Int. Jrnl. of Soc. of Agr. & Food, 2018, Vol. 24, No. 3, pp. 431-448

The Transformative Potential of Social Innovation. The Case of Wheat and Bread Value Chain in Tuscany

Paper first received 15 March 2017; Accepted: 10 July 2018; Published in final form: 30 October 2018

ADANELLA ROSSI AND RICCARDO BOCCI

Abstract. The complexity of the transition to more sustainable food systems has taken multiple trajectories, differently driven and oriented. In this scenario, innovation pathways promoted at the grassroots level and based on collective action driven by social purposes appear to carry a strong transformative capacity. Considered as expressions of social innovation, their study has been approached through different theoretical frameworks. By referring to some of these, and in particular to the developments of transition theories, we analyse the innovation pathways involving the wheat-bread value chain in Tuscany (Italy). The analysis sheds light on the relevance of the nature of social innovation carried out by grassroots initiatives in their pursuing radical change aimed at deeply redefining production-consumption practices through social interaction, to meet socially shared needs and achieving several social benefits. The paper also analyses the factors and mechanisms underlying the change processes this innovation has triggered in the mainstream system, focusing on the so-called "anchoring" process. Through this analysis, the work aims at improving the understanding of the transformative potential of social innovation.

1. Introduction

It is widely acknowledged that a transition to more sustainable food systems requires radical and comprehensive change. Numerous pathways have been promoted in this direction, testifying the complexity of the process. They do not stem from a linear, concurrent and coherent evolution of technological, organizational, cultural and institutional components; they rather evolve through often incoherent dynamics of change, involving multiple and often un-aligned visions, interests and goals, and affecting the different areas involved not simultaneously or with the same intensity.

In this scenario, bottom-up innovation appears particularly effective in generating and influencing trajectories of change. Many grassroots initiatives have been experimenting and spreading innovative ways of thinking and doing around food, often through systemic approaches that are particularly significant from a change perspective. Some scholars look at many of these initiatives as expressions of social innovation, because they stem from shared social needs, are based on new forms of interaction-cooperation and aim at achieving multiple social benefits (Murray et al., 2010). Understanding their features and potential has thus become increasingly important, stimulating the development of studies from multiple perspectives.

Different theoretical approaches and heuristics have been mobilised to study these expressions of social innovation and their capacity to contribute to broader changes. Co-evolutionary approaches referring to transition theories have increasingly framed these initiatives as niches of innovation, focussing on their role in boosting change. Over time, this analytical framework has been complemented with other perspectives, to better represent the social

Adanella Rossi, Associate Professor, Department of Agriculture, Food and Environment, University of Pisa, Via del Borghetto 80 - 56124 Pisa. E-mail: adanella.rossi@unipi.it

Riccardo Bocci, Managing Director, Rete Semi Rurali, Via di Casignano 25 50018 Scandicci, FI – ITALIA. E-mail: riccardo.bocci@semirurali.net

ISSN: 0798-1759 This Journal is blind refereed.

component of processes of change promoted by these pathways. The need to further deepen and theoretically ground the transformative potential of social innovation initiatives has recently stimulated new fields of study.

This paper intends to contribute to the understanding of the potential of social innovation, focusing on its specific characteristics and the mechanisms that affect its capacity to generate system-wide change. Looking at the sustainability-driven dynamics of innovation occurring in the wheat and bread-making chain[1] in Tuscany, we a) explore the forms they assume, in relation to the constituent features of social innovation, and b) analyse their transformative potential, exploring the interaction between the innovative pathways and the mainstream sector (and the changes triggered therein). By highlighting the most critical aspects and the needs for further research that emerge, we may contribute to improve the approaches to the study and to the support of social innovation.

In the following sections, the paper illustrates its conceptual framework, contextualises the innovation process analysed, describes and discusses the findings.

2. Conceptual framework

In the complex scenario of a transition to more sustainable food systems, processes of innovation promoted by non-mainstream actors or through mechanisms alternative to those of the dominant agro-food system have been emerging, being based on collective action and moved primarily by social purposes and appearing particularly promising in terms of transformative capacity. Considered as expressions of social innovation, they have been approached through a variety of theoretical frameworks and perspectives. We present here the most common, pointing out their strengths and their capacity to offer complementary insights into the issue.

2.1. On the features of social innovation

The application of the social innovation concept to dynamics involving food-related practices, as with the social innovation issue more in general (cf. European Commission, 2013), has been quite shallow. It has mostly been applied to a multiplicity of initiatives and processes, often at different scales, without really analysing the constitutive elements nor the potential of this form of innovation. This is likely due to the lack of a theoretically sound concept of social innovation and the different approaches used by different disciplines, often in problem-driven and intervention-oriented types of research (Howaldt and Schwarz, 2016).

To better ground the concept theoretically, several approaches have been developed. According to a comprehensive approach, social innovation is viewed as a process of change aimed at meeting social needs (not fully satisfied in alternative ways), grounded in existing relations and at the same time developing new forms of cooperation among multiple social actors, and aimed at pursuing social benefits (Murray et al., 2010; BEPA, 2010; Moulaert et al., 2013). This approach - where the social dimension concerns the origin of the change, the process to promote and tackle it, and its outcomes - allows foregrounding significant aspects of grassroots innovation initiatives:

[1] The paper analyses different pathways of innovation on-going in the wheat-bread chain in Tuscany (Italy), since the early 2000s, aimed at creating alternatives to a situation perceived as unsatisfactory. The study draws on empirical materials gathered over a multi-year period of research on and direct involvement in the innovation pathways developing in this sector and in the area. Part of these activities has been carried out in EU-funded projects of 7th FP (SOLIBAM - www.solibam.eu) and Horizon 2020 (DIVERSIFOOD, grant agreement n. 633571 - www.diversifood.eu).

i) the search for alternative solutions, by developing new attitudes, approaches and practices, stems from shared material or immaterial needs; ii) the development of reflexivity and social capital in multi-actor networks is crucial to that end; iii) capacity building, empowering processes, cooperation and development of collective agency, systemic approaches to problems, and pursuit of public value are frequent achievements. Close to these aspects are those related to the will and capacity of these initiatives to trigger processes of broader change involving multiple domains of the mainstream system. This, more in general, relates to the potential of social innovation to promote more significant processes of social transformation (Haxeltine et al., 2013).

2.2. On the development of social innovation and its potential for change

The interest in understanding the genesis and development of innovative social practices and their transformative potential has characterised the development of various theoretical-analytical frameworks. Some of these have focused on social innovation not as a distinct process but rather as a component of complex processes of innovation, such as those involving technological changes. However, they have contributed to stimulate further developments in dealing with the issue. Although these frameworks have been originally defined and empirically tested in non-food sectors or in a more general perspective, they have been widely adapted to the study of innovations in the agro-food sector as well.

