The Art of Blurring the Lines: From Passive Spectatorship to Activating Immersion for Innovative and Inclusive Climate-Neutral and Smart Cities; Rethinking Approaches to Communication and Social Transformation within The Green Transition and Smart City Governance

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Abstract
The paper seeks to clarify the ways in which art could help empowers the residents with higher agency and two-way communication as part of a Green Transition and more open smart cities governance (i.e. the dimension that examines bringing multiple stakeholders together to solve common problems, improve public services and digitally manage smart cities). Also, it explains the motive behind place-based and art-based methods used as part of the methodology of on ongoing research at the University of West England-Bristol; Liveable Neighbourhoods as Catalyst for a Green Transition through an Interdisciplinary Intervention of Art, Place and Technology. The study explains the necessary change in the design and dynamic of ways to ensure sustainable momentum in terms of the Green Transition and interest in people’s involvement in city-making, participation and inclusive decision-making processes. Therefore, it offers a deeper insight to useful ways of exploring and reshaping different relationships in and with the smart city motivated by making the most out of human-technology interaction or purposeful synergy and collaborative intelligence that is empowered by place-based and art-led methods. Different systematic and non-systematic techniques and methods of data collection were used in searching and filtering of resources and literature.
1. Introduction

The paper starts with Sustainability, Pluralism and Restorative Environments, then moves to matters of Governing, Imagining, and Understanding the city, followed by a debate around Spectatorship, Immersion, and Activation, and ends with making the case for Moving towards Reflexivity, Resilience, and Pluralism. This research stems from a recently published critical literature review “Making cities smarter for an inclusive green transition towards a long-term sustainable development: A critical literature review” (Hatem, 2023). The publication was part of an ongoing research project at the University of West of England, Liveable Neighbourhoods as Catalyst for a Green Transition through an Interdisciplinary Intervention of Art, Place and Technology which explores changing the dynamic of conventional public engagement in city-making and decision-making processes. The project suggests using place-based accessible platform (online and offline) that brings various people in the city together. This is proposed through an artistic activation (i.e. using art to change something that was inactive to become active) that stimulates exchange of roles among different stakeholders in the city to result in change in behaviour and attitude toward a more successful, inclusive and engaging green transition.

As shown in Figure 1, the approach advances the argument around what smart cities are and can be to practically focus on human centric methods that could be used as part of its sustainable development. Integrating art, place and technology, shifts the focus from activity to activation (i.e. from engagement with only who are already interested in participating to stimulation of all other categories mapped in this publication). This is a part of the greater focus shift from notions and empty labels to what can be achieved on the ground by means of activation and enaction that are capable of shaping and re-shaping various relationships with and within the city as well as fostering exchange of roles among different stakeholders. This is suggested to be used as higher leverage point (i.e. places in the system where a small change in one thing can lead to big changes in everything) (Meadows, 1999), to better intervene in cities given their complex nature, and to assist a real and sustainable change in attitude and behaviour among people.

Figure 1. Using a combination of art, place and technology to empower cities, diagram is generated by the researcher.
Relying only on problematic city diagramming (i.e. how the city is mapped and controlled) and existing methods to involve people in decision making or urban development have been namely summoned up in calls for public engagement as part of the “bottom-up” versus “top-down” debate is proven to be insufficient and depend very much, in its success, on the type and number of the participants among other factors (Hatem, 2023). Meadows (1999) argued that intervening in complex systems such as cities generates only a little influence if change to the components is undertaken under the same key players or structures of current systems, making it a lower leverage point, compared to changing the insight and key players (Hatem, 2023).

Meadows (1999) stated that global issues (e.g. climate change) sometimes need a slower, negative, or even no growth. It is crucial to clarify the hidden and often contradictory aspects of these visions. Similarly, Vigar et al. (2005) mention that the concept of the multicultural city which is usually associated only with positive impressions of “cityness” such as “enjoyment” and “creativity” through providing multiple identity resources for residents, may also result in anxiety, tensions, and segregation amongst different groups, “creating deep divides between those with access to ‘smart’ and those without (Datta, 2014; 2015, Luque-Ayala and Marvin,2015; 2108; Hatem, 2023). A deep insight into ways of intervention in complex systems like cities is needed, because determining leverage points within is hard. Even if they are detected, they are intuitively pushed in the wrong direction causing problems to further deteriorate as they rush towards further growth (Meadows, 1999; Hatem, 2023).

This paper starts by introducing arguments around the notion of sustainability and the need for a deeper and common understanding of urban issues including the need for pluralism and restorative environments. Then the topic changes to present an argument for establishing the ability to imagine, express and conceptualize the city in multiple ways in urban policy and planning. After that, the difference between passive spectatorship and immersion is presented including the impact both have, various ways of mapping stakeholders in the city as well as presenting six ways to integrate art in processes of social transformation and handling global issues like climate change. Finally, the need for more fluid, reflexive and resilient cites governance and planning is clarified to enhance the understanding of different aspects and complexities of design and change.

2. Methods

A combination of systematic and non-systematic data collection methods was used to search, filter and engage with publications and material related to the topic. The paper was informed by workshops and discussions that took place with senior academics and professionals with extensive interest and empirical work in smart cities, climate change and public engagement. The collected material was filtered by searching the summary, introduction and conclusion sections. Various resources were combined to sustain the position of this paper or to stimulate discussion to clarify different angles of the topic. As part of the systematic search and filtering, a snowball development arose in a way that helped secure more resources, links and practical examples. This has led to a deeper understanding of the connections to contribute to a gap in knowledge on integrating art, place-based methods and activation to improve smart cities or realise climate neutrality.

3. Results

3.1. Sustainability, Pluralism and Restorative Environments

Many studies conducted by scholars such as Browning et al. (2014) and Kellert and
Calabrese (2015) and Heerwagen and Heerwagen (2017), confirmed that creating and maintaining a sense of place evokes a better attitude and sense of responsibility towards the built environment fostering public participation which is vital to the development of a more liveable smart city. Kellert et al. (2011: 6) stated “this attachment to territory and place remains a major reason why people assume responsibility and long-term care for sustaining buildings and landscapes. Conversely, lacking a sense of place, humans typically behave with indifference toward the built environment” which directly connects the design of urban space to behaviour and accountability of individuals within it.

