Emerging Places of Social Innovation (POSI). The co-production of space between multilevel stakeholders: the case of productive urban green infrastructure

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Abstract: Social innovation is recurrently positioned as an important collaborative element in helping cities to transition and address human needs and societal challenges for the health, wellbeing and welfare of citizens. To address a call for more sector-specific research on the spatiality of social innovation and further understanding of the process dimension of social innovation, this article presents a conceptual framework of the process of socio-spatial innovation. By combining social innovation insight from process theories and urban spaces discourse the article indicates that socio-spatial innovation in the co-production of space can be grouped into four major processes: 1) Identification of human need or societal challenges to sustainable development; 2) Development of social relations in systems or structures; 3) Provision of opportunity for social empowerment; 4) Reflection of socio-spatial development practice. Applying this framework, the article examines how the case of productive green infrastructure emerges in the urban landscape as a Place of Social Innovation (POSI). The framework draws attention to the significance of partnership working and intermediation activities to improve access to urban spaces to contribute to socio-spatial justice and healthy orientated urban environments.

Keywords: healthy city, social innovation, co-production of space, productive green infrastructure

Introduction

Contemporary cities need to find more effective and efficient solutions to societal challenges of climate change, inequality and healthcare (BEPA, 2011, European Commission, 2013). The field of innovation studies is well-placed to contribute to debates on urban transitions to tackle such challenges, but only when it considers the role of human agency in transforming the built environment towards sustainable development (Geels and Schot, 2016). Consequently, there has been a renewed attention on the role of social innovation to sustainable development, especially around cooperation and participatory approaches to spatial development to develop new capacities (Ardill and Lemes de Oliveira, 2018).

Participatory forms of urban growing have been emphasised in the search for socially innovative solutions to social, economic, and environmental challenges of changing cities whilst civil society and institution instigated growing projects have multiplied in recent times (Cunk et al., 2017). This socio-spatial process is reshaping urban landscapes, experimenting with alternatives to capitalist formations of urban environment (Harvey, 2012) and co-producing public spaces as productive green infrastructure (Rosol, 2012). As a consequence, Places of Social Innovation (POSI) are emerging in the urban landscape in the co-production of space between multilevel stakeholders. The term is defined here as the place-based process of urban change in the collaborative planning, design and delivery of public infrastructure; physical and social, between bottom-up citizens, intermediate non-governmental organisations, and top-down government institutions.

The process of social innovation is argued to perform a significant role in helping to integrate participatory mechanisms into urban decision-making processes, increasing the social inclusion of disadvantaged groups, and enhancing the resilience of urban areas and communities (Moulaert et al., 2005, 2010, Mehmood, 2016). Nevertheless, there have been few studies on the process dimension of social innovation that investigate common patterns or aggregated learning (Mulgan, 2006), especially how it is 'designed, diffused and supported' (Caulier-Grice, Davies, Patrick, and Norman, 2012, p.33) with further research on social innovation spatiality required to comprehend dynamics in social and urban change (Moulaert and Mehmood, 2011). Therefore, this article seeks to contribute to the understanding of social innovation process in the co-production of urban spaces. The focus for the article is to consider the topic of social innovation, and how participatory and collaborative processes may support the development of planning principles linked to healthier, more equitable built environments.

The article now proceeds to review current knowledge on social innovation process. Then, it develops a process framework for understanding socio-spatial innovation in the co-production of space, considering the various cooperative inputs which are necessary or possible from innovation participants. Afterwards, the article presents an overview of an emerging POSI in order to illustrate the main characteristics of the proposed framework in the case of productive urban green infrastructure. Finally, the article ends with a summary and concluding remarks.

The process of social innovation

In this section a framework to investigate the social innovation processes in the co-production of urban space is proposed after reviewing three social innovation models found in the literature. Mulgan (2006) proposed a framework for the process of social innovation, later advanced with other collaborators from the Young Foundation and NESTA UK (e.g., Mulgan *et al.*, 2007, Bacon *et al.*, 2008, Murray *et al.*, 2010, SIX, 2010, Caulier-Grice *et al.*, 2012), identifying six stages: 1) Prompts, inspirations and diagnoses (which involves identifying and defining a need to be met); 2) Proposals and ideas (the stage of idea generation and designing ways to deal with the identified need); 3) Prototyping and pilots (where ideas get tested in practice through pilot projects with feedback from users and experts); 4) Sustaining (when the idea becomes everyday practice); 5) Scaling and diffusion (which involves developing a range of strategies for growing and spreading an innovation to a larger group or to other communities); and 6) Systemic change (so that it works on a broader scale by introducing entire systems). Sustainable

systemic change in redesigning society through changes in relations between institutions and stakeholders is positioned by policy advisors as being the principal focus of social innovation (Murray *et al.*, 2010, SIX, 2010, BEPA, 2011, Baturina and Bežovan, 2015). Caulier-Grice *et al.* (2012) highlight that the innovation process proposed is iterative rather than linear and the model be considered more like multiple spirals than straight lines. Therefore, it should not be assumed that initiatives will transcend all six stages as many will jump between or skip entire stages altogether. Some cases of social innovation 'remain small in scale and locally based, rather than attempting growth and scale, and very few social innovations effect or reach the stage of systemic change' (Caulier-Grice *et al.*, 2012, p.34). Social innovation is understood broadly as the production of societal value in meeting social needs and creating new social relationships or collaborations to enhance society's capacity to act (Mulgan, 2006, Mulgan *et al.*, 2007, Murray *et al.*, 2010)