Among these, we consider the frameworks developed within transition theories as particularly significant, including their combinations with social practice and social movement theories, and the more recently developed framework relating to transformative social innovation. Each of them can provide useful insights to the analysis of the innovation potential of grassroots initiatives.

Transition theories and, in particular, the Multi-Level Perspective (MLP) (Rip and Kemp 1998; Geels, 2005; Smith et al., 2005; Geels and Schot, 2007) analyse innovation as a multi-dimensional and complex interplay between micro-, meso- and macro- levels. According to MLP heuristics, new practices arise and consolidate within protected spaces (niches) and under certain conditions (landscape) may promote changes in the structure and functioning of the mainstream system (regime). Together with the pressures coming from the socio-technical landscape and the related 'windows of opportunity' for generating change, niche development and niche-regime interaction are considered the core of system innovation. Central to this process are: i) the capacity of the niche to innovate in a radical and continuative way by redesigning whole socio-technical systems (in its relational and organisational infrastructures, technological and institutional components) (Klerkx et al., 2012); ii) the forms that the niche-regime interaction assumes, in relation to the niche capacity to affect specific contexts in which it operates, so creating pressure on the regime, and to establish links with parts of the regime, thus introducing innovation (also in terms of "translation", namely the adaptation of innovative socio-technical configurations to make this linking possible) (Smith, 2007).

MLP is a highly flexible heuristic framework and in fact it has been widely utilised despite the criticisms of limited applicability and ability to represent real dynamics of innovation. The need to overcome its limitations has led the framework to evolve over time (Geels, 2010, 2011, 2014; Smith and Raven, 2012), in line with the growing consensus towards co-evolutionary approaches. Its elaboration to meet policy-making and management needs, such as in Transition Management and Strategic Niche Management (SNM), has stressed elements that are significant in terms of social innovation and its transformative potential, e.g., network building, social learning, reflexive governance, collective agency. SNM (Kemp et al., 1998) has expanded MLP

to better incorporate the role of civil society as a potential agent of change (Seyfang and Smith, 2007; Seyfang and Haxeltine 2012). Other studies have deepened other aspects, enriching the effectiveness of analysis. Elzen and colleagues (2011) have explored the complexity of niche-regime interaction, capturing the multi-layered and multi-dimensional interactions through which change takes shape through the concept of "transition in the making". They have also explored the mechanisms of niche-regime linking, identifying the process of "anchoring", in its different forms of network, technological and institutional anchoring,[2] in relation to the areas involved in the emerging linking (Elzen et al., 2012). As other sustainability transition analyses have shown (Bui et al., 2016), this concept helps to explain the multiple ways through which niche-regime interaction may unfold and, ultimately, the process underlying the transformative action of social innovation. It also underlines the variegated nature of regime structure and the associated opportunities it offers to creating enabling environments for change (Smith, 2007; Elzen et al. 2012). In this regard, the presence of "areas of overlap" between regimes and niches, especially at micro-level, are particularly significant. In these areas, characterised by connections between regimes and niches, by means of actors or technical or institutional elements, small changes may develop, which then lead to more stable or broader changes if appropriate conditions arise. In these processes, a key role is given to intermediation, which significantly contributes to anchoring (Elzen et al., 2012; Klerkx et al., 2012).[3]

This evolution in how multi-level dynamics are represented has led to a more nuanced configuration of its constitutive elements, based on a less sharp distinction of areas of action and on more diversified and dispersed forms of power, interacting with each other (Elzen et al., 2012). In this enriched representation of transition processes, societal pressures towards change – in terms of needs, approaches and goals – seem to find new space.

As noted above, other theoretical frameworks also contribute fruitful insights. Social practice theory (SPT), which focuses on the consolidation of practices resulting from the horizontal circulation and integration of different elements of practice (Schatzki, 1996; Røpke, 2009; Shove et al., 2012), has provided another successful approach to study social innovation. The attention here is on the practices in everyday life, on their constitutive elements (meanings, competences, materials) and on how these practices are socially organised. The need to deepen the dynamics underlying their change and their innovation potential has led to combine this theory with transition theories, looking for mutual reinforcement. Hargreaves and colleagues (2013) have developed an integrative framework, combining the horizontal dimension of social practice

---

2 Network, technological and institutional anchoring refer, respectively: to the quantitative and qualitative changes that occur in the relationships around innovation, to the progressive definition of technical elements of an innovation by/among the actors involved, to the new or adapted cognitive (interpretative), normative and economic rules orienting actors' activities (Elzen et al., 2012).

3 Already considered crucial for its capacity to facilitate interactive processes (Howell, 2006), intermediation has taken on an even more significant role over the debate on transition. There is a broad literature on it. To take into account the variety of real situations, this function has been increasingly associated with diverse actors, including actors involved in the processes (Leeuwis and Aarts, 2011; Kilelu, et al., 2011). Elzen and colleagues (2012), while mentioning van de Poel's (2000) concept of "outsiders" (outside or at the margin of the regime, namely part of it but not fully integrated in its rules), stress the role of "hybrid actors" (belonging to regime or niche, but open to change). In a perspective of systemic intermediation, also the activities carried out may be multiple, including many kinds of facilitation - networking, (re)framing, mobilisation of knowledge and other resources, empowerment, legitimation, etc. (Kilelu et al., 2011; Seyfang et al., 2014). This concept of intermediation seems suitable to address the complexity of dynamics underlying social innovation.

development and the vertical dimension of the multi-level interaction. The dynamics through which innovative practices may spread and contribute to broader change are indeed at the basis of SNM studies on innovation and transformative potential of grassroots niches (Seyfang and Haxeltine, 2012; Seyfang et al., 2014).

The need to analyse the effects of societal innovations on the mainstream system, as emerged also in SNM studies, is at the basis of another effective combination of perspectives, namely the one between the MLP framework and social movement theories (Elzen et al., 2011; Seyfang and Haxeltine, 2012). Through this integrative approach, within the above-mentioned frame of "transition in the making", Elzen and colleagues (2011) analyse the effect of normative pressures from societal groups on techno-economic and institutional domains of the mainstream system.

Starting from the MLP framework and its evolutions, the objective of theoretically grounding the role of social innovation in relation to social change has recently driven the development of another promising branch of studies, those on transformative social innovation (TSI) (Haxeltine et al., 2013). This is conceived as a "social innovation that challenges, alters or replaces dominant institutions in the social context" (Avelino et al., 2017, p.2), a fundamental and persistent change across society, exceeding sub-systems and including simultaneous changes in multiple dimensions. This heuristic builds on many concepts of MLP, developing and enriching them further. Besides the general frame of interaction between diverse fields of forces, it envisages the inclusion of various perspectives in dealing with system innovation, such as socio-technical, socio-ecological, socio-political, socio-economic (Avelino et al., 2014). The concept of "narratives of powerful change" is as powerful; many discursive contributions to change coming from grassroots movements in the forms of counter-narratives, can be read in this light.