Guy (2011) opposed singular views of urban sustainability holding that further development results from solely improving one aspect of it such as technology or architectural aesthetic. In his view, the development path is rather collective of different architectural representations of the changing relationship between environment and society, through a variety of different philosophies, processes, and practices. This concept rejects the dependency on a one-size fits all or a unified approach to sustainability, arguing that the meaning and practice of sustainable architecture is subject to debates between several knowledge societies, including architects, policymakers, and the general public. To better understand the heterogeneity of sustainable strategies, we need to consider different approaches to identifying, defining, communicating, and assessing problems and then materializing them through various design and development paths (Guy and Moore, 2007; Guy, 2011). However, the focus on flexibility does not aim to defend a disordered practice without judgment nor does it necessarily call for an entirely new practice to replace the latter, but rather to create a state of balance to “avoid closing the evaluation process prematurely” (Bijker, 1995; Guy, 2011; 142) by being open to other possibilities and heterogeneous sets of purpose and program without restraining the options with certain types of technology (high or low tech), materials, etc.

Moreover, it is important to understand not only the role that technological innovations play, but also the knowledge as well as the contradictions associated with its manufacture, implementation, and use, to better understand the competed transition approaches. The suggested approach gives a better opportunity to understand the possible rearrangements of what Swyngedouw (2006) referred to as “combined metabolic transformations of socio-natures” (Swyngedouw, 2006, 109; Guy, 2011; 142), as it transcends the controversial and ideological debates about sustainable visions, to the often chaotic ways in which architecture takes place in local contexts with funded systems that use specific expertise (or not), connect or disconnect to infrastructure networks, are discussed by a limited (or expanded) user community, put into a planning framework (or not), and so on. Thus, the aim is not to provide a global blueprint, but to find out how can certain combinations that are no longer focused on technological advancements, but also, the knowledge behind, different practices and power dynamics, help address specific challenges in the site through understanding and critically engaging with the involved parties to be able to outline some general principles and priorities that may provide a framework for a “fluid design”, and to create a compelling and applicable toolkit for innovations in design, technologies, and practices (Guy, 2011).

According to Muñoz-Erickson et al. (2017), sustainability calls for innovations that are not limited to how the built infrastructure is designed in cities but also how their knowledge infrastructures are planned and developed as well, to establish new ways of thinking. Knowledge systems include the organizational and routine practices that are used to create, verify, communicate, and apply knowledge. Knowledge systems analysis shown in Figure 2 is a framework that examines both how these practices and routines work and how they interact with “visions, values, social relationships, and power dynamics” that all play a role in managing the creation of sustainable cities. Thus, using it as a conceptual and empirical
framework is recommended for scholars and practitioners interested in designing knowledge co-production opportunities, seeking not only to produce a better knowledge but also to facilitate the successful implementation of sustainable long-term results; as it aims to achieve resilience and transformation potential for cities (Muñoz-Erickson et al., 2017).

As the term knowledge co-production refers to the interconnected practices of knowledge production and application, whereby the various actors of science, practice and politics jointly identify problems, produce knowledge and put it into practice through cooperation, integration and learning (Cash, 2003; Berkes, 2009; Hegger et al., 2012; Muñoz-Erickson et al., 2017), it challenges the view that knowledge production and policy-making take place in silos separate from one another (Van Kerkhoff, 2006; Vogel, 2007; Muñoz-Erickson et al., 2017). Therefore, it requires a fundamental shift in knowledge and governance towards more relevant, integrative, reflective, and reflexive practices, calling to upgrade the scientific foundation of decision-making in a way that brings knowledge closer to practice, moving towards a broad interaction with a multiple set of knowledge systems (Miller, 2008; Muñoz-Erickson et al., 2017), instead of traditional institutional and administrative boundaries that view the relationship between science and decision-making as “a one- or two-way interaction to a more complex relationship in terms of multiple actors and knowledge, multiple interactions and multiple mechanisms” (Muñoz-Erickson et al., 2017; 3). At the same time, reorganizing knowledge requires understanding how urban management and life operate socially, politically and economically, including the factors that affect facilitating or limiting the change potential in urban knowledge systems. Thus, the first critical step at the beginning of seeking the creation and implementation of new knowledge for urban sustainability and resilience is to understand the complex ways in which knowledge and governance practices are intertwined across processes and institutions of the city (Muñoz-Erickson et al., 2017). This view is also supported by Davoudi’s (2015) “Planning as a practice of Knowing” which emphasises more multidimensionality, situatedness, contestation, and dynamism by acknowledging the interconnectedness between theories, skills, practical wisdom and doing as presented in Figure 3, noting that theory and practice are relational. The interconnected and ever-changing web of dynamic relationships between planners and society and their

Figure 2. Elements of knowledge system analysis after Muñoz-Erickson et al. (2017)
planning concepts “mediated through forms of representations, systems of rules and relations of power” where knowledge is no longer an isolated category in itself is essential to this concept (Davoudi, 2015; 328).

![Figure 3. Planning as an act of knowing after Davoudi (2015)](image)

Based on this feature of plurality of place (i.e. having multiple forces and processes interrelating) a place-based methodology is recommended for design researchers as this perception of place can offer a better approach to understanding its multiplicity by allowing interdisciplinary actors to better locate and perform, avoiding homogenization (Vanni and Crosby, 2023). Similarly, Snadercock (2005) emphasised the power of securing inclusive narratives of place to negotiate and mediate perceptions conditioned by lifestyle through different ways such as local storytelling, events and cultural designs or programs, as by making them visible we strengthen social cohesion and provide a new more contemporary basis for transforming the area. Kiib and Marling (2015) asserted the possibility of opening the city visually and physically creating new narratives through new accessibilities and transparent mediums brought by various architectural projects while observing the resulting cityscape changes and cultural exchange while noting who the users were and how they used the site. However, closed and homogenous spaces were mentioned as demarcation areas that did not allow social change or progress openness of the city in new ways as noticed in connecting transition areas (e.g. parks, bridges, edge zones) that are designed in context to form a flow of people and items while creating a framework for exchanging behaviours, cultures and perspectives on social issues across boundaries (Hajer & Rejindorph, 2001; Kiib and Marling, 2015).

