability: Comparing the diffusion pathways of three ecovillage projects. *Environment and Planning A*, 47(2), 320–337. doi:10.1068/a140250p
- Bulkeley, H., & Castán Broto, V. (2013). Government by experiment? Global cities and the governing of climate change. *Transactions of the Institute of British Geographers*, 38(3), 361–375. doi:10.1111/j.1475-5661.2012.00535.x
- Casas-Cortés, M. I., Osterweil, M., & Powell, D. E. (2008). Blurring boundaries: Recognizing knowledge-practices in the study of social movements. *Anthropological Quarterly*, 81(1), 17–58. doi:10.1353/anq.2008.0006
- Castells, M. (1997). *The information age: Economy, society and culture*. Vol. 2, *The power of identity*. Cambridge, MA: Blackwell.
- Castells, M. (2015). *Networks of outrage and hope: Social movements in the Internet age*. Cambridge: John Wiley & Sons.
- Celata, F., & Sanna, V. S. (2014). *Community activism and sustainability: A multi-dimensional approach*. Rome: Università degli Studi di Roma “La Sapienza”.
- Charter, M., & Keiller, S. (2014). *Grassroots innovation and the circular economy: A global survey of repair cafés and hackerspaces*. Retrieved from <http://cfsd.org.uk/site-pdfs/circular-economy-and-grassroots-innovation/Survey-of-Repair-Cafes-and-Hackerspaces.pdf>
- Chu, E., Anguelovski, I., & Carmin, J. (2016). Inclusive approaches to urban climate adaptation planning and implementation in the Global South. *Climate Policy*, 16(3), 372–392. doi:10.1080/14693062.2015.1019822
- Cunningham, F. (2011). The virtues of urban citizenship. *City, Culture and Society*, 2(1), 35–44. doi:10.1016/j.ccs.2010.10.003
- Cuppen, E., Pesch, U., Remmerswaal, S., & Taanman, M. (2016). Normative diversity, conflict and transitions: shale gas in the Netherlands. *Technological Forecasting and Social Change*. Advance online publication. doi:10.1016/j.techfore.2016.11.004
- De Moor, T. (2013). De herontdekking van het Collectief. *Samenleving en politiek: tijdschrift voor een democratisch socialisme (Sampol)*, 20(4), 29–38.
- de Tocqueville, A. (2004). *Democracy in America* (Vol. 147). New York: Digireads.com.
- Devine-Wright, P., & Wiersma, B. (2013). Opening up the “local” to analysis: Exploring the spatiality of UK urban decentralised energy initiatives. *Local Environment*, 18(10), 1099–1116. doi:10.1080/13549839.2012.754742
- De Waal, B. G. M. (2012). *De stad als interface: Digitale media en stedelijke openbaarheid*. Groningen: University Library Groningen.
- Dóci, G., Vasileiadou, E., & Petersen, A. C. (2015). Exploring the transition potential of renewable energy communities. *Futures*, 66, 85–95. doi:10.1016/j.futures.2015.01.002

- Dosi, G., & Nelson, R. R. (1994). An introduction to evolutionary theories in economics. *Journal of Evolutionary Economics*, 4(3), 153–172. doi:10.1007/BF01236366
- Feola, G., & Nunes, R. (2014). Success and failure of grassroots innovations for addressing climate change: The case of the transition movement. *Global Environmental Change*, 24, 232–250. doi:10.1016/j.gloenvcha.2013.11.011
- Fløttum, K., Gjesdal, A. M., Gjerstad, Ø, Koteyko, N., & Salway, A. (2014). Representations of the future in English language blogs on climate change. *Global Environmental Change*, 29, 213–222. doi:10.1016/j.gloenvcha.2014.10.005
- Forrest, N., & Wiek, A. (2014). Learning from success—toward evidence-informed sustainability transitions in communities. *Environmental Innovation and Societal Transitions*, 12, 66–88. doi:10.1016/j.eist.2014.01.003
- Frantzeskaki, N., Dumitru, A., Anguelovski, I., Avelino, F., Bach, M., Best, B., ... Rauschmayer, F. (2016). Elucidating the changing roles of civil society in urban sustainability transitions. *Current Opinion in Environmental Sustainability*, 22, 41–50. doi:10.1016/j.cosust.2017.04.008
- Frantzeskaki, N., & Kabisch, N. (2016). Designing a knowledge co-production operating space for urban environmental governance—Lessons from Rotterdam, Netherlands and Berlin, Germany. *Environmental Science & Policy*, 62, 90–98. doi:10.1016/j.envsci.2016.01.010
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Research Policy*, 31(8–9), 1257–1274. doi:10.1016/S0048-7333(02)00062-8
- Geels, F. W., Berkhout, F., & van Vuuren, D. P. (2016). Bridging analytical approaches for low-carbon transitions. *Nature Climate Change*, 6, 576–583. doi:10.1038/nclimate2980
- Ghose, R., & Pettygrove, M. (2014). Urban community gardens as spaces of citizenship. *Antipode*, 46(4), 1092–1112. doi:10.1111/anti.12077
- Giddens, A. (2002). *Runaway world: How globalisation is reshaping our lives*. London: Profile Books.