All these theoretical frameworks and the related analytical tools are relevant for exploring the real processes through which social innovation develops and the mechanisms enabling the expression of its transformative potential, offering complementary insights. We use them in combination to develop our analysis.

3. Initiatives in the bread-production chain in Tuscany

In Europe, since the 1960s, the development of the wheat-bread supply chain has been strongly conditioned by the common agricultural policy (CAP) and the production strategies of the agro-food industry. Productivism and standardisation logics have influenced every aspect of the technology of production – selected/cultivated varieties, farming/processing techniques – affecting actors' knowledge and practices.

Within supply chain relations that have become essentially vertical and asymmetrical in terms of power, farmers have been managing their activity mostly in isolation and have become fully dependent on the other chain stages (seed companies, input providers and processing industry). This regime has heavily affected also the economic performances of the cultivation phase. Especially after the change in the CAP subsidy regime in the mid-2000s, farmers have become dependent on global market dynamics, experiencing a progressive erosion of profitability and a growing precariousness of their work. In addition to farmers' conditions, other failures of this development pattern have come to the fore, such as: the dramatic reduction of cultivated diversity in cereal systems; the inadequacy of modern varieties for organic and low input systems (Wolfe et al., 2008); and the decrease in nutritional and health quality of wheat-based products (Sofi et al., 2010).

Since the 2000s, this scenario has stimulated the search for remedies and alternatives, aimed on the one hand at improving the functioning of the supply chain and, on the other, at implementing strategies to create new value. The former includes actions such as supply aggregation and supply chain contracts, which have been widely utilized and supported by public funding. The latter consist of market valorisation initiatives promoted by chain actors or public bodies, as well as a myriad of local grassroots initiatives aimed at deeply re-organizing the value chain.

The case of the wheat-bread value chain in Tuscany mirrors the above illustrated tendencies and difficulties, with different strategies being used to address the shortcomings of the dominant development pattern. These approaches all are oriented towards the re-localisation of production-consumption systems and the creation of new value around wheat and bread products. However, visions, strategies and internal dynamics are different, offering interesting insights into mechanisms of change and related outcomes.

In addition to the more conventional strategies aimed at improving the chain functioning by strengthening the vertical integration, an important line of action is represented by the pathways through which mainstream system actors have invested in value creation, in order to break away from the commodity market. These centre around differentiation of products on a territorial basis and/or with reference to the production technique (low input or organic). In a situation of growing difficulty on the market, over time these pathways have become more and more important, often in combination with chain integration approaches, and have been increasingly supported by the public sector.

A different approach, widely adopted by grassroots initiatives, aims at more radically renewing the production system and the relation with the market, investing on a quality – and sustainability – centred concept of farming and processing and a closer relationship with consumers. This has resulted in the search for non-conventional crop germplasm, new or renewed cultivation and processing techniques, and other ways to highlight the value of the final product. This reorganisation is moreover considered as part of a broader strategy of "re-appropriation", of regaining an active management of the economic, environmental and social values created, in a form closely embedded in the local context.

The first strategies are still based on a conventional logic of marketing, aimed at differentiating the product and increasing the added value, thus sheltering the production system from the mass market adversity. The second one follows a more radical logic in striving to achieve a qualitative conversion of all aspects of the production process: technical, cultural, institutional, juridical-political.

Although over time the boundaries between these more or less radical experiences have sometimes become blurred, they certainly stemmed from different perceptions of the problem, adopted different approaches and had different objectives. These features are significant in terms of social innovation. Moreover, the evolution of these pathways, also in terms of their interaction, has introduced new meaningful elements in the on-going innovation processes. In that regard, new initiatives that have developed more recently and that see the involvement of mainstream system actors seem particularly significant.

3.1. Product differentiation in a marketing logic: the “Tuscan Bread”

Since the 1980s the valorisation of the qualitative characteristics of food products in Tuscany has played a key role, significantly supported by regional rural development policies. Some of the initiatives promoted for the bread chain over the last two decades fall into this “tradition”. They

aim at promoting local produce through quality marks, which refer to the territorial provenance and/or the processing specificities.

The most important of these initiatives is the establishment of the Protected Designation of Origin (PDO) of the "Tuscan sourdough bread", a mark promoted by bread manufacturers and supported by the Regional Government. The Consortium that has been established to manage the procedures includes the main organizations of the chain actors (e.g. farmers' unions, bakers' organisations). The process for obtaining the recognition started in the early 2000s and, not without difficulties, ended in 2016. Currently, about 50 farms, 3 mills and about 15 bakers adhere to the denomination.[4] Indeed, the initiative has involved only a small portion of the sector.

The Code of Practice strongly links the specific characteristics of the bread in question to a supposed "Tuscan" tradition that underlies all production stages. However, the definition and recognition of such Tuscan features was not easy, as the length of the process for obtaining the PDO demonstrates. The product specification states that the wheat varieties employed can be a combination of old Tuscan varieties and varieties of more recent origin. This choice was the result of a compromise between the regional technicians, who wished to promote the regional character of the product, and the actors involved in the actual bread-making, who wanted to avoid too stringent criteria for the raw material allowed, especially ensuring the use of more productive and easier to handle modern varieties with higher protein content. Another difficulty was identifying univocally the product typicality on such a wide territorial basis, given the variability of cultivation environments and the diverse historical and cultural traditions.

This (re-)construction of a typical product has been deemed of great importance to revitalize the sector and, in general, strengthen the image of Tuscan agro-food produce. Since its early stages, the partnership established with the world of research has been decisive. It has involved researchers from the Universities of Florence, for the genetic characterization of traditional wheat varieties, and of Pisa, to study the best processing techniques, including assessments of technological performance of old and modern varieties and microbial characterisation of the sourdough to be used. These last studies provided the Consortium with a scientific basis for fine-tuning the traditional processing with sourdough, in order to obtain bread with well-defined and replicable characteristics (the researchers are even in charge of conserving a sample of the sourdough used). Thanks to the PDO, the final product has been heavily advertised as "the only true Tuscan Bread", in an effort to increase its consumption in the region and in national and international circuits. The entire project outcomes are still indefinite, in terms of market success and actual benefits for the involved actors.

3.2. The collective reconstruction of the bread chain

As mentioned earlier, since the second half of the 2000s, other, more radical initiatives for re-shaping the entire wheat-bread chain emerged in Tuscany. These are based on principles and goals such as: high nutritional and health value of final products; agro-ecological sustainability; equity in value distribution and power balance; re-connection between farming and communities. This process of innovation developed from the needs and experiences of several, closely interacting actors: farmers, researchers, organisations engaged in sustainable farming and farmers' rights issues, artisanal bread-makers, organised citizens-consumers.