### 3.2. Governing, imagining, and understanding the city

Establishing the capacity to imagine the city in multiple ways in urban policy and planning is necessary to express concepts of “cityness” in spatial strategies in a collaborative way by exploring “local contingencies”, their implied meanings, and implications (Healey, 1997; Vigar et al. 2005). These imaginaries and conceptions are considered highly significant in developing the experience and governance of the city as they were also historically important in land use planning where they are used in the policy field, establishing the spatial planning domain. Discouraging further discussion on what is meant by words like “city” in the domain of spatial planning saves the contemporary governance a lot of trouble by making multiple policy interventions more coordinated and unified while mobilising various actors.
to turn them into political coalitions (Vigar et al. 2005). The broader understanding of the urban seems also to be obtained from public, cultural and artistic illustrations (e.g. exhibitions, photographs ... etc.) which contribute later on to the city development when applied as a type of art critic that belongs to architectural imagination (Kurg and Shields, 2004). According to Soares (2015), the public imagination of the urban is representing cities in paintings, movies, literature ... etc. Gandy (2014) for example treated modernism through linking various epistemologies (e.g. public discourse, scientific knowledge, and individual creativity) and relying on a more politically directed approach through the use of art, literature, and photography; presenting modernism as a “historic and geographic form of the relationship between water and urban infrastructure” Gandy (2014; 488) to represent the relation between water and modernity and on the emergence of urban infrastructure from debates amongst actors, ideologies and power relations that led to “uneven distribution of resources and environmental hazard related to water” (Gandy, 2014; 1).

Miller (2020) is one of the scholars who advocate the principle of integrating both techno-politics and sociotechnical imaginaries while taking smart cities as “empirical focus”. This view is justified with the possibility to approach smart cities as “socio-technical assemblages that are inherently techno-political” (Hommels, 2020; 412) as techno-political agendas are involved in shaping both sustainability and sociotechnical imaginaries. Miller (2020) also confirmed the existence of “tensions between imaginaries at the local, national and international scale” (Miller, 2020; Hommels, 2020, 415) and for STS to consider global techno-politics and local context. This validates the STS perspective on cities as “highly appropriate strategic research sites for studying the complex interactions and tensions between the local, national and global” (Hommels, 2020). However, Healey (2007) discussed the existing strategy-making that aims to “mobilize resources and concepts of place identity” as a political task by seeking to “summon up” (Amin 2002; Healey, 2007) concept of a city or an urban area. As the involved actors are investing in physical projects and making sense of qualities of place, there is a need for new politics that are more fluid and operate with consideration of the dynamic nature of cities as places of social interaction. Also, considering the complex nature of spatiality and “places of cities” as constructions that emerge through the collaboration between various networks helps not to treat the urban regions as “integrated unities with a singular driving dynamic, contained within clearly defined spatial boundaries” (Healey, 2007; 23).

It is well established that urban development planning, in the socio-economic and environmental sense, cannot be subject to a linear process “from intention to planning, to action, to outcome” (Healey, 2007; 23) following a governmental intervention in a non-reflexive manner that ends within a certain timeframe. It requires awareness on the part of the participants in spatial strategy-making of the multiple networks of relationships as well as the interplay of the diverse dynamics (i.e. economic, socio-cultural, environmental and political/administrative dynamics) as they develop across and within an urban area transcending the limitations of examining spatial patterns of activities in a two-dimensional map. Within the scope of governance, this means that traditional planners, focusing on qualities of a place, must meet analysts and policymakers specialized in other areas of policy field resulting in rethinking government and governance creatively, seeking a more effective implementation of policy agendas that is more citizens centric and consider demands of “organized stakeholders” (Healey, 2007; 23). Luque-Ayala and Marvin (2015) hold that gaining exposure to these processes will enable us to get to know the current pathways of smart cities and their possible splintering or integrating nature. Also, it will help to inspect the claimed potentials which are primarily generated through technologies that are controlled by logics of politics and administrative methods (Hudson, 2011; Luque-Ayala and Marvin, 2015, Marvin and Luque-Ayala, 2017).
Science and technology studies (STS) seem to provide a more complex and rather morepromising perspective to approach studying cities, presenting them as vital sites to understand socio-technical changes and the interrelations of power dynamics, technology and knowledge (Gieryn, 2006; Hommels, 2020;). Under the topic of “knowing the city”, scholars like Rob Shields-professor of Sociology and Anthropology at Carleton University, Ottawa-argues that only the materialistic nature of a city is what is represented in maps and official records. There are other intangible aspects bound to cities and the urban as a system that in its performance also depends on other intangible elements that include socio-economic interplay, qualities of standard agreements and structures governing the citizen’s behaviour and interaction. Shields explains that it is significant not to approach the city as a merely physical object limited in its scope of charts, maps, and urban characteristics. The concept of a city includes other virtual qualities of the urban with the previously mentioned representations in official documents as it will offer a better sense of what a city is and this would better clarify the ontology of the city, which in its turn brings the field of urban studies into a stronger existence amongst other disciplines. Regarding the distinction between the urban and the rural; Shields argues that both are “a context within which cities develop which are difficult to separate” depending on the virtual nature of the socio-environmental aspect of the urban instead of limiting the notion to be only defined by Euclidean imaginaries (e.g. geological properties represented in maps) (Kurg and Shields, 2004) as these representations are not equipped to embrace the diversity of the modern city (Boeri, 1998/99; Vigar et al., 2005; 1407). Limiting words such as city and smart to be recognized with one definition or a single interpretation in the public imaginary might objectify what a city is and would inevitably favour certain places, people, imaginaries (Vigar et al., 2005). Whereas, urban STS scholars can provide the necessary criticism that reveals the sway of imaginaries and positivist science promoting that smart would be always politically neutral and just. This will guarantee more realistic smart cities imageries that state the negative impacts while standing for values that support the participatory process of change and admitting the active nature of the interaction between residents and technologies on day today basis (Karvonen, 2020).