Another framework is the Alternative Model of Local Innovation advocated by Moulaert *et al.* (2005, 2010) to counter social exclusion dynamics experienced at various socio-spatial scales. The model conceptualises social innovation dynamics occurring in interaction with each other over time, beginning with the deprivation of human needs across four areas: economic or material basic needs, such as food, clothing, shelter and employment; social needs of health and education; cultural needs of self-expression, identity and recognition; and political needs of equal opportunity and active citizenship (Moulaert *et al.*, 2005, 2010). The deprivation of needs causes a reaction and the mobilisation of resources; recognised as human, social and institutional, organisational, and financial with mediation between stakeholders (e.g., civil society and state) in order to develop social initiatives to satisfy human needs that are currently not being satisfied. This agency fosters processes of 'social changes in existing social and power relations' towards inclusive and democratic urban governance systems to 'increase the level of participation of all but especially deprived groups in society' (Moulaert *et al.*, 2005, p.1976). Consequently, previously excluded social groups are empowered through 'increasing the socio-political capability and access to resources' needed to improve rights to satisfaction of human needs and participation (Moulaert *et al.*, 2005, 2010). Thus, social innovation is understood in a radical perspective as social and urban change that achieves conditions of empowerment, favouring bottom-linked governance initiatives and inclusive infrastructure development, and 'therefore explicitly refers to an ethical position of social justice' (Moulaert *et al.*, 2005, p.1978).

The third model reviewed in this article is the one drawn by Ayob, Teasdale, and Fagan (2016). Examining how the concept has developed over time they argue that the social innovation process has 'five plausible routes through some or all of this process, all of which can be conceived of as social innovation. First, new forms of social relations lead to innovation; second, innovation leads to a restructuring of social and or power relations; third, innovation leads to utilitarian social value; fourth, new forms of social relations lead to innovation which results in the restructuring of power relations (and thus societal impact); and fifth, new forms of social relations lead to innovation, which creates utilitarian social value (and thus societal impact)' (Ayob *et al.*, 2016, p.648). In doing so, the authors distinguish between two social innovation traditions and outcomes in social change. The first, seen as utilitarian, emphasises changes in aggregate individual utility. The second, considered more radical, 'sees social (and political) change occurring as a consequence of innovations in social relations' (Ayob *et al.*, 2016, p.648). The authors proceed to draw similarities between co-production and the five social innovation pathways outlined due to common themes of: 1) collaboration (new forms of social relations); 2) the generation of new ideas (innovation); 3-4) empowerment (utilitarian social value and/ or new forms of power relations); and 5) societal change (societal impact). To conclude, the radical

approach, termed 'strong social innovation', is suggested in this model as strongly linked to co-production due to shared emphasis on shifting power influences as a key component of this approach, notably through the engagement and empowerment of previously disadvantaged individuals and groups (Ayob *et al.*, 2016).

The models outlined attempt to address different questions and develop their own viewpoint on social innovation process. Mulgan *et al.* is interested by how innovations in the social field progress, identifying six stages 'that take ideas from inception to impact' (Murray *et al.*, 2010, p.12). Whereas, Moulaert *et al.* (2005, 2010) examines what structural changes in social relations are happening, making the connection between urban governance, empowerment and socio-spatial justice. Finally, Ayob *et al.* (2016) explores how social innovation has evolved, linking pathways to co-production and shared actions in developing collaborative forms of social relations, leading to changes and societal impact. This article attempts to integrate these three models into a socio-spatial innovation framework that encompasses all three of these components: the progress of the innovation, changes in social relations, and collaborative agency. The article does this by defining a model of the social innovation process in the co-production of space involving four cyclical stages. Table 1 indicates how the stages of this model relate to the elements in the Mulgan *et al.*, Moulaert *et al.* (2005, 2010), and Ayob *et al.* (2016) models.