An important starting point, common to most of these initiatives, is the search for alternatives by farmers. A first step in this direction, since the late 1980s, was a transition by many

[4] The farms run less than 1% of the surface cultivated with wheat in Tuscany.

cereal growers to low input and then to organic farming; some introduced on-farm processing and direct selling of the final product. However, successfully going organic and producing a more artisanal, higher quality bread were challenged by the lack of suitable varieties for this kind of production system. Varieties well adapted to organic conditions were scarce on the market (also because most did not comply with the seed legislation) as well as the quantity of organically produced seed. Farmers hence started experimenting with landraces and/or old varieties (obtained through breeding in the first half of the 20th century), recovering them from public gene banks and initiating their reproduction and dissemination. The exchange of seeds and experiences among farmers was essential to this end.

The search for a bread with better nutritional and health properties was a further stimulus to search for alternatives in farming and bread-making practices. Traditional varieties show superior characteristic (Sofi et al., 2010); their expression, however, requires processing methods different from the conventional ones. This has paved the way to a significant process of redefinition of techniques (for milling, leaving, kneading) and adaptation of equipment. Together with farmers, small artisanal millers and bakers have been the protagonists of this process of bread "re-qualification", carrying out an important experimentation to get the best baking performance from flours of traditional/diverse varieties.

This reshaping of wheat-bread production has also benefitted from the fruitful interaction established with some scientists, already engaged in exploring qualitative properties of old wheat varieties and landraces. A key role has been played by the work carried out since the mid-1990s by Stefano Benedettelli, geneticist at the University of Florence, in turn collaborating with Salvatore Ceccarelli, an eminent geneticist engaged in participatory plant breeding at the international level. Their expertise has been crucial to centre the goal of increasing agrobiodiversity and to support practitioners in their reorganisation. These scientists have interacted as peers with the practitioners – involving them in the research design, implementation and evaluation of results – and shared a systemic approach.

This integration of different knowledge fields and skills has kick-started collective experimental work aimed at identifying and evaluating the wheat varieties more adapted to specific cultivation environments and in terms of flour quality. This activity has shaped a collective effort leading to a dynamic 'on-farm management' of the varietal diversity identified. As an effect of this close interaction many farmers have acquired the capacity to manage the on-farm evaluation plots quite autonomously, mastering the development of new knowledge around these varieties.
Other actors have contributed to the development of these alternative production systems. Since the second half of the 2000s, the *Tuscan Coordination of Organic Producers* (CTPB) has engaged farmers in the collective work of varietal evaluation and breeding, providing technical support and aiding the creation of local networks of relationships. Even more crucial has been the activity of the *Rural Seeds Network (RSR)*, an organisation committed to the issues of agrobiodiversity enrichment and genetic resource management.[5] Since the early 2000s, it has carried out an important intermediation role among organic farmers and processors potentially interested in diverse varieties. In close cooperation with the above-mentioned researchers, RSR has facilitated the exchange and spread of knowledge on agrobiodiversity and the development of a systemic view of the reorganisation of production systems. It has also promoted exchanges among Tuscan initiatives and other similar experiences in Italy and abroad. Through this linking activity but also thanks to its engagement in communication and advocacy at cultural and juridical-political level,

[5] The organisation operates at national and international scale but is based in Tuscany (www.semirurali.net).

RSR has contributed to greatly broadening the significance of the innovative practices collectively carried out.

In close interaction and synergy with the work of these organisations, individual technicians also have played an important role in the process, providing farmers interested in these pathways with technical support and other facilitation activities. Their ability to empathize with farmers' needs and capacities, at the same time giving and strengthening the sense of a common pathway, is a constant in farmers' reports.

Over time, such collective work on local varieties and traditional baking has attracted new farmers, favouring the spread of the new practices and the growth and structuring of the networks of relationships. These interactions have also been important for a further development in the activities around seeds: to enhance agrobiodiversity (and farmer autonomy), an evolutionary breeding approach has been introduced, to increase varietal diversity and adaptation to specific farm environments and management.

Farmers' and processors' innovation capacity and their need for a suitable market space have met a growing appreciation among citizens-consumers for products with higher quality (environmental, nutritional, organoleptic, ethical), produced locally by identifiable producers. This has led to close relations with consumers and, in some cases, to entire local communities committed to purchasing these innovative products

3.3. The further mobilisation around bread from diverse varieties

The favour met by the bread made with diverse varieties and traditional technology has, over the last years, stimulated a general mobilization around this innovation, involving a growing number of actors.

3.3.1. Interest from other economic actors

During the last years, several new initiatives focusing on the wheat-bread value chain have emerged in Tuscany, in some cases as a form of diversification from conventional production, in others as new conversions to alternative models. A significant initiative is the one enabled by the Agricultural Consortium of Siena, a large second-level cooperative comprising mostly conventional farmers, which manages several processing and marketing chains. The Consortium has acquired an important role in the spread of Verna, the commercially best-known old bread-wheat variety. After having supported its registration in the national seed catalogue, in 2012 it obtained the licence to reproduce it in purity and place it on the market; moreover, it manages the production and commercialization of its derived products (bread and beer). Although irrelevant in size, the chain of Verna is a key asset of the Consortium's marketing strategies.

Other initiatives have been promoted by small cooperatives, which have seen a solution to their economic hardships in the conversion to quality varieties and processing internalization. Over a few years, these organisations have profoundly redefined their marketing, repositioning themselves on differentiation strategies and valorisation on local markets.

3.3.2. Interest from the research world

Equally significant is the growing interest towards these innovation processes by public research, despite the diversity of objectives and methodological approaches.

Some projects, funded by the Region through rural policies, include the experiments carried out by universities and research institutes of Siena and Florence (e.g., Benedettelli's team) to investigate the effects of varietal combinations on nutritional and health benefits of products.

These studies represent a more institutionalised form of the first research efforts on the potential of single landraces/old varieties (late 1990s), and involve farmers and bakers interested in getting scientific evidence on the quality of their products.

In the late 2000s, new collaborations between the networks involved in the grassroots initiatives and University research groups have resulted in co-participation in EU funded projects.[6] An example is the cooperation established with groups of rural economists of the Universities of Pisa and Florence around the socio-economic dynamics related to the promotion of agrobiodiversity. The broad, systemic perspective of these researchers and their familiarity with participatory methods have contributed to the development of a favourable learning environment within the networks, stimulating further mobilisation of knowledge. They have also supported the spread of innovation outside these initiatives. In particular, they have helped advocating a comprehensive approach to agrobiodiversity, both within the research world and in the policy arena (e.g. in the relationships with Regional bodies) and have taken this issue to higher levels of visibility and debate (e.g. by co-writing/participating in European projects and in advocacy actions).