Healey (2007) stated that the urban settings will not have much validity unless the residents’ experiences, expectations, and associated meanings of what the daily experience would be like, are met through a "strategic spatial frame of reference” managing urban areas as “imagined places". This strategic imagination succeeds by capturing a multidimensional feeling for the unknowable, multidimensional, emergent 'placeness' of the urban (Healey, 2007; 288). The critical understanding these research efforts try to provide to assess the notion from different perspectives is significant; according to a study focused on scientific communication headed by Joanna Hoxster-an environmental scientist at Bucknell University in Pennsylvania- it has been well established that to achieve successful scientific communication; understanding as a means by which novel information is analysed and digested and connections amongst different inputs are made is essential to knowledge as “facts must be weaved, analysed, and contextualized. Linking cause to effect and deciding what to do next only happens when knowledge can be coupled with understanding” (Livni, 2017).

As urban techno-politics emphasise the strong interplay between urban and technological developments (Rutherford, 2020; Karvonen, 2020), handling cities through an “STS urban lens” in further studies and research efforts are expected to clarify the properties and relations of smart cities in-depth as the research interests amongst scholars in both disciplines complement each other (i.e. how technology and humans influence each other within the city is the main concern of STS scholars and how these STS concepts are meant to expand the capabilities of analysing the implications of the socio-technical systems on
urban development is the focus of urban studies). This combination presents an opportunity for a broader interpretation of cities “as messy sociotechnical achievements that are simultaneously discursive, material, temporal, spatial, and infused with power dynamics” (Karvonen, 2020). To provide knowledge about cities and analyse how they develop over time, new urban science has been introduced by urban researchers and promoted by academic research centres utilizing various means including “big data, ubiquitous sensing, geospatial and social network analyses, algorithms, machine learning, and artificial intelligence … multiple urban observatories, control centres, and knowledge platforms” (Miller, 2019; Karvonen, 2020; 418). By investigating knowledge production processes which fall under the influence of “implicit political assumptions about how we know the city and how we apply this knowledge in various ways” (Karvonen, 2020; 419) urban STS scholars can inspect the way with which the knowledge is produced and legislated and by whom it is arranged. They can also examine how this knowledge might advise decision making processes and democratizes modes of knowledge generation (e.g. replacing top-down with bottom-up approach) and suggest alternatives, which leads to a closer look at the power dynamics of the process to consider the parties included and the involvement of their expertise. This will illustrate how knowledge is processed and applied elsewhere through urban techno-politics.

3.3. Spectatorship, Immersion and Activation

Meadows (1999) stated that intervening in complex systems such as cities needs a higher leverage points as little influence is caused if change is undertaken under the same key players or structures of current systems. As such high leverage can be secured by changing the insight and key players (Hatem, 2023), the study adopts a theatre-inspired argument established by Reason (2019) which suggests that a traditional theatre can change into a more engaging and immersive one, when techniques were used to exchange the roles among audience and performer. This has also resulted in a different and deeper insight than just being a passive spectator. Such capability adopts a concept of immersion as involvement has proven possible in immersive theatre where the spectator’s role has changed to the performer and vice versa making it more effective and engaging while providing instant delivery of the message as well as response from the audience (Kolesch et al., 2019). The paper suggests that a similar argument could be made if we start adopting this approach to immersive participation to secure different feedback loops among various participants and stakeholders in two way communication, replacing top down and bottom up approaches. Hence, the study was inspired by the level engagement and quality of feedback secured by immersion through provocations that stimulated active participation and roles exchange. Also, this evidently will help to design engaging ways and places to motivate various people in the city towards undertaking change, participation and responsibility.

Weinberger et al. (2021) confirmed that spaces can be used to motivate and activate people given their sensory characteristics:

“In the case of architectural or environmental aesthetics specifically, sensory features of an environment instantiate interest and a desire to explore or approach a given space (i.e., behavioral-motivational responses; Coburn et al., 2017). This link is consistent with longstanding accounts in cognitive science that postulate associations between perception and motivation (Day, 1967) and attention (James, 1985; Kaplan, 1995; Reber et al., 2004), as well as perspectives from environmental psychology that propose that evolutionarily-beneficial environments automatically capture human interest (Bowler et
al., 2010; Joye, 2007; Ulrich, 1993). Specific visual properties of the environment elicit activation of temporal lobe regions sensitive to visual motion (Vartanian et al., 2015) and the globus pallidus, a brain structure responsible for regulating voluntary movement (Vartanian et al., 2013), further evidence for this association between environmental visual features and behavioral-motivational responses”.

Therefore, study advocates a place-based approach to be employed, enhancing the city`s capacity to activate improves the green transition potential (i.e. transition from a carbon-based to a more environmental and sustainable economy/industry/development) of existing neighborhoods to become more restorative (i.e. healthy, resilient and engaging) (Roe and McCay, 2021), as part of their climate action aiming for greenhouse gas reduction (mitigation), adaptation, resilience building, and engagement. This parallels with the need for action from governments, cities, regions, businesses, and investors for an effective implementation of the Paris Agreement which formally acknowledges the urgent need to maximise the global response to climate change, prompting governments to be even more ambitious. Governments agreed on the urgent need to mobilize stronger and more ambitious climate action to achieve the goals of the Paris Agreement at the United Nations climate change conference (UNFCCC, 2023). The restorative framework focuses on using attributes and contexts of a city to ensure psychological resilience and healthy behaviours. In this model, place-making, interactivity and varied experiences on the scale of neighbourhood and the city play a role to provide social connections and maintain mental health. This resonates with WHO (World Health Organisation) recommendation to prioritise health and equity in governance and planning (WHO, 2016; Row and McCay, 2021) as well as the United Nation`s Sustainable Development Goal 11; to provide cities that are safe, inclusive, resilient and sustainable by 2023 (UN, 2016b). This also stems from its agenda to secure healthy living and wellbeing for everyone through different ages and stages of life for a more sustainable future urban development (UN, 2016a; UN-Habitat and WHO, 2020). This advocates the meaning of place as a dynamic construction that includes not only the physical structure or local history but also the flow of people and their insights due to the plural nature of place as owned by various actors and stakeholders. (Kiib and Marling, 2015).