Table 1: Relationship between different stages of the social innovation process in models

Murray *et al.* (2010) *How innovation progresses?*	Moulaert *et al.* (2005, 2010) *What innovation in social relations is taking place?*	Ayob *et al.* (2016) *How do collaborative actions cause change?*	Ardill and Lemes de Oliveira, *What is the stage of the particular process?*
Prompts, inspirations and diagnoses Proposals and ideas	Deprivation of human needs	New forms of social relations Innovation	*Identification of human need or societal challenges to sustainable development*
	Mobilisation of resources Changes in social relations (and political relations)		*Development of social relations in systems or structures*
Prototyping and pilots	Empowerment	Utilitarian social value	*Provision of opportunity for social empowerment*
Sustaining		New forms of power relations	*Reflection of socio-spatial development practice*
Scaling and diffusion Systemic change	Satisfaction of human needs and participation	Societal impact	

Socio-spatial innovation framework

The traditional linear process of technological innovation postulated innovation always starts with research (Godin, 2006, Balconi *et al.*, 2010), then followed by development, and ends with production and diffusion (Balconi *et al.*, 2010). This model has been much criticised (Godin, 2006, Balconi *et al.*,

2010). It fails to recognise that 'knowledge does not flow smoothly among different stages of the innovative process and among different organizations and institutions. Nor does it flow freely among geographical areas' (Balconi *et al.*, 2010, p.7). Following Murray *et al.* (2010) this article therefore proposes a framework for social innovation process based on iterative innovation processes, allowing for overlap, interaction and nonlinearity, as 'change needs to be understood through the iterative action of the processes and dynamics' (Van de Ven and Poole, 2004, p.317). While stages are not necessarily linear or sequential, this article can identify four key stages based on theoretical knowledge to provide an analytical framework with which to think through all the activities taking place (Ardill and Lemes de Oliveira, 2018), the various agents involved, and patterns in the context of such innovation journeys (Rip, 2012). The proposed framework is illustrated in Figure 1 as a circular process with the implication that socio-spatial change is a constant activity. Key stages are described in following paragraphs and process dynamics and factors categorised at the end of this section in Table 2.

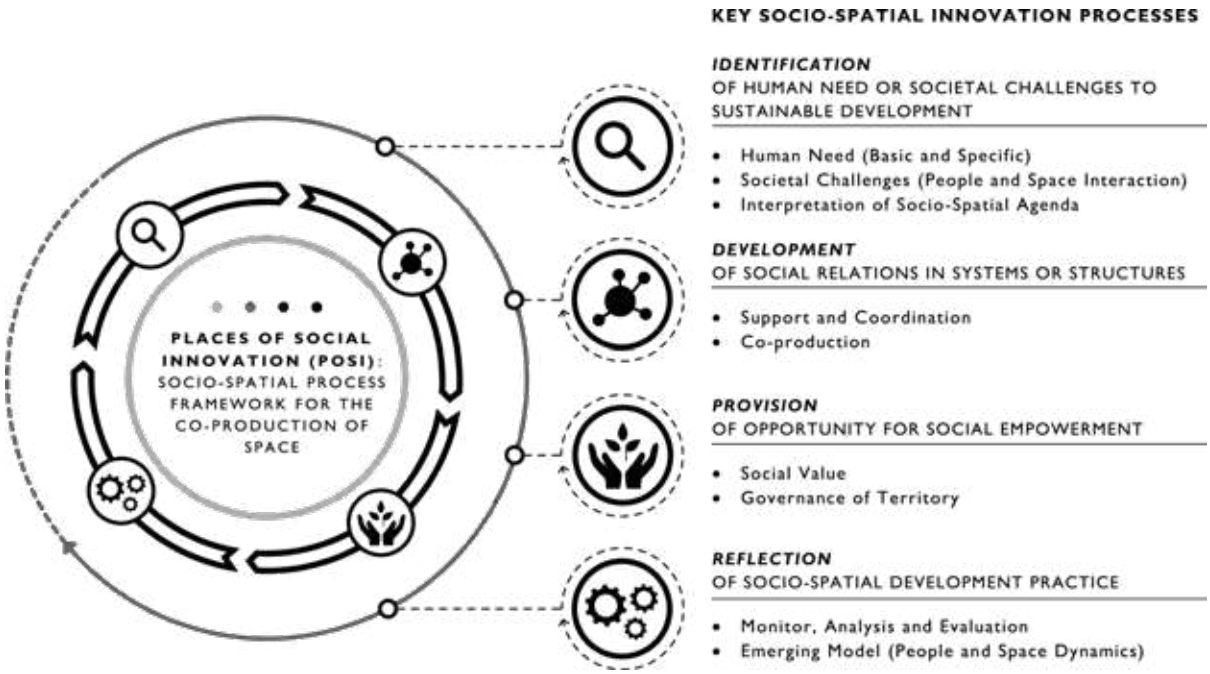

Figure 1: Proposed socio-spatial innovation process framework

The first stage: *identification of human need or societal challenges to sustainable development* involves prompts that highlight the need for innovation to address human need or societal challenges (Murray *et al.*, 2010, SIX, 2010). Human need may include the basic or specific needs of individuals and groups. Maslow (1954) characterises basic needs as physiological needs (e.g., food, clothing, and shelter), and safety needs of health and wellbeing, employment, and security. Whereas, societal challenges in a sustainable development perspective (BEPA, 2011, Baturina and Bežovan, 2015) are directed towards society as a whole and recognised as major concerns shared by all citizens, especially uneven development, health, and climate action (Grimm *et al.*, 2013). They are highlighted by people and space interactions (Smith, 1984). Long-standing and emerging urban problems are brought into focus by an experience or event or research and interpretation of socio-spatial agenda takes place (Murray *et al.*,

2010). This process involves diagnosing unmet need or challenges by understanding contextual dynamics affecting the situation in order to frame opportunities and constraints (SIX, 2010). From the identification of need an idea for a solution is generated to activate an initiative. Data gathered is synthesised as findings and made into a persuasive argument to immediate stakeholders that the solution proposed can be effective, and a defined brief with strategic objectives and directions is set out (Torresa, 2017).