Over the last few years, other research activities have focused more on specific aspects of the production process or on the associated properties of the products. A growing interest in technological, health and nutraceutical aspects involve several research groups in the region, generally characterised by a specialist approach to the production process. The quality features of PDO Tuscan Bread, for example, are at the centre of new projects. One of these, funded by the Region in 2017, sees the technologists of the University of Pisa exploring specific bread biochemistry aspects, especially those responsible for the bread shelf life, given the Consortium's interest in marketing beyond regional and national borders. Microbiologists of the same University coordinate an important national project (2017-2019) aimed at investigating the microbiological aspects of bread-making, in order to optimize the process of making bread with superior nutritional and health properties.

3.3.3. Interest from the public sector

The dynamics that have characterised public intervention are significant, as already testified by increased research funding. In general, public actors' narrative on the development of the cereal sector seems more complex than in the past. It still includes references to the optimization of the supply chain functioning, but it increasingly opens to strategies for quality conversion of production systems, focusing in particular on the benefits stemming from old varieties and traditional bread-making. The growth of knowledge on and interest in the properties of these varieties and the tendency to promote them through localized production-consumption circuits have in recent years contributed to shifting administrators' and politicians' attention towards the economic and social opportunities offered by this innovation. The availability of additional elements to differentiate the product - nutritional and health properties and strengthened traditional characteristics - is seen as instrumental to create a secure and more profitable market niche. In addition, it offers opportunities for rural development, especially in marginal areas. Moreover, health-related elements represent an asset capable of creating social value and synergies with other areas of public management (e.g. health, education). Although in a very "soft" form, which does not necessarily envisage the conversion to organic, the environmental benefits linked to the

[6] See note n.1.

breakdown of the dominance of the modern varieties are sometimes emphasized. Overall, the active engagement of public actors in the debate and the economic support provided in terms of funding for trademarks, research and experimentation activities, training or public procurement have facilitated the development of these initiatives and given them more visibility. The progressive growth of interest and commitment by the Regional administration is furthermore particularly meaningful considering that it is in charge of rural-agricultural policies.

4. Analysis of the innovation pathways

We have identified the main pathways of innovation that are affecting the wheat-bread chain. In the following analysis, we will read them in the perspective of social innovation, aiming to shed light on the process of development of social innovation and on its transformative potential. The section focuses on i) characters of social innovation (origin, modes and outcomes of innovation) and ii) factors and mechanisms underlying the capacity to trigger system change.

4.1. Seeking social innovation

4.1.1. The trajectory promoted by grassroots initiatives

As mentioned earlier, the grassroots initiatives aim at reshaping the production-consumption processes deeply. The needs that trigger the search for new solutions come from diverse social actors; among them, actors traditionally less powerful in the conventional agri-food system – farmers and consumers – play a central role. Farmers aim at regaining control over their activity, repositioning their role in the food chain and re-embedding their work in the territory and society. Joining these reorganised chains, consumers meet the tangible and intangible needs associated to accessing a special quality product and being part of more sustainable food systems. Besides the motivations of actors directly involved in the supply chain, the objectives pursued by the civil society organisations (e.g. RSR) and the scientists supporting this process play a key role in the development of new paradigms and practices. The bases of these initiatives for change are, therefore, socially shared material and immaterial needs.

The processes leading to the reorganisation of the production-consumption systems appear strongly linked to the interaction that develops among the involved actors. The relational environment of collective experimentation enables the learning processes that underpin the redefinition of all the symbolic, cognitive and material components of practices (Røpke, 2009; Shove et al, 2012). These processes indeed redefine principles and goals, cultural and social meanings of productions systems/products, systems of knowledge and skills, the biological basis and the technology of production, forms of coordination along the chain, institutional tools for product management. In the perspective of transition theories, these processes redesign the socio-technical system in all its constituents (Geels, 2005; Geels and Shot, 2007).

The quality of the interactions plays a crucial role in these processes. This concerns first of all the relations among farmers: rather than being isolated in the vertical integration of the conventional chains, they are engaged in an intense sharing of experiences, knowledge and materials. The same applies to the interactions along the chain, which are essential for the redefinition of technology, product quality and value distribution. The relationship with scientists, shaped by the participatory approach they adopt, is also important. Because of their distance from mainstream research, they play as system "outsiders" (van de Poel, 2000), looking for alliances to put in practice their alternative scientific approach to variety evaluation and breeding. In this role they establish a fruitful cooperation with the various practitioners, facilitating the spread and

consolidation of the innovation. Fully integrated in networking dynamics, they indeed contribute to the technological and institutional "anchoring" within the niche (Elzen et al., 2012). The enabling environment created, inspired by principles of research decentralisation and democratisation (Pimbert, 2006; Bocci et al., 2014), favours further learning processes, supporting the development of new knowledge around breeding (boosting a significant broadening of perspective as in the case of evolutionary breeding), and creating conditions for change in farmers' role and in the formal recognition of the specific genetic resources.

In all this, the importance of facilitation actions emerges to support awareness raising and interaction (Kilelu, et al. 2011; Klerkx et al., 2012). In close synergy with the work of scientists, the role played by RSR is crucial in this regard. The organisation contributes to facilitate circulation of information, interaction among actors and social learning, as well as horizontal connection among initiatives, locally and at a larger scale. In so doing, it contributes to anchor the novelty among niche actors involved (Elzen et al., 2012). Through its commitment in the political arena, it also fosters second order learning (reflexivity) (Seyfang and Haxeltine, 2012), positioning the local initiatives into broader contexts of meaning and collective agency (such as seed legislation, farmers' rights, food sovereignty). These factors favour the configuration of the niche further and creates the premises for a vertical mobilisation of the innovation towards system changes (Sayfang et al., 2014). When confirming the importance of intermediation, RSR's work, together with that of the independent advisors acting as animators, highlights the potential of agents acting inside the emerging niche, as well as the role that the civil society can play in this regard (Kilelu, et al. 2011; Klerkx et al., 2012; Seyfang et al., 2014).

Finally, the close relation established with consumers/local communities constitutes another significant space of learning and change in practices, creating the conditions for the sustainability of the production systems (together with all the values they incorporate) (Brunori et al., 2018). When the networks around these initiatives also involve local public actors, the experimentation of an alternative system acquires even greater significance, contributing to institutional innovation.