### 3.3.1 Mapping roles in the city and exchange of roles

![Figure 2 Mapping stakeholders in the smart city, figure after Carbonnell (2019) “SMART-CITY: Stakeholders roles and needs.” 2019, medium.com.](medium.com)
There are various ways of mapping stakeholders in the smart city, but often they relate to basic classification of their sector (e.g. public, private, civil society …etc) as shown in Figure 2. Whereas actors in policy making are the people who create, implement and enforce laws and policies (e.g. government officials, interest groups, or the public), stakeholders are those who are affected by what is created including individuals, companies or interest groups. Public value creation aspect is related to co-design, leading to a sense of shared responsibility and ownership. High participation rates can lead to high-quality governance that would enable a harmonious development process in the context of sustainability and community life. In addition, new approaches to sustainable development emphasize the role of building relationships with stakeholders and, as appropriate tools, the way in which stakeholders can be involved in the development and recommend methods based on demand and opportunities while stimulating innovative ideas in all aspects of spatial economics (Vitálišová et. al., 2021). Hence, we suggested a new mapping that goes beyond the sectorial divisions in Figure 2 to be grouped under certain ways of looking at the city or taking interest in it as shown in Figure 3. The new map highlighted five key perspectives of positions towards the city and its making which include rolling out of policies, motivations towards change as in various social catalyst professional, bodies and groups, investigating and rethinking the city, financial and innovation investments or efforts and being affected by whatever happens in the city which is under the Affectee category. The latest could apply to any of the preceding categories depending on the placement of the stakeholder. For instance, one can be a policy maker but this does not mean that will not be affected by it. On the other hand, a resident who is not taking part in any of the categories, is namely being passive or remains affected by change or actions around him/her.

Figure 3 Other suggested ways of mapping stakeholders in the city according to their perspective/interest in preparation of exchange of roles, diagram is generated by the researcher
Figure 4 Overlooked categories of people in the city according to their position/attitude towards participation/public engagement, diagram is generated by the researcher

Existing top-down and bottom-up approaches of governance are limited in effectiveness and capacity to capture the complexity of urban environments (Luque-Ayala and Marvin, 2015; Sarkar, 2017; Karvonen et al., 2019, Karvonen et al., 2020). The conventional ways of bottom-up engagement is not enough, they seem to engage with those who are readily interested in and have time for participation in indoor meetings and surveys, however there are many other categories as shown in Figure 4. Thus, we need to boost the ability not only capture this complexity but also to assess and deliver effective solutions in relation to the urban policy goals. According to Leeds Climate Commission, difficulties include maintaining momentum as they address some key challenges that are preventing work at the scale and pace required. Also, the biggest challenge was keeping people engaged while face-to-face meetings or events could not take place during the pandemic (Leeds Climate Commission, 2023). As there are other overlooked categories of potential, challenged or demotivated participants, another map resulted from looking differently at the people in the city to explore their attitude towards the city, which is shown in Figure 4.

The Place Based Climate Action Network (PCAN) is focused on achieving transformative change on the ground by turning climate policy into action. Climate committees are city or district partnerships that bring together people and organizations from the public, private and civil society sectors who work together to promote, guide, support and monitor climate action. Commissions are independent bodies that complement and expand the activities of local governments, combined agencies and local business partnerships, and build an area's capacity to ensure climate resilience and a transition to a low-carbon economy. Inspired by the Leeds model, new climate commissions were set up as part of the Place-Based Climate Action Network (PCAN), which started in January 2019. The ESRC-funded network aims to help the UK meet the requirements of the 2015 Paris Climate Agreement and the UK Climate Change Act by building local potentials and capacities as well as encouraging the flow of green finance in different cities in the UK. New climate commissions were established in January 2020 in Belfast and February 2020 in Edinburgh. PCAN aims to develop a reproducible model for other locations to set up their own climate commissions, and more are being set up independently of PCAN but supported by PCAN (PCAN, 2023). Nevertheless, issues related to achieving green
transition clearly depend on sustaining and developing the current built environment and its social human aspect/factor which requires improving the level of engagement, care/knowledge about the cause and responsibility towards the surrounding environment.

As shown in the change model illustrated in Figure 5, such results require certain changes through innovative catalyst methods for change while working collaboratively and not in silos. This also means to innovate ways of collaborative intelligence as people engage with various elements of the city including technology as part of authentic exploration of people’s understanding and imaginaries of their city. By giving them the chance to express their impressions, reflections and visions, a higher level of agency is offered as well as potential to cause change and not only just reflect on or react to change around them. In addition, as people interact with technology this way, it becomes easier to explore and reshape their relationship and other relationships among elements of the city through artistic means supported with accessible and appealing tools. This approach celebrates various people, relations, and elements of cities innovatively, which is necessary to achieve smart cities that are not only more sustainable but also more liveable and resilient. As part of study, integrating art, place and technology is proposed as part of a two-way approach that uses the heterogeneous places/transition areas to implement an atmospheric place-based methodology. This brings different people and elements together in a way that redesigns and make their interactions more visible in the city, bringing it to life and adding to its resilience. This approach enriches the city in many ways by boosting its ability to evoke and use inclusive narratives, affective atmospheres and sense of place. This is done purposefully to ensure attachment and belonging as well as multi-influence spheres on a wide range of people as well as the city’s life, resilience and image or atmosphere.