- Gil de Zúñiga, H., Jung, N., & Valenzuela, S. (2012). Social media use for news and individuals' social capital, civic engagement and political participation. *Journal of Computer-Mediated Communication*, 17(3), 319–336. doi:10.1111/j.1083-6101.2012.01574.x
- Gupta, A. K., Sinha, R., Koradia, D., Patel, R., Parmar, M., Rohit, P. ... other members of Honey Bee Network. (2003). Mobilizing grassroots' technological innovations and traditional knowledge, values and institutions: Articulating social and ethical capital. *Futures*, 35(9), 975–987. doi:10.1016/S0016-3287(03)00053-3
- Habermas, J. (1999). *The structural transformation of the public sphere. An inquiry into a category of Bourgeois society*. Cambridge: MIT Press.
- Hajer, M. A. (2011). *De energieke samenleving. Op zoek naar een sturingsfilosofie voor een schone economie, Den Haag: Planbureau voor de Leefomgeving*.
- Hargreaves, T., Hielscher, S., Seyfang, G., & Smith, A. (2013). Grassroots innovations in community energy: The role of intermediaries in niche development. *Global Environmental Change*, 23(5), 868–880. doi:10.1016/j.gloenvcha.2013.02.008
- Hasanov, M., & Zuidema, C. (2018). The transformative power of self-organization: Towards a conceptual framework for understanding local energy initiatives in The Netherlands. *Energy Research & Social Science*, 37, 85–93. doi:10.1016/j.erss.2017.09.038
- Hess, D. J. (2005). Technology- and product-oriented movements: Approximating social movement studies and science and technology studies. *Science, Technology, & Human Values*, 30(4), 515–535. doi:10.1177/0162243905276499
- Hess, D. J., Breyman, S., Campbell, N., & Martin, B. (2008). 20 science, technology, and social movements. In *The handbook of science and technology studies* (Vol. 473, pp. 489–498). Cambridge, MA: The MIT Press.
- Hinrichs, C., & Kremer, K. S. (2002). Social inclusion in a Midwest local food system project. *Journal of Poverty*, 6(1), 65–90. doi:10.1300/J134v06n01_04
- Hisschemoller, M. (2012). Local energy initiatives cannot make a difference, unless ... *Journal of Integrative Environmental Sciences*, 9(3), 123–129. doi:10.1080/1943815X.2012.716193

- Hisschemöller, M., & Sioziou, I. (2013). Boundary organisations for resource mobilisation: Enhancing citizens' involvement in the Dutch energy transition. *Environmental Politics*, 22(5), 792–810. doi:10.1080/09644016.2013.775724
- Höflehner, T. (2011). *Ecovillages as pioneers for sustainable development in communities and regions*. Graz: Karl-Franzens University.
- Holland, L. (2004). Diversity and connections in community gardens: A contribution to local sustainability. *Local Environment*, 9(3), 285–305. doi:10.1080/1354983042000219388
- Irwin, A. (1995). *Citizen science. A study of people, expertise and sustainable development*. London: Routledge.
- Jasper, J. M. (1998). *The emotions of protest: Affective and reactive emotions in and around social movements*. Paper presented at the sociological forum.
- Kelly Garrett, R. (2006). Protest in an information society: A review of literature on social movements and new ICTs. *Information, Communication & Society*, 9(02), 202–224. doi:10.1080/13691180600630773
- Kemp, R., Schot, J. W., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis & Strategic Management*, 10(2), 175–198. doi:10.1080/09537329808524310
- Kingsley, J. Y., & Townsend, M. (2006). 'Dig in' to social capital: Community gardens as mechanisms for growing urban social connectedness. *Urban Policy and Research*, 24(4), 525–537. doi:10.1080/08111140601035200
- Kullenberg, C., & Kasperowski, D. (2016). What is citizen science?—A scientometric meta-analysis. *PLOS ONE*, 11(1), e0147152. doi:10.1371/journal.pone.0147152
- Lambooy, J. (2005). Innovation and knowledge: Theory and regional policy. *European Planning Studies*, 13(8), 1137–1152. doi:10.1080/09654310500336444
- Magnani, N., & Osti, G. (2016). Does civil society matter? Challenges and strategies of grassroots initiatives in Italy's energy transition. *Energy Research & Social Science*, 13, 148–157. doi:10.1016/j.erss.2015.12.012
- Marselis, I., Avelino, F., Quist, J., & Pesch, U. (2017). *Envisioning sustainability transitions in social innovation initiatives; a cross-case comparison of five Dutch ecovillages*. Paper presented at IST2017 Conference 18–21 June 2017, Goteborg, Sweden.