The practices developed within this relational environment lead to multiple benefits, most of which carry social value. These include material benefits, such as strengthening of local, agro-ecologically-oriented and resilient crop systems, availability of healthy food, and creation of value on a receptive market; as well as immaterial benefits, including awareness raising, empowerment, development of collective agency and political engagement. Significant expressions of the latter processes are the radical change towards more participatory, decentralised and empowering crop breeding; a broader view of food production, conceived as an integrated, socially-based system, engaged in producing and reproducing public goods; consumers' empowerment, based on knowledge of the socio-ecological value of the production systems/products; the association of food-related practices with issues concerning rights, power, equity and democracy.

All these aspects contribute to characterise the radical social innovation that the grassroots initiatives pursue and develop, moreover showing their capacity to cover several dimensions, by which social purposes integrate with technical, ecological, economic, cultural and political domains (Avelino et al., 2014).

4.1.2. Other pathways of innovation

Different origin, modes and outcomes characterise most other initiatives promoted to enhance the wheat-bread chain performances, in parallel to the grassroots ones. At the origin of these initiatives, such as the promotion of the PDO Tuscan Bread and of the Verna wheat bread, there is

essentially the need to address the problem of the sector's market difficulties. Consumers' appreciation for healthy and locally differentiated food is seen as an opportunity to this end.

Regarding approaches and results in pursuing this innovation, several aspects of these initiatives report a quite narrow view underlying the changes carried out: no real substitution of genetic material (few old/local varieties, used in combination with modern varieties and instrumentally to differentiate the final products on the market); minimal changes in the cultivation techniques and no interest in changing breeding criteria/methods; only partial adaptation of processing techniques and anyhow focused on micro aspects of technology, often defined through a specialist approach and without considering the role of practitioners, their skills and context specificities.

This view is mirrored in the low level of active participation of the involved chain agents (rather represented by their organisations), in the lack of co-production and sharing of knowledge and in the rather dominant role of usual big players. Consumers are involved primarily through conventional marketing approaches, hence only in the last stages of the chain.

The innovation achieved by these initiatives does not seem to deliver very significant social benefits. It is oriented towards pursuing economic advantages, to guarantee the sector sustainability, but it does not support real empowerment of farmers and sharing of knowledge and risk among actors. Furthermore, its approach to agro-biodiversity is merely a marketing strategy but does not carry any longer-term environmental or social goals.

4.2. The transformative potential of social innovation

To uncover the transformative potential of the social innovation promoted by grassroots initiatives, one has to consider the changes that have been occurring over time through their interaction with the mainstream system, looking at the involved actors, mechanisms and outcomes. In this regard, together with the contribution to the creation of a favourable market environment, through the new narrative created around the wheat-bread chain, the dynamics involving public research and public institutions prove to be particularly significant.

As far as research is concerned, scientists involved in these initiatives result, again, as key actors, and the effects of their action are significant. In their role as "outsiders" (van de Poel, 2000) to mainstream research, as we have seen, geneticists started getting involved by establishing relationships with diverse grassroots communities, more or less radical in pursuing a change in wheat/bread production models. Hand in hand with the development of innovation, their role has changed. No more "outsiders", as effect also of the legitimation of their activity, they seem to have assumed the role of "hybrid actors" (Elzen et al., 2012), a change which is functional to spread the innovation. While cooperating with grassroots initiatives, fostering advancements in breeding and processing techniques, they continue to support radical innovation. Through the collaboration with the internal facilitators, they contribute to the development of reflexivity and further mobilisation within the niche; they also mediate the interaction with the mainstream system (e.g. in other research fields, or on juridical issues). Within the mainstream initiatives, their cooperation strengthens the marketing strategies or policy actions, giving scientific support to the narrative developed, although in a more limited frame of innovation. Indeed, in this context, geneticists' exhortation to invest in agrobiodiversity beyond simply using old varieties has little effect. While there is a full adhesion to this paradigm in the grassroots initiatives, where the evolutionary character of breeding is a key factor of the innovation, this exhortation is generally ignored by the mainstream actors, as the symbolic value of "heritage wheats" is a strategic asset and there is no interest in investing in more difficult to handle and disempowering material.

The actions promoted by the researchers interested in the processing technology

(technologists and microbiologists) have also been very significant. Having contributed to the 'construction' of the specific product quality of the PDO bread and to its management on the market (e.g. through studies on durability), some of the researchers have later developed an autonomous interest in microbiological aspects, channelling their investigations in the emerging research on health and nutraceutical properties of food. Their research has joined the other studies on the effects of bread on human health which have developed hand in hand with the field experimentation on the diverse wheat varieties, sometimes in cooperation with the involved practitioners. These scientists are "insiders" to the mainstream system but through their interest in alternative bread-making techniques, they too contribute to legitimate the innovation. They act on technological aspects, by recognizing and further legitimating the new approach in bread-making, as well as on institutional aspects, by providing the knowledge basis associated to the production process and related product, as well as elements to define the rules for their management. The increasing interest in this field of research and the consequent funding, the new marketing strategies of big players of the agri-food system, as well as the new narrative generally spreading around the quality of bread in relation to the methods of its production are the most important evidences of the change occurring.

Other opportunities for consolidating this innovation develop where the public sector is engaged in support and institutionalisation. As we have seen, this occurs at the micro-scale of local contexts, where grassroots innovations arise and grow, as well as at the regional scale, where innovative initiatives become subject of more general debate and support. In both contexts, the innovative approaches of grassroots initiatives are legitimated by the acknowledgement of the social benefits the related production systems offer. Moreover, the legitimated space of experimentation of technological and institutional solutions is particularly significant as it can facilitate further dissemination of the innovation at broader scales.

Overall, it seems that some of the changes introduced by the grassroots initiatives have started to be integrated by the system. The process however seems not linear. The alliance between a few scientists and the most innovative initiatives, as well as the involvement of a few local public actors, looks like an "area of overlap" between niche and regime (Elzen et al., 2012) where social innovation promoted by the niche seems to find an enabling environment to express its approach and vision. In other spaces of interaction, on the other hand, the radicalness of innovation of grassroots initiatives, grounded in their systemic and normative approach, seems to leave space to partial and adapted innovations. In the case of research, this is mirrored in the focussing on specific aspects, through a specialist approach, and neglecting interdependences and context influences, with a consequent scaling down of the potential for change. In terms of public policies, despite the new narrative concerning the sector development and the integration of new priorities (e.g. food health properties, sustainability of crop systems, re-localisation), it is early to say if this process will lead to a systemic approach as proposed by the niche innovation (integrating ecological, social, technical and political aspects), or it just will facilitate the adoption of some selected fragments of such innovation.