![Figure 5 The change diagram, generated by the researcher](image)

Stakeholder involvement can strengthen their position and give them a stronger voice in local politics or give people agency in the city in clearer and more visible ways. As shown in Figure 5, the study suggests to redesigns communication and interaction in and with the city (i.e. between various people, technology and built environment) to motivate and support during their transition and promote more sustainable decisions, behaviors and learning by using an accessible (engaging) place-based structure/elements. This could mean that they are located in a certain area in the city to capture the needs and insights of different local people and plurality of that place) that is varied over time or in context and showcases different provocations (e.g. artistic). By using provocations to exchange various roles in the city; things that stimulates and invites learning, interest, creativity and reflection, more opportunities to contribute, learn and
interact are made more available on the ground being accessible to different people as part of their daily physical interactions with elements of the city. This helps to inspire an appreciation for the role of rich interactions and narratives design between people, technology and the city in a way that imitates the interactive engagement found in some forms of relational art or participatory experiences which focus on addressing perception of the audience and providing a sense of place and atmosphere (i.e. ambience or mood of a place) that fosters higher attachment, responsibility and belonging among people audience (Kiib and Marling, 2015; Pallasma, J., 2017 Koelsch et. al., 2019; Roe and McCay, 2021). This targets various actors, stakeholders and interests as it locates itself in a public area where the flow of different people and diverse insights in city are more likely to exist, instead of conventional limited settings of engagement accessible to certain people (e.g. surveys, indoor meetings...etc.). The areas in which the implementation takes place is recommended to be heterogenous (e.g. Edge/In between/Transition areas) to maximize inclusion (Kiib and Marling, 2015). This is implemented as part of an innovative two-way communication approach where a constellation of various stakeholders and interdisciplinary skills co-design participatory interests and interactions that provide meaningful ways of communication that aligns more with their experiential needs and to facilitate sustainable growth, connecting the local with the global while building and maintaining momentum during the climate crisis. This resonates with the need for an innovative place-based climate action commission in more cities, like Bristol, to maintain momentum and keeps people engaged with the green transition while it enriches the city in many ways by boosting its ability to evoke and use inclusive narratives, affective atmospheres or sense of place (i.e. sensations that affects people`s impression, attachment and attitude).

By establishing this place-based engagement, powered by technology, there is also an added value or potential of monitoring change of behavior over time as well as level of engagement by exploring repetitive visits. Asking the participants to share the event or elaborate on whether they had the experience before, what they did differently since the last time in terms of environmental or climate change action or even communication (e.g. sharing or inviting others) or provide insight to the impact of this place based technique and its artistic stimulation on people.

Figure 6 Multi-ripple effect, stimulation and activation on various scales, diagram is generated by the researcher
By capturing the complexity of urban and human natures and needs this helps to enrich the current approaches of identifying, defining, communicating, and assessing problems and then materializing them through various design, governance and development paths (e.g. top-down, or bottom-up) (Guy and Moore, 2007; Guy, 2011; Luque-Ayala and Marvin, 2015; Karvonen et al., 2019, Karvonen et al., 2020). The suggested place based approach is focused on providing a practical tool to engage everyone including stakeholders/policy makers and not only the residents. Therefore, the project also explores whether this combination/tool can also change the roles of the different parties in the city at certain points to make them more involved instead of being passive watchers or spectators due to the nature of their existing roles or interests and in turn motivate them to act. As part of a structure, tool or provocation that is located in the open spaces of the city (i.e. place-based), a multi ripple-like effect is introduced as people are anticipated to also become facilitators of this inclusive change as they contact and impact each other, stakeholders, and systems in real and virtual realities. As shown in Figure 6. The effect and impact achieved can be on different scales defined by various zones on the chart. The first zone identified the noticed impact on direct observers immediately, whereas the second shows others who can see those involved in the real world. Those who are invited of affected in the virtual world and various online and accessible platforms are represented in zone 3. Finally wider level of communication and inspiration to various parts of the world is expressed in zone 4, which also related to boosting justice and access to this knowledge on the scale of the globe. This in turn can create different levels of influence where other people, organizations, and interest groups can be inspired to explore, act and advocate for the cause/debate. The influence caused also includes evoking an atmosphere or sense of community, interrelation and diversity that makes the city’s intangible aspects deliberately visible, utilized and engaging.

3.3.2. Stimulation through art provocations: Six identified ways to integrate art in the green transition process

The following section presents six different ways that were identified through investigation of art mediation that was used particularly to make a case for sustainability, climate change and call for actions This evidently clarifies how art could be integrated to mediate transformation, conversation and exchange of ideas as proposed to be part of the green transition. The investigation focused on the city of Bristol; the largest city in the southwest of England, the European Green Capital for 2015, the UK’s official first cycling city and the UK’s official first cycling city.

3.3.2.1. Dynamic display and artistic translation

Cabot Conversations is the exhibition in which artworks on climate change were created, as ten artists were invited to respond translating conversations about climate change by using different means of art. The conversations and the artworks can still be observed in action online. Each of the ten artists adapted to each talk, interpreting talks of two experts from different disciplines, from the Cabot Institute for the Environment and beyond. The topics discussed were variant including Climate Emergency Power of People, Heatwaves and Health, Net Zero, Earthquakes and the Environment, Water, Ocean Floor, Ecosystem Services, Resilient Cities, and Climate Justice (see more in Cabot Conversations on the University of Bristol website).

3.3.2.2. Showcase, awareness, and discussion

A more direct contact with the artists participating in Cabot Conversations was offered as part
of the Bristol SU’s Climate Emergency Day of Action. The event invited people to meet with five artists while showing the artworks created in response to climate change talks and exchange perspectives around both the global issue and the interpretation. Additionally, the invitation encouraged networking and discussion on prospective collaboration with participating artists and exploring their reflection and feedback on their experiences interpreting environmental research through art and provided space for contemplation while viewing the artworks.