- Martin, C. J., & Upham, P. (2015). Grassroots social innovation and the mobilisation of values in collaborative consumption: A conceptual model. *Journal of Cleaner Production*, 134, 204–213. doi:10.1016/j.jclepro.2015.04.062
- McClintock, N. (2014). Radical, reformist, and garden-variety neoliberal: Coming to terms with urban agriculture's contradictions. *Local Environment*, 19(2), 147–171. doi:10.1080/13549839.2012.752797
- McFarlane, C. (2009). Translocal assemblages: Space, power and social movements. *Geoforum*, 40(4), 561–567. doi:10.1016/j.geoforum.2009.05.003
- McGrane, S. (2012). An effort to bury a throwaway culture one repair at a time. *New York Times*.
- Monaghan, A. (2009). Conceptual niche management of grassroots innovation for sustainability: The case of body disposal practices in the UK. *Technological Forecasting and Social Change*, 76(8), 1026–1043. doi:10.1016/j.techfore.2009.04.003
- Naylor, L. (2012). Hired gardens and the question of transgression: Lawns, food gardens and the business of 'alternative' food practice. *Cultural Geographies*, 19(4), 483–504. doi:10.1177/1474474012451543
- Nelson, R. R. (1995). Co-evolution of industry structure, technology and supporting institutions, and the making of comparative advantage. *International Journal of the Economics of Business*, 2(2), 171–184. doi:10.1080/758519306
- Nelson, R. R., & Winter, S. G. (1977). In search of useful theory of innovation. *Research Policy*, 6(1), 36–76. doi:10.1016/0048-7333(77)90029-4
- Omman, I., Mock, M., Polzin, C., Rauschmayer, F., Fischer, A., & Thronicker, I. (Eds.). (2015). Deliverable 5.1: Report on sustainable lifestyle initiatives in 7 case studies, Glamurs project, EU FP7 Grant Agreement (613420).

- Ornetzeder, M., & Rohracher, H. (2013). Of solar collectors, wind power, and car sharing: Comparing and understanding successful cases of grassroots innovations. *Global Environmental Change*, 23(5), 856–867. doi:10.1016/j.gloenvcha.2012.12.007
- Pacheco, D. F., York, J. G., & Hargrave, T. J. (2014). The coevolution of industries, social movements, and institutions: Wind power in the United States. *Organization Science*, 25(6), 1609–1632. doi:10.1287/orsc.2014.0918
- Pel, B., & Bauler, T. (2015). *The Institutionalization of Social Innovation: between Transformation and Capture*.
- Pesch, U. (2005). *The predicaments of publicness. An inquiry into the conceptual ambiguity of public administration*. Delft: Eburon.
- Pesch, U. (2014). Sustainable development and institutional boundaries. *Journal of Integrative Environmental Sciences*, 11(1), 39–54. doi:10.1080/1943815X.2014.889718
- Pesch, U. (2015a). Publicness, privateness, and the management of pollution. *Ethics, Policy & Environment*, 18(1), 79–95. doi:10.1080/21550085.2015.1016960
- Pesch, U. (2015b). Tracing discursive space: Agency and change in sustainability transitions. *Technological Forecasting and Social Change*, 90, Part B, 379–388. doi:10.1016/j.techfore.2014.05.009
- Pesch, U., Correljé, A., Cuppen, E., & Taebi, B. (2017). Energy justice and controversies: Formal and informal assessment in energy projects. *Energy Policy*, 109, 825–834. doi:10.1016/j.enpol.2017.06.040
- Pesch, U., Vernay, A.-L., van Bueren, E., & Pandis Iverot, S. (2017). Niche entrepreneurs in urban systems integration: On the role of individuals in niche formation. *Environment and Planning A*, 49(8), 1922–1942. doi:10.1177/0308518X17705383
- Pol, E., & Ville, S. (2009). Social innovation: Buzz word or enduring term? *The Journal of Socio-Economics*, 38(6), 878–885. doi:10.1016/j.socec.2009.02.011
- Purtik, H., Zimmerling, E., & Welpé, I. M. (2016). Cooperatives as catalysts for sustainable neighborhoods—a qualitative analysis of the participatory development process toward a 2000-Watt Society. *Journal of Cleaner Production*, 134, 112–123. doi:10.1016/j.jclepro.2016.02.075
- Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65–78. doi:10.1353/jod.1995.0002
- Putnam, R. D. (2001). *Bowling alone: The collapse and revival of American community*. New York: Simon and Schuster.