We can read these interactive dynamics between social innovation and mainstream change as an expression of a variegated and evolving anchoring process (Elzen et al., 2012), showing different meanings and potential in relation to the dimensions involved. In an early stage, when involved actors have the chance to share motivations and approaches, this process builds on changes concerning all the anchoring components (network, technological, institutional) in an integrated and consistent way. Indeed, the social interactions that develop around the innovation (the network) constitutes the relational space where all the institutional aspects (cognitive,

normative and economic) as well as those related to technology are collectively and coherently redefined by the different actors involved. Such a process allows the consolidation of the niche innovation and creates the premises for major interaction with the system. However, when the integration of innovation grows in scale, potentially acquiring greater impact, it takes place through partial (technological and institutional) and adapting anchoring. It indeed is characterised by: a detachment from any form of social interaction around innovation (no network dimension); a narrower perspective when addressing technology; a definition of institutional elements (cognitive codes, norms, rules) on the basis of specific knowledge and value systems and referring to specific goals, again through little interaction; finally, a consequent lack of a systemic approach in the redefinition of technology or in addressing institutional issues. Under the influence of more reinforcing, than radically innovative, forms of power (Elzen et al., 2012; Avelino and Wittmaier, 2016), this anchoring assumes the features of a translation (Smith, 2007), which loses most of the transformative characteristics of the grassroots innovation.

5. Conclusions

This work aimed at exploring the factors and mechanisms underlying social innovation and the expression of its transformative potential. A comprehensive approach to social innovation, looking at its inherent social nature, mirrored in its origin, mechanisms and outcomes (Murray et al., 2010) has been the basis of our analysis. The developments of transition theories and their integration with other perspectives in turn provided us complementary analytical tools to explore the transformative potential of this innovation, conceived in a perspective of "transition in the making", taking place in diversified and articulated combinations of areas and levels (Elzen et al., 2011). In this complex interaction, recognizing the variegated nature of the system allowed investigating the "anchoring" processes (Elzen et al., 2012), through which niche innovation may consolidate and spread. The perspective of TSI suggested further insights to explore the transformative potential of social innovation, looking at its social dynamics basis, its capacity to adopt a normative view, its systemic approach (including socio-technical, socio-ecological, socio-political and socio-economic components), and its capacity to develop new visions (Avelino et al., 2014).

Within this composite conceptual frame, we first showed how the radical innovation pursued by some grassroots initiatives founds its potential in meeting socially shared needs, building on social interactions and achieving several social benefits. The co-existence and integration of these features, which look extremely significant for the actors involved, allow achieving deep changes involving multiple domains, in a closely integrated way. This makes the difference with other forms/processes of innovation.

The use of the above-mentioned analytical tools allowed us to deepen the understanding of the potential of social innovation, from the consolidation of novelty in the grassroots innovation to the processes of change triggered in the mainstream system. We read these dynamics as result of an articulated and evolving process of anchoring, in relation to the degree of mobilisation and integration of its constitutive components: network, technological, institutional. The analysis of the anchoring manifestations in the different stages and, thus, in relation to different conditions in terms of actors' involvement around the innovation, provided us useful insights on the factors and mechanisms that intervene. It confirmed the complementarity of the three components and thus the importance of their alignment to generate a durable anchoring, leading to a significant change (in niche or regime) (Elzen et al., 2012). Within such integrated system, the primary role played by the network component, able to condition the development of the other two, emerged. The

interactions and interdependences that develop among actors involved around the innovation development, and the associated shared and reflexive learning, constitute the fundamental ground where innovative attitudes and practices develop. On the other hand, the reality observed during the study[7] showed how the integration of innovation may occur through different conditions, giving rise to partial and adapting anchoring (e.g. technological aspects), which are associated with processes of translation that dilute the transformative potential of social innovation.

When exploring the mechanisms that may influence anchoring, in the interaction between innovation niches and mainstream system, we looked at the features of the areas of overlap. In these areas the horizontal and vertical dimension of innovation – the development of new practices and their diffusion and institutionalization – may more easily meet. They hence constitute important spaces for potentially fruitful interactions and, on that basis, for generating change. The analysis showed, however, how different the outcomes of such spaces may be, in relation to the possibility that the different worlds that meet can really dialog and, eventually, align around common goals. In that regard, the significant role of intermediation emerges, in the multiple forms that it may assume. The analysis highlighted the key role of actors who, by virtue of their hybrid nature (mostly associated with openness of views and relational ability), can create bridges between innovative experiences and the socio/technical/institutional structures of the dominant system, facilitating experimentation, spreading of new paradigms and practices, processes of institutionalisation. The presence of intermediation so influences anchoring greatly, facilitating the development of its different forms and their integration - setting the stage for networking, as a primary condition, and hence promoting technological and institutional changes that enhance innovation. In its absence, not complete understanding, partial integration or a certain redefinition of innovation according to other visions and goals may occur.

All these dynamics are central to social innovation processes, highlighting the need for an even deeper understanding of their drivers and mechanisms. Our study suggests that, while investigating anchoring, specific research could focus on the interactions between more innovative and more reinforcing forms of power within the networks that develop around innovation. Attention should be given to the role that intermediation can play in these network dynamics and, indirectly, in the development of the technological and institutional components of anchoring and their alignment. This could shed light on the ways an innovation such as the one promoted by societal groups and showing the features of social innovation can spread in the regime without losing its transformative potential.

References

AVELINO, F., WITTMAYER, J., HAXELTINE, A., KEMP, R., O'RIORDAN, T., WEAVER, P., LOORBACH, D. and ROTMANS, J. (2014) Game-changers and Transformative Social Innovation. The Case of the Economic Crisis and the New Economy, TRANSIT working paper, TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.

AVELINO, F. and WITTMAYER, J.M. (2016) Shifting power relations in sustainability transitions: A multi-actor perspective, Journal of Environmental Policy and Planning, 18(5), pp. 628-649.

AVELINO, F., WITTMAYER, J.M., PEL, B., WEAVER, P., DUMITRU, A., HAXELTINE, A., KEMP, R., JØRGENSEN, M.S., BAULER, T., RUIJSINK, S. and O'RIORDAN, T. (2017) Transformative social innovation and (dis)empowerment. Technological Forecasting and Social Change. http://dx.doi.org/10.1016/j.techfore.2017.05.002

[7] Our analysis refers to a definite period of the on-going process, which might produce other effects in the long term.

BEPA (Bureau of European Policy Advisors) (2010) Empowering people, driving change: Social Innovation in the European Union, Luxembourg: EUR-OP.

BOCCI, R., REY, F. and CHABLE, V. (2014) Policy recommendations to sustain diversity strategies within food systems, SOLIBAM project, www.solibam.eu.

BRUNORI, G., ROSSI, A. and D'AMICO, S. (2018) A Comprehensive and participatory approach to the valorisation of biodiverse products, in A. Isoni, M. Troisi and M. Pierri (eds) Food Diversity between Rights, Duties and Autonomies. Legal Perspectives for a Scientific Cultural and Social Debate on the Right to Food and Agroecology, LITES, vol.2, Basel: Springer International Publishing AG, p. 3-22.