The second stage is the *development of social relations in systems or structures*. A multitude of stakeholders will be typically engaged on this stage (e.g., the stakeholder that has identified the need or challenge and other stakeholders that are interested in or might directly benefit from addressing the socio-spatial agenda). In this regard, generating cross-sectorial support and coordination will be valuable here to mobilise resources to work on the social innovation solution and the co-production approach presents a way of collaborative working (Boyle and Harris, 2009, Voorberg *et al.*, 2014, Ayob *et al.*, 2016). The setup of a coalition and supportive structures further develop the innovative solution (Murray *et al.*, 2010), and creation of a protected space for experiment are significant features of this process (Rip, 2012). This stage is aided by innovation intermediaries, such as agents and organisations (TEPSIE, 2014). Intermediaries create opportunities and spaces (e.g., social, economic, and physical) through facilitation, configuring, and brokering activities to create relationships to support innovation (Stewart and Hyysalo, 2008). Furthermore, the contribution of civil society through social entrepreneurship and social enterprise (Mulgan *et al.*, 2007, Phills *et al.*, 2008, Howaldt *et al.*, 2018) aligned with state steering to coordinate processes of social innovation creates the condition for hybrid partnerships to emerge (Baker and Mehmood, 2015, Nicholls *et al.*, 2015). New coalitions are comprised of public, private and social participants in the organisation of development (Noworól, 2013). These coalitions contribute to the rearrangement and restructuring of existing social relationships (Mumford, 2002, Moulaert *et al.*, 2005). As such, the use of embedded resources and assets is a way of engaging a range of stakeholders in the co-design and development of solutions (SIX, 2010, Caulier-Grice *et al.*, 2012, Manzini, 2014), and design-based approaches fusing design-thinking can progress and shape the idea (Brown and Wyatt, 2010, Manzini, 2015). To help ensure needs are met, collaboration amongst the stakeholders that contribute to the development of the social innovation solution through co-production activities, such as their planning, design and delivery with the active participation of citizens and beneficiaries is significant (Voorberg *et al.*, 2014).

The third stage: *provision of opportunity for social empowerment* is where a socio-spatial initiative is implemented and is about creating openings to enhance society's capacity to act in a changing environment (Murray *et al.*, 2010, BEPA, 2011, Grimm *et al.*, 2013). This involves generating social value, both to disadvantaged groups and society as a whole (Phills *et al.*, 2008, Ayob *et al.*, 2016), and through increasing participation in multilevel urban governance structures to increase access to resources (Gerometta *et al.*, 2005, Moulaert *et al.*, 2005, Evers *et al.*, 2014, Ayob *et al.*, 2016, Brandsen *et al.*, 2016). In this stage, opportunities for community development are enabled through inclusive practices and social engagement to encourage active citizenship to help meet needs (Davies and Simon, 2013, Mehmood and Parra, 2013, García *et al.*, 2015). In this regard, social learning activities, where people can learn from each other collectively rather than through the isolated activity of an individual (Reed *et al.*, 2010), increases community capacity through development of new skills to construct more resilient communities (Pol and Ville, 2009, Manzini, 2015). Moreover, building resilience will contribute to sustainable place making and the promotion of sustainable development (Mehmood and

Parra, 2013, Baker and Mehmood, 2015). In this process, improving access to urban resources helps to build capacities (TEPSIE, 2014), and changes in group-decision making and power relations creates new socio-political capabilities, enhancing peoples control over their own lives to support socio-spatial inclusion and justice (Moulaert *et al.*, 2005, 2010, MacCallum *et al.*, 2009).