3.3.2.3. Communication-sharing people’s views to inspire thinking about the future

Twenty drawings were crafted by a Bristol-based illustrator and designer crafted to be presented in the UN’s COP27 summit held in Egypt. The art project communicated people's opinions on climate change and messages they wish to send to decision makers. Also, the artist was appointed by the University of Bristol's Cabot Institute for the Environment to draw on feedback that came from those who visited areas open to the public at COP26 in Glasgow (Pritchard-Jones, 2022).

3.3.2.4. Facilitating confrontational conversations and raising awareness to stop unknown dangerous practices

A new mural located on St Mark's Road in Easton, Bristol was designed by the Peace Arts Group to draw attention to dangerous air pollution in their area. The artwork was the latest work of the group and one of 17 climate change-inspired art pieces led by Towards 2030, What Are You Doing? and Vanguard, who also delivered the exhibition Bristol Street Art: The Evolution of the Global Movement at Mshed. The new mural was the outcome of collaboration between Peace of Art (consisting of Emily Richards, Aumairah Hassan, Safina Khan and Manazzar Siddique) and community-led project Saaf Hava, run by Residents Against Dirty Energy (RADE) and Council of Bristol Mosques. The group was concerned with wood stoves as a real problem in parts of Easton, particularly given that burning fuels such as wood causes serious harm to the lungs and heart and produces small particles called PM 2.5. Therefore, the artwork helped to raise people’s awareness of the consequences of their actions and fight associated stereotypes; Mrs Hassan said: "When people think about air pollution they think about cars, trucks and buses whereas in the locality of where the mural is actually being painted there is a real issue of PM 2.5....wood burning stoves in particular were an uncomfortable conversation".

Moreover, as the conversation was mediated through this kind of art so that the delivery of the message was ensured to be less confrontational than without as expressed by the Mrs Hussain: "It's trying to, excuse the pun, but ignite that conversation without offending people because I think a lot of people who have wood burning stoves don't really understand the implications"(see more in Bristol art group reveal climate change-inspired mural-BBC News, 2021).

3.3.2.5. Restoring mental health and give strength to the climate movement

A Climate Poetry Workshop was created by a Bristol based activist, with the aim of providing a safe space to establish, discuss and support better mental health while backing the climate movement. This stems from the need to overcome issues like eco-anxiety which might not be known to everybody and yet they could be affected by. Having such restorative methods
helps to maintain momentum and provide safe and sustainable pathways of change.

3.3.2.6. Providing answers on how a global issue affects us directly

HighWaterLine Bristol is a community-led chalk marking to mark the flood line in Bristol and Avon. Various community groups took part in workshops on climate change and flood resilience, as part of their commitment to artist Eve Mosher’s public show in September 2014. Each group handed the sport chalk to another connecting different neighbourhoods and parts of the city while showing the high-water mark that scientists have identified for future flooding in Bristol (see more in High Water Line – Visualising Climate Change, 2014). Such art led activities and hands on experiences alongside like-minded people in the city creates synergy for climate action and not only communication or awareness of the issue. Also, they make it possible for people who observe the line expressing to know the possible danger directly affecting their city and livelihood because of climate change.

3.4. Moving towards reflexivity, resilience, and pluralism

Luque-Ayala and Marvin (2015) stated three priorities and challenges for future research in the field of smart urbanism, emphasising the urgent need for a dialogue about the multiple ways in which smart urbanism is imagined and legislated across different urban contexts to provide a systematic comparison. The priorities start with a focus on the further development of methods of theorizing and visualizing smart urbanism. It is necessary to examine the development of subjectivities that serve the neoliberal city to reveal the political aspect of smart. A creative combination of theoretical frameworks is needed to illustrate how knowledge in smart is built up by specific contexts with a particular historical background and are conveyed through certain organizations and power relations. These frameworks help to understand the mutual relations between innovations, socio-technology, profit, ecological and power dynamics as well as social justice, and how digital innovations are being utilized to repeatedly “unbundle and re-bundle users, space, services and networks” (Luque-Ayala and Marvin, 2015; 2112).

Another priority is to examine the normative nature of smart urbanization highlighting the possibility of generating alternative concepts and understandings of the city while exploring the objectives of smart urbanism by examining its standards and the possibility of producing alternatives. The alternative responses need to be more diverse, inclusive, user- or demand-centred, and focused on a wider range of social and environmental priorities with more informal social structures. It is also necessary to investigate how they differ from the dominant approaches, they use similar technologies, mechanisms and thinking rationalities that can be hard to distinguish. Also, binary logics do not apply to smart urbanism practices as it comes in many various forms in practice, so practically, the concepts of top-down and bottom-up are not sufficient to reveal the complexity of the situation. Thus, there is a need to critically examine these approaches to state challenges, risks, and potentials of maintaining informal alternatives of smart urbanism, while questioning the rationality that leads to their emergence instead of idealizing them. In opposition to “bottom-up” approaches, governance strategies through smartcitizenship are open, experiential, and adjustable where citizens may reject or reverse them and possibly redirect them through other forms of urbanization. To meet their interests, companies and municipalities make smart citizens subject to “individualized and marketized social relations”. In the meanwhile, some forms of smart urbanisation are being introduced by a large number of widely distributed and separate initiatives led by communities, ad hoc volunteer groups and local institutions, among many examples of this;
“the rise and fall of amateur Wi-Fi networks providing free Internet access (Powell, 2011), community organisations using big data ‘to build an economy of information more open to civic intervention’ (Couldry and Powell, 2014: 1), attempts to bypass traditional commercial digital connectivity through user-generated fixed-line broadband (Middleton and Bryne, 2011) and the informal establishment of digital sensors in urban infrastructure towards civic uses (Shepard, 2014)” (Luque-Ayala and Marvin, 2015: 2112).