- Quist, J., & Tukker, A. (2013). Knowledge collaboration and learning for sustainable innovation and consumption: Introduction to the ERSCP portion of this special volume. *Journal of Cleaner Production*, 48(0), 167–175. doi:10.1016/j.jclepro.2013.03.051
- Raven, R. P. (2005). *Strategic niche management for biomass*. Eindhoven: Eindhoven University of Technology.
- Raven, R. P., Heiskanen, E., Lovio, R., Hodson, M., & Brohmann, B. (2008). The contribution of local experiments and negotiation processes to field-level learning in emerging (niche) technologies meta-analysis of 27 new energy projects in Europe. *Bulletin of Science, Technology & Society*, 28(6), 464–477. doi:10.1177/0270467608317523
- Rip, A. (1995). Introduction of new technology: Making use of recent insights from sociology and economics of technology. *Technology Analysis & Strategic Management*, 7(4), 417–432. doi:10.1080/09537329508524223
- Rip, A. & Kemp, R. (1998). Technological change. In S. Rayner, & E. L. Malone (Eds.), *Human choice and climate change* (Vol. 2, pp. 327–399). Columbus: Battelle Press.
- Robbins, C., & Rowe, J. (2002). Unresolved responsibilities: Exploring local democratisation and sustainable development through a community-based waste reduction initiative. *Local Government Studies*, 28(1), 37–58. doi:10.1080/714004128
- Rosner, D. K. (2014). Making citizens, reassembling devices: On gender and the development of contemporary public sites of repair in Northern California. *Public Culture*, 26(1 72), 51–77. doi:10.1215/08992363-2346250
- Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: Transition management in public policy. *Foresight*, 3(1), 15–31. doi:10.1108/14636680110803003

- Sahakian, M. (2014). Complementary currencies: What opportunities for sustainable consumption in times of crisis and beyond? *Sustainability: Science, Practice, & Policy*, 10(1), 4–13. doi:10.1080/15487733.2014.11908121
- Schor, J. (2014). *Debating the sharing economy*. Great transition initiative. Toward a transformative vision and Praxis. Retrieved from <http://www.greattransition.org/publication/debating-the-sharing-economy>
- Schot, J. W., & Geels, F. W. (2008). Strategic niche management and sustainable innovation journeys: Theory, findings, research agenda, and policy. *Technology Analysis & Strategic Management*, 20(5), 537–554. doi:10.1080/09537320802292651
- Schot, J. W., & Rip, A. (1997). The past and future of constructive technology assessment. *Technological Forecasting and Social Change*, 54(2–3), 251–268. doi:10.1016/S0040-1625(96)00180-1
- Schumpeter, J. A. (2000). *Capitalism, socialism and democracy*. London and New York: Routledge.