The fourth stage connecting the process cycle is *reflection of socio-spatial development practice*. It involves consideration of measures of success of the initiative (SIX, 2010, Bund *et al.*, 2015), and the process of selecting, developing and prescribing a model of standardisation. The activity of demonstrating, refining and testing ideas to obtain feedback from users and specialists in order to evolve solutions and maximise impact is important to learning (SIX, 2010, Torresa, 2017). Through iteration, conflicts can be resolved and coalitions gather strength (Murray *et al.*, 2010), supporting ongoing infrastructuring and embedding of stakeholder relations, networks and resources (Hillgren *et al.*, 2011, Björgvinsson *et al.*, 2012). Here the adaption of the idea and the sustaining of the initiative through use of evidence and identifying further resources is necessary to carry the innovation forward (Murray *et al.*, 2010, SIX, 2010). In this stage, the spreading and sharing of the solution through diffusion and emulation of an idea or practice occurs (Murray *et al.*, 2010, SIX, 2010, Caulier-Grice *et al.*, 2012). As such, the provision of support and know-how from one organisation or place to another (Murray *et al.*, 2010) is significant to open knowledge advancement (Chesbrough *et al.*, 2014, TEPSIE, 2014). This is necessary to move innovation from a community level to a widespread solution (Torresa, 2017). It is important here to identify how an initiative can be imitated from a highly localised context to other contexts and will involve other agents adopting and implementing that solution in new situations and places (Windrum *et al.*, 2016).

Table 2: Key socio-spatial innovation processes, dynamics and factors

Key process	Process dynamics and factors
Identification of human need or societal challenges to sustainable development	Human Need • Basic Need (individual and collective): Physiological; Safety and Security in Environment (for Health and Wellbeing) • Specific Need of groups: Deprivation of Community and Locality; Disadvantaged Group and Vulnerability Societal Challenges (People and Space Interaction) • Built Environment (Physical and Social Dimensions): Access to Public Spaces and Equitable Environment; Urbanisation • Climate Action: Human Activity and 'the Environment' (Land Use and Resources); Ecological Resistance Interpretation of Socio-Spatial Agenda • Frame Opportunity or Constraint: Diagnosis of (Unmet) Need or Challenge; Context Dynamics (Locality, Politics, Economy) • Strategy and Brief Preparation (of Inititiative): Idea for a Solution; Inception and Activation
Development of social relations in systems or structures	Support and Coordination • Social Economy: Civil Society Contribution (Citizens, Organisations and Institutions); Networking (Social and Geographical); Social Entreprenurship and Enterprise • Intermediation Activity (People and Locality): Agent (Facilitation, Configuring and Brokerage); Spaces (Creation of Physical and Social) • Hybrid Arrangements and Cross-Sector Partnerships: Use of Embedded Resources and Assets; Local Authority and State Steering Co-production • Co-design and Ideation: Participation in Planning; Design-thinking (Empathy and Understanding) • Public Services and Infrastructure Delivery (Physical and Social): Citizen and End User Participation; Collaboration and Cooperation Between Groups
Provision of opportunity for social empowerment	Social Value • Community Development and Capacity (to act): Engagement and (Active) Citizenship; Education, Skill and Social Learning; Socio-economic • Change and Transformation (Reciprocal Influence of People and Space): Placemaking (Culture and History Identity); Spatial Quality and Character (of Space); Socio-Spatial Cohesion, Integration and Inclusion Governance of Territory • Restructure Existing Power Relations: Civic Participation and Multilevel Influence; Group Decision-making; Infrastructure and Common(s) Management • Spatial Justice (Social Justice and Space): Access to Resources; Emergence of Public Space
Reflection of socio-spatial development practice	Monitor, Analysis and Evaluation • Consideration of Idea Testing and Visibility: Prototype Generation(Experimentation); Demonstration of Initiative (Communication) • Action Plan for Development: Feedback Systems; Stakeholder Relations, Networks and Resources (Infrastructuring Systems) Emerging Model (People and Space Dynamics) • Adapting and Sustaining: Iteration and Adjustment (Refining Ideas); Embedded Socio-Spatial Practice • Emulation and Diffusion: Open Knowledge Advancement; Adoption and Spreading of Idea

Socio-spatial innovation: towards emerging Places of Social Innovation (POSI)

This section presents an overview of a case of emerging POSI in order to illustrate the main characteristics of the proposed framework. The section starts by introducing the organisation involved in the development of socio-spatial innovation presented. Then, key processes are distinguished through employing the analytical framework outlined in this article. Finally, a graphic visualisation of the analytical framework as applied to the case is presented at the end of the section in Figure 2.

Case background

The Brighton & Hove Food Partnership (henceforth the Food Partnership) formed in 2003 due to the identified need for a partnership approach to integrate sustainable urban policy, agency and change. It emerged as an umbrella non-governmental organisation within the local system connecting cross-sectorial stakeholders to form a participatory and strategic approach to developing a holistic food system. The organisation is embedded in the city with over 4000 members and links food policy with initiatives within public health, education, community development, land use, urban planning and sustainable development.

'Harvest Brighton & Hove' was an innovative citywide programme instigated by the Food Partnership from 2009 to 2013 to develop local food projects. Altogether, Harvest supported the development of 54 new growing projects across the city, transforming 1.19 hectares of urban land into productive green infrastructure. As a Harvest exemplar, the Racehill Community Orchard (henceforth Racehill Orchard) was the most significant community growing space to be developed with permission to grow to 1.30 hectares and is the largest orchard in the city. Contextually, the Whitehawk estate bordering Racehill Orchard in 2015 was the most deprived area in the city and the 331st most deprived area in the UK out of 32,844, placing it just outside the national bottom one percent (NHS Brighton & Hove, 2015).