Finally, to promote a comparative approach to smart urbanism practices examining the differences and contradictions of smart logics and perspectives to their interplay broadly across geographies and scales within a context. In addition, the comparison would give a chance to inspect the possibility of creating alternatives of knowledge and understanding of the different interrelations that are more critical and “contested”. Whereas the dominant logic of smart is meant to examine the development of smart subjectivities that resonates with the needs of the neo-liberal city, it is important to understand that it is a complex and non-linear process. Neoliberalism in practice is “far from uniform in time and space, and varies in its responses through hybrid formations that are clearly conditioned by geopolitics as much as particular local contexts and existing urban” (Luque-Ayala and Marvin, 2015: 2113).

One of the examples of structuring alternative responses to complex problems is the suggestion by Geels et al. (2015) to introduce the reconfiguration position as a third position to complement the existing two positions; the reformist and the revolutionary that frame the SCP (sustainable consumption and production) research. The reformist position representing the political and academic doctrine focuses on companies seeking environmentally friendly innovations for consumers and buying environmentally efficient products. However, the revolutionary position radically criticizes the dominant "capitalism, materialism, and consumption" and promotes thrift, economy, and localism. The three positions were not meant to be presented as “absolutist categories” as theories suggesting shades of grey were also discussed in the critical appraisal. Furthermore, their manifestations in the real world can “exist simultaneously and interact dynamically” (Geels et al., 2015; 9). By considering new conceptual frameworks while focusing on changes in socio-technical systems and practical daily activities, the reconfiguration position aims to reduce the dichotomy among both positions as they critically respond to each other which results in “politically conservative outcomes” as policymakers are more likely to choose the reformist approach if a revolution is the only option left. SCP benefits from the ambiguity of different interpretations of its concept by collecting different scholars and actors, highlighting that the SCP agenda played an important role in contributing to and contradicting the economic and technological over-optimism in green and eco-friendly innovations. Similar to the smart cities literature, the reconfiguration position would need more interdisciplinary cooperation and critical innovative attempts, for example, critically rethinking capitalism, the gap between nature and culture, and the definition of social and political issues related to the discourses (Shove, 2010; Geels et al., 2015). Also, the unit of analysis needs interdisciplinarity rather than concentrating on particular actors (e.g. firms, consumers and politicians) (Geels et al., 2015).

Nevertheless, Luque-Ayala and Marvin (2015) highlighted three challenges to overcome. Firstly, the development of an interdisciplinary conceptual approach to analyse smart urbanism. This means examining how smart is currently being perceived in sciences while identifying areas of agreement, dialogue, and opposition, to develop conceptions of smart. Secondly, to assess the social and political consequences associated with applying smart logics both materially and discursively; analysing how particular urban scenarios reinforce and restrict smart urbanism transitions and participate in the production of alternative trajectories. Finally, to produce new knowledge comparing the forms, processes, and implications of smart urbanisation internationally. As the current research on smart is still in
progress, limited to specific disciplines and individual cases, while cities function actively in different ways complicating, enabling, resisting and translating smart urbanisation, which indicates a lack of comparative studies about the set of urban contexts in which smart arises (Luque-Ayala and Marvin, 2015).

According to Degen et al. (2008), studies on the city require multiple theoretics and methodologies (Borden et al., 2001; Dovey, 1989; Degen et al., 2008). Also, there is a need for different approaches to thinking about urban aesthetics as well as other critical tools and more accurate critical vocabulary (see also Goss, 1999; Julier, 2006; Degen et al., 2008). This will enable researchers to better engage with the debate rather than adding to the dominant critics on the “banality” of contemporary urban designs which are often exposed by “the rush to theoretical order” (Amin and Thrift, 2002; 3, Degen et al., 2008; 1917) that is proven to be inconsistent with the complexities of urban visualities. Many scholars-Karvonen et al. (2019), Karvonen et al. (2020), Luque-Ayala and Marvin (2015) among others-agree that the research on smart cities is still in its infancy and further critical understanding of the concepts, implications, and potentials that are associated with the promotion of smart cities, is needed (Karvonen et al., 2020).

As the literature concentrates on technical, engineering and economic aspects of smart while ignoring the social and political aspects, a critical, interdisciplinary and comparative approach in research on the international level is significant for an accurate understanding of how urban imaginaries and knowledge on smart are being established. Also, the socio-technical and political implications require deeper insight and empirical efforts (Luque-Ayala and Marvin, 2015), to allow understanding how and why smart is being interpreted as another opportunity to reinforce “dominant circuits of capital and a neoliberal governmentality” (Vanolo, 2013) or as a new governmental form altogether (Gabrys, 2014) (Luque-Ayala and Marvin, 2015; 2018) across different urban contexts. In their analysis of the smart city standard of the British Standards Institution, Joss et al. (2017) concluded that there is a need for a standard that deals more explicitly with the three analytical dimensions of citizenship regime; “the (envisaged) responsibility relationship between the individual, the community, the market, and the state; the rights and duties establishing the boundaries of political community; and governing practices, including modes of citizen engagement” (Joss et al., 2017; 43), in particular, to further clarify the nature of the citizens’ agency and to deal more clearly with pluralistic, advisory decision-making processes. The study also emphasizes the need for additional investigation to address the potential of applying the standard to cause a significant shift in local citizenship practices, or whether the local practices mitigate or even eliminate the citizenship system published by the standard, to explore and further develop a practically efficient citizenship system while highlighting the emerging governance relationship between the standard as a national agency and local actors in urban development. Thus, new and critical thinking on the part of both governance professionals and political theorists is necessary too because the concept of citizenship may be rapidly changing that it can no longer be embraced by the current models (Joss et al., 2017).

While urban governance experts are aware of the significance of diverse knowledge and experience in looking for and developing sustainable city policies (Petts et al., 2006; Evans et al., 2006; Muñoz-Erickson et al., 2017), they may lack the crucial analysis of power dynamics related to institutional expertise and practices that constitute knowledge production, how are cities imagined and whether there are opportunities for rethinking or redesigning the relations between knowledge and action (Muñoz-Erickson et al., 2017). The knowledge systems analysis presented by Muñoz-Erickson et al. (2017