BUI, S., CARDONA, A., LAMINE, C. and CERF, M. (2016) Sustainability transitions: Insights on processes of niche-regime interaction and regime reconfiguration in agri-food systems, Journal of Rural Studies, 48, pp. 92-103.

ELZEN, B., GEELS, F.W., LEEUWIS, C. and VAN MIERLO, B. (2011) Normative contestation in transitions 'in the making': Animal welfare concerns and system innovation in pig husbandry Research Policy, 40, pp. 263–275.

ELZEN, B., van MIERLO, B. and LEEUWIS, C. (2012) Anchoring of innovations: Assessing Dutch efforts to harvest energy from glasshouses, Environmental Innovation and Societal Transitions, 5, pp. 1–18.

GEELS, F. and SCHOT, J. (2007) Typology of socio-technical transition pathways. Research Policy, 36, pp. 399–417.

GEELS, F.W. (2005) Technological Transitions and System Innovations: A co-evolutionary and Socio-technical Analysis. Cheltenham: Edward Elgar Publishing.

GEELS, F.W. (2010) Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. Research Policy, 39(4), pp. 495–510.

GEELS, F.W. (2011) The multi-level perspective on sustainability transitions: Responses to seven criticisms, Environmental Innovation and Societal Transitions, 1(1), pp. 24-40.

GEELS, F. W. (2014) Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective. Theory, Culture & Society, 31(5), pp. 21–40.

HARGREAVES, T., LONGHURST, N. and SEYFANG, G. (2013) Up, down, round and round: connecting regimes and practices in innovation for sustainability. Environ. Plan. A, 45(2), pp. 402–420.

HAXELTINE, A., AVELINO, F., WITTMAYER, J., KEMP, R., WEAVER, P., BACKHAUS, J. and O'RIORDAN, T. (2013) Transformative social innovation: a sustainability transitions perspective on social innovation. In: Paper Presented at NESTA Social Innovation Research Conference, November 14–15. 2013, London, UK, (Online at: http://www.scribd.com/doc/191799102/Transformative-social-innovations-A-sustainability-transition-perspective-on-social-innovation) (accessed on 31 Jan 2018).

HOWALDT, J. and SCHWARZ, M. (2016) Social Innovation and its Relationship to Social Change. Verifying existing Social Theories in reference to Social Innovation and its Relationship to Social Change., D1.3 of DRIVE (Social Innovation: Driving Force of Social Change) project, Grand Agreement number 612870.

HOWELLS, J. (2006) Intermediation and The Role of Intermediaries in Innovation. Research Policy, 35(5), pp. 715-728.

KILELU, C.W., KLERKX, L., LEEUWIS, C. and HALL, A. (2011) Beyond Knowledge Brokering: An Exploratory Study on Innovation Intermediaries in an Evolving Smallholder Agricultural System in Kenya, Knowledge Management for Development Journal, 7(1), pp. 84–108.

KLERKX, L., VAN MIERLO, B. and LEEUWUIS, C. (2012) Evolution of systems approaches to agricultural innovation: concepts, analysis and interventions., In Darnhofer, I., Gibbon, D., Dedieu, B. (eds.) Farming Systems Research into the 21st Century: The New Dynamic, Springer, pp. 457-483.

LEEUWIS, C. and AARTS, N., 2011. Rethinking communication in innovation processes: creating space for change in complex systems. The Journal of Agricultural Education and Extension, 17, pp. 21-36.

MOULAERT F., MACCALLUM, D. and HILLIER, J. (2013) Social innovation: intuition, precept, concept, theory and practice, In Moulaert, F., MacCallum, D., Mehmood, A., Hamdouch, A. (eds): The International Handbook on Social Innovation. Collective Action, Social Learning and Transdisciplinary Research., Cheltenham, UK: Edward Elgar Publishing Limited.

MURRAY, R., CAULIER, G. and MULGAN, G. (2010) The Open Book of Social Innovation. The Young Foundation & NESTA.

PIMBERT, M. (2006) Transforming Knowledge and Ways of Knowing for Food Sovereignty, International Institute for Environment and Development (IIED), London.

RIP, A. and KEMP, R. (1998) Technological change. In: Rayner, S., Malone, E.L. (eds), Human Choice and Climate Change. Vol. 2. Columbus, Ohio: Battelle Press, pp. 327-399.

SCHATZKI, T.R. (1996) Social Practices: A Wittgensteinian Approach to Human Activity and the Social. Cambridge: Cambridge University Press.

SEYFANG, G., HIELSCHER, S., HARGREAVES, T., MARTISKAINEN, M. and SMITH, A. (2014) A grassroots sustainable energy niche? Reflections on community energy in the UK, Environmental Innovation and Societal Transitions, 13, pp. 21–44.

SEYFANG, G. and HAXELTINE, A. (2012) Growing grassroots innovations: exploring the role of community-based initiatives in governing sustainable energy transitions, Environment and Planning C: Government and Policy, 30, pp. 381-400.

SEYFANG, G. and SMITH, A. (2007) Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environ. Politics, 16, pp. 584–603.

SHOVE, E., PANTZAR, M. and WATSON, M. (2012) The dynamics of social practice. In: Everyday Life and How It Changes. Sage Publications, London.

SMITH, A. and RAVEN, R. (2012) What is protective space? Reconsidering niches in transitions to sustainability, Research Policy, 41, pp. 1025–1036.

SMITH, A., STIRLING, A. and BERKHOUT, F. (2005) The governance of sustainable socio-technical transitions. Research Policy, 34(10), pp. 1491-1510.

SMITH, A. (2007) Translating sustainabilities between green niches and socio-technical. Technology Analysis & Strategic Management, 19(4), pp. 427–450.

SOFI, F., GHISELLI. L., CESARI, F., GORI, A.M., MANNINI, L., CASINI, A., VAZZANA, C., VECCHIO, V., GENSINI, G.F., ABBATE, R. and BENEDETTELLI, S. (2010) Effects of short-term consumption of bread obtained by an old Italian grain variety on lipid, inflammatory, and haemorheological variables: an intervention study, J. Med. Food., 13, pp. 1-6.

VAN DE POEL, L. (2000) On the role of outsiders in technical development. Technology Analysis & Strategic Management, 12(3), pp. 383-397.

WOLFE, M.S., BARESEL, J.P., DESCLAUX, D., GOLDRINGER, I., HOAD, S., KOVACS, G., LÖSCHENBERGER, F., MIEDANER, T., ØSTERGÅRD, H. and LAMMERTS VAN BUEREN, E.T. (2008) Developments in breeding cereals for organic agriculture, Euphytica, 163(3), pp. 323-346.