Identification of human need or societal challenges to sustainable development

At the national level, the Cabinet Office Strategy Unit (2008) review into UK food policy emphasised societal challenges to meeting needs concerning economics and equity, health, safety, and environment. Previously, the Department of Health 'Choosing Health' (2004) report had identified local community food initiatives as an instrument to support behavioural changes and reduce health inequalities. The Food Partnership likewise recognised the social utility of community food initiatives to meet specific local needs whilst helping to address wider societal challenges. Within Brighton & Hove, there was a contextual need to reduce inequalities to help realise a more just city (Fainstein, 2010), especially in relation to health. The Annual Report of the city's Director of Public Health (2006) highlighted challenges of growing health inequalities and deprived wards having a life expectancy of up to five years below more affluent wards in the city (Brighton and Hove City Primary Care Trust, 2006). Furthermore, geospatial data exposed a social equity divide between rich and poor within Brighton & Hove (OCSI, 2007); bringing to light a social injustice and prompting social innovation (Murray et al., 2010).

The Food Partnership interpreted the opportunity presented by the Local Food Fund (2007 to 2013) to develop an integrated citywide approach to make locally grown food more accessible and build material, personal, and cultural capacity to develop the overall capacity and resilience of communities involved (Local Food, 2012). In preparing their bid document, the Food Partnership organised meetings with

members and partners, including the City Council and Primary Care Trust, to jointly develop the aims, outcomes and delivery of initiatives. The specific need for community growing spaces was demonstrated by a strong interest in local food, and its impact on the environment and health. The collaborative project development, between the Food Partnership and Harvest partners within the local system representing the identified beneficiaries demonstrated a strategic approach to addressing needs. Here, consultations with those affected by development were significant to identifying a cohesive strategy to satisfy needs (Fainstein, 2010). Although Harvest aimed to benefit citywide residents the programme targeted areas of socio-economic disadvantage that would especially gain from interventions to address poor access to fresh food, high incidence of poor health or lack of access to urban resources (Harvey, 2009). As such, the Racehill Orchard Harvest exemplar was developed within the deprived Whitehawk neighbourhood of East Brighton because the high-density estate was identified as a location experiencing social need and would enable more residents to participate in urban growing (Murray *et al.*, 2010).

Development of social relations in systems or structures

Collaboration with other Brighton & Hove stakeholders through partnership working was central to the case, helping to strengthen and develop new or existing relationships within the local system, and aided by multilevel intermediation to network groups and people across issues and communities (Stewart and Hyysalo, 2008). For instance, a cross-sectorial advisory committee for the Racehill Orchard aided project partners in organising the co-production of space, ensuring interested parties were democratically represented (Fainstein, 2010). The participatory framework enabled a co-design process to promote a sense of community ownership and collectively develop a spatial and programmatic brief (Marcuse, 2009). To undertake linking, the Food Partnership operated across levels to broker top-down support from the City Council to access resources and develop strategies to ensure long-term support for Harvest's aims. They configured and multiplied their agency with other non-profit organisations through sharing resources and expertise in developing green infrastructure to realise more effective production than working independently, whilst engaging bottom-up residents with neighbourhood growing projects to embed social practices and behavioural changes.

As a Harvest partner, the City Council provided organisational support by facilitating land access and recognising the social value of citywide development (Baker and Mehmood, 2015), especially to deprived areas whilst adhering to strategic urban policy as part of its commitment to sustainable development. For example: The Sustainable Community Strategy (2006) aimed to increase land available for food growing; the City Food Strategy (2006) sought to increase growing opportunities (Brighton & Hove Food Partnership, 2006); and the updated Food Strategy Spade to Spoon: Digging Deeper (2012) targeted 'more food consumed in the city is grown, produced and processed locally using methods that protect biodiversity and respect environmental limits' (Brighton & Hove Food Partnership, 2012b, p.14). A 15-year land agreement for Racehill Orchard was also significant to the case. The implications were reflected in the agreement serving as informal governance model between the City Council and community groups for other Harvest growing spaces on public land later developed. As such, learning generated by Harvest enabled the Food Partnership to create a template for future community agreements with the City Council that outline roles and responsibilities for each partner, maintenance arrangements, and conditions for governing areas of public green spaces.

Provision of opportunity for social empowerment

Harvest increased the amount of food grown in the city by developing more community growing spaces and increasing the number of people involved, supporting community development to meet urban needs and address inequalities (Moulaert et al., 2005; Murray et al., 2010; TEPSIE, 2014). Material capacity was increased by developing physical infrastructure, improving public access to green space and complemented by educational opportunities to build personal capacity. Here, Harvest facilitated community development through training workshops, skills-sharing and open days delivered citywide to residents, often in community growing spaces, supporting engagement. Consequently, confidence was built in food growing and developing abilities in running growing projects to help embed productive green infrastructure.