- Scott, M., Redmond, D., & Russell, P. (2012). Active citizenship and local representational politics in twenty-first century Ireland: The role of residents groups within Dublin's planning Arena. *European Planning Studies*, 20(2), 147–170. doi:10.1080/09654313.2012.650905
- Seyfang, G. (2010). Community action for sustainable housing: Building a low-carbon future. *Energy Policy*, 38(12), 7624–7633. doi:10.1016/j.enpol.2009.10.027
- Seyfang, G., & Haxeltine, A. (2012). Growing grassroots innovations: Exploring the role of community-based initiatives in governing sustainable energy transitions. *Environment and Planning-Part C*, 30(3), 381–400. doi:10.1068/c10222
- Seyfang, G., & Longhurst, N. (2013). Desperately seeking niches: Grassroots innovations and niche development in the community currency field. *Global Environmental Change*, 23(5), 881–891. doi:10.1016/j.gloenvcha.2013.02.007
- Seyfang, G., & Longhurst, N. (2016). What influences the diffusion of grassroots innovations for sustainability? Investigating community currency niches. *Technology Analysis & Strategic Management*, 28(1), 1–23. doi:10.1080/09537325.2015.1063603
- Seyfang, G., & Smith, A. (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. *Environmental Politics*, 16(4), 584–603. doi:10.1080/09644010701419121
- Smith, A. (2006). Green niches in sustainable development: The case of organic food in the United Kingdom. *Environment and Planning C: Government and Policy*, 24(3), 439–458. doi:10.1068/c0514j
- Smith, A. (2007). Translating sustainabilities between Green Niches and socio-technical regimes. *Technology Analysis & Strategic Management*, 19(4), 427–450. doi:10.1080/09537320701403334
- Smith, A. (2011). The transition town network: A review of current evolutions and renaissance. *Social Movement Studies*, 10(1), 99–105. doi:10.1080/14742837.2011.545229
- Smith, A., Fressoli, M., & Thomas, H. (2014). Grassroots innovation movements: Challenges and contributions. *Journal of Cleaner Production*, 63, 114–124. doi:10.1016/j.jclepro.2012.12.025
- Smith, A., Hielscher, S., Dickel, S., Soderberg, J., & van Oost, E. (2013). *Grassroots digital fabrication and makerspaces: Reconfiguring, relocating and recalibrating innovation?* SPRU Working Papers Series SWPS 2013-2. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2731835
- Smith, A., & Raven, R. (2013). What is protective space? Reconsidering niches in transitions to sustainability. *Research Policy*, 41(6), 1025–1036. doi:10.1016/j.respol.2011.12.012
- Smith, A., & Stirling, A. (2016). *Grassroots innovation and innovation democracy* (STEPS Working Paper 89). Brighton: STEPS Centre.
- Spekkink, W., Quist, J., Leising, E., & Pesch, U. (2016). Deliverable 5.4: Case Study Report. Rotterdam-Delft-The Hague: Local Energy Initiative and Repair Cafes, EU FP7 SSH Grant Agreement 613420. Retrieved from http://glamurs.eu/wp-content/uploads/2016/11/WP5_Deliverable_5.4.pdf
- Stirling, A. (2011). Pluralising progress: From integrative transitions to transformative diversity. *Environmental Innovation and Societal Transitions*, 1(1), 82–88. doi:10.1016/j.eist.2011.03.005

- Stirling, A. (2014). Transforming power: Social science and the politics of energy choices. *Energy Research & Social Science*, 1, 83–95. doi:10.1016/j.erss.2014.02.001
- Swedlow, B. (2012). Cultural coproduction of four states of knowledge. *Science, Technology & Human Values*, 37(3), 151–179. doi:10.1177/0162243911405345
- Toffler, A. (2013). Revolutionary wealth. *New Perspectives Quarterly*, 30(4), 122–130. doi:10.1111/npqu.11414
- Turnheim, B., Berkhout, F., Geels, F., Hof, A., McMeekin, A., Nykvist, B., & van Vuuren, D. (2015). Evaluating sustainability transitions pathways: Bridging analytical approaches to address governance challenges. *Global Environmental Change*, 35, 239–253. doi:10.1016/j.gloenvcha.2015.08.010
- Van der Have, R. P., & Rubalcaba, L. (2016). Social innovation research: An emerging area of innovation studies? *Research Policy*, 45(9), 1923–1935. doi:10.1016/j.respol.2016.06.010
- Vercauteren, C., Quist, J., Van Bueren, E., & Veen, E. (2013). *Community gardens as learning spaces for sustainable food practices*. Paper presented at the proceedings of SCORAI Europe & InContext Workshop, Rotterdam, The Netherlands, 7–8 October 2013; Sustainable Consumption Transitions Series, Issue 3.
- Walker, G., & Devine-Wright, P. (2008). Community renewable energy: What should it mean? *Energy Policy*, 36(2), 497–500. doi:10.1016/j.enpol.2007.10.019
- Walker, G., Hunter, S., Devine-Wright, P., Evans, B., & Fay, H. (2007). Harnessing community energies: Explaining and evaluating community-based localism in renewable energy policy in the UK. *Global Environmental Politics*, 7(2), 64–82. doi:10.1162/glep.2007.7.2.64
- White, R., & Stirling, A. (2013). Sustaining trajectories towards sustainability: Dynamics and diversity in UK communal growing activities. *Global Environmental Change*, 23(5), 838–846. doi:10.1016/j.gloenvcha.2013.06.004
- Williams, A., Goodwin, M., & Cloke, P. (2014). Neoliberalism, Big society, and progressive localism. *Environment and Planning A*, 46(12), 2798–2815. doi:10.1068/a130119p
- Wittmayer, J., Backhaus, J., Avelino, F., Pel, B., Strasser, T., & Kunze, I. (2015). *Narratives of change: How Social Innovation initiatives engage with their transformative ambitions*.