The Racehill Orchard demonstrates how opportunities were provided to residents within deprived areas of East Brighton to contribute to personal development and social empowerment. Brighton Permaculture Trust, an organisation which promote sustainable development through design, trains residents in traditional agricultural techniques, including scything, tree and hedgerow planting, pruning and caring for fruit trees. The social value of these opportunities is demonstrated through enhancing capabilities (Fainstein, 2010). Volunteers can be trained in leadership skills through a session leaders' course, helping to devolve organisation and diffuse knowledge. This approach to social behavioural change supports community empowerment through enhancing the neighbourhood capacity to act (Bacon *et al.*, 2008). It improves resident access to skills and resources whilst helping growing projects become self-sustaining (Moulaert *et al.*, 2005, TEPSIE, 2014). The importance of increasing urban participation, especially amongst groups excluded from the built environment in some form was central to meeting Harvest aims (Madanipour, 1998). At Racehill Orchard, free activities and events target people living on the deprived estate. Regular 'Healthy Activity Days' involve health walks, foraging events, pick and cook sessions, and other activities promoting healthy lifestyles and behaviour. The production of green infrastructure in bringing new land into food production, providing community events to build capacity, and improving the access to resources of specific target groups is reinforced by enabling public access to urban space (Lefebvre, 1968, Mitchell, 2003, Harvey, 2012, Low and Iveson, 2016). Cultural capacity was developed through engagement and territorial appropriation to give residents a sense of connection with their urban landscape and is significant to the social production of space, where space operates as both a product and a producer of changes in the urban environment (Lefebvre, 1991, Soja, 2010).

Reflection of socio-spatial development practice

The citywide development was an archetype for practitioner based social innovation and the integrated approach across multiple levels helped diffused socio-spatial innovation, generating a territorial infrastructure in relations, networks and resources. The measure of social innovation success (Murray *et al.*, 2010) in terms of developing capacity (Fainstein, 2010) in Brighton & Hove was evidenced by community growing spaces tripling from 25 to 79, helping to diffuse ideas and behaviours and amplify the visibility of social practices. By undertaking Harvest, the Food Partnership helped to improve distributional justice by accessing new land for urban growing (Fainstein, 2010, Soja, 2010, Low and Iveson, 2016), with many projects located in housing estates, public parks, churchyards and railway stations to increase the visibility of community growing practices.

A central objective of the Harvest experiment for the Local Food programme was to share experience and knowledge of the project's approach to increasing food production to disseminate learning that could be replicated in other cities, both within the UK and internationally. This was undertaken in several ways: establishing a Reference Group to enable parties to learn from the experiences of nationwide projects; visits from other Local Food Fund Beacon Projects to demonstrate Harvest activities; attending international conferences on planning and food systems to exchange thinking; the Local Food 'Share and Learn' networking events and the national evaluation event 'More than just the veg' in 2012; and distributing reports on Harvest to influence policymakers by demonstrating outputs.

Locally, dissemination was supported by the innovativeness (Bund *et al.*, 2015) of the Food Partnership's intermediation between bottom-up to top-down levels of urban stakeholders (Stewart and Hyysalo, 2008). Grassroots working helped to mobilise an urban social movement of community growers and develop a network of growing spaces (Castells, 1983). Engaging local decision-makers helped to influence planning and development policy whilst attracting attention of national policy makers (Baker and Mehmood, 2015). To embed good practice into local planning, Harvest insight supported lobbying to include references within the Brighton & Hove City Plan Submission Part 1 for the City Council 'to support and promote local food growing', expressly in city wide polices: SA6 Sustainable Neighbourhoods, CP8 Sustainable Buildings, and CP16 Open Space (Brighton & Hove City Council, 2013), later developed in the City Sustainability Action Plan (2015) setting key actions to develop productive green infrastructure and support sustainable development.

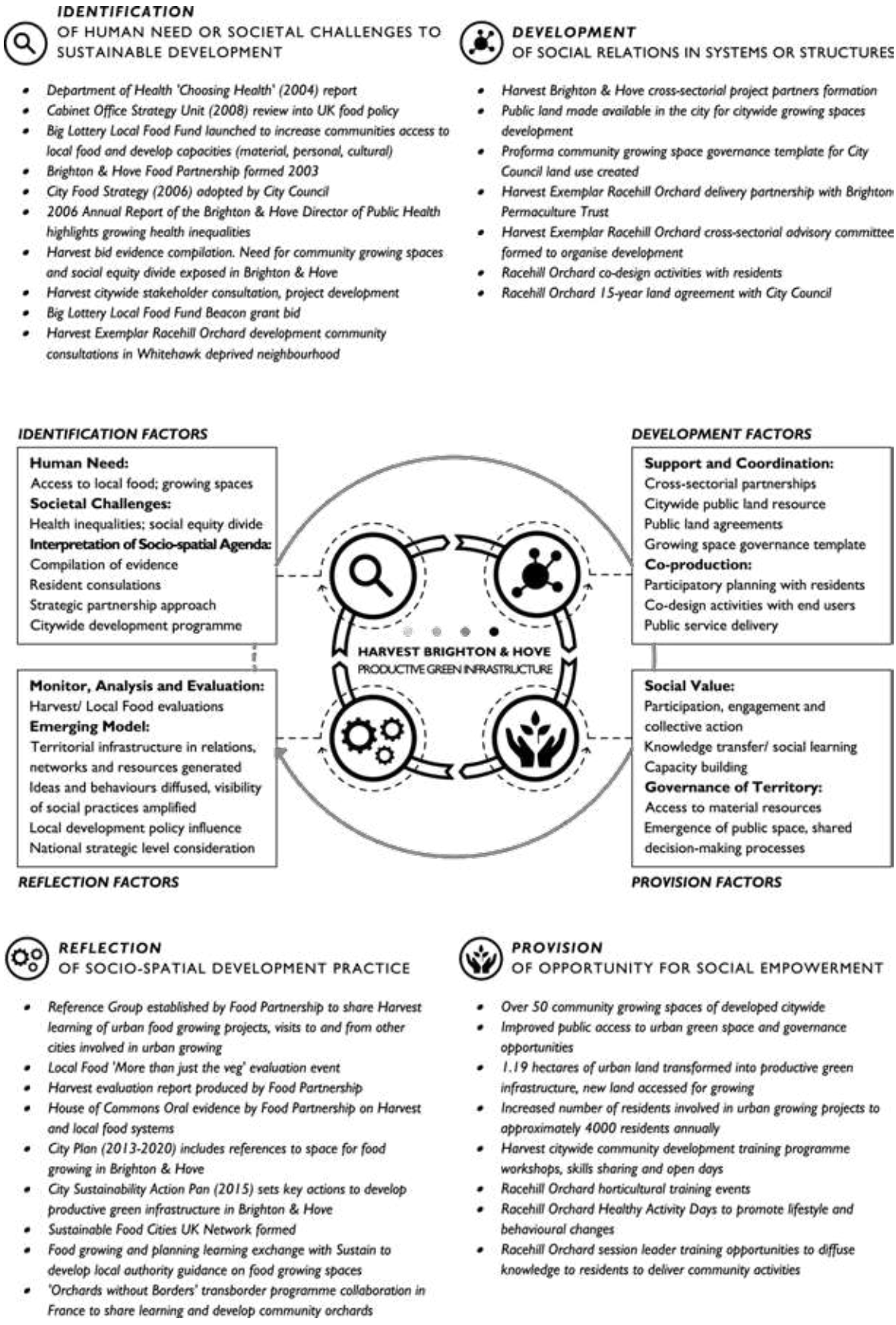

Figure 2: Application of socio-spatial innovation framework. Populated with Harvest Brighton & Hove urban growing programme. Key socio-spatial process factors highlighted in boxes and case dynamics bulleted.

Conclusion

This article was concerned with the role of social innovation as a way of contributing to a healthy orientated built environment and has taken the perspective of how socio-spatial innovation can contribute to the process of creating capacity to meet human needs and respond to societal challenges. Social innovation has gained attention in the promotion of active citizenship in sustainable development policy and practice, especially around collaborative service delivery and novel approaches to welfare (BEPA, 2011). The socially innovative development of productive green infrastructure is of interest as a participatory concept that can meet needs, create social relationships and form new collaborations. However, as a process this innovative approach does not end with the development of a growing space. Like cities, it needs to continuously evolve in order to meet the challenge of affecting changes in social structures and systems regarding the participation in decision-making processes, social inclusion, and sustainable urban development (Cunk *et al.*, 2017).

To understand social innovation dynamics in the co-production of urban space a conceptual framework of the process of socio-spatial innovation was proposed in this article. An advantage of proposing this framework is that it provides a basis for understanding how a change process occurred. Especially, in analysing how urban space is collaboratively produced by social interactions between multilevel participants throughout the social innovation process in a more just way to promote health and reduce built environment inequities.

To provide some insight on the role of socio-spatial innovation in the process of an emerging POSI an overview of a case study of productive green infrastructure was presented: Harvest Brighton & Hove. This comprised the collaborative planning, design and delivery of a socially innovative development programme in the city of Brighton & Hove, UK to deal with challenges of health inequalities and equity divisions. The problem found was a lack of urban growing projects to meet needs, training to build capacities and lack of coordination of community projects as networked infrastructure. The solution proposed was a citywide food growing project that would be co-produced through a partnership approach linking stakeholders. This would develop new community growing initiatives to improve access to local food, especially within deprived areas. The aim was to support communities to grow and eat more local food, by developing skills and confidence, and helping to find more land for food growing. As such, the integrated development model presented an approach that improved access to local food, increasing both the land available and the number of people involved in urban growing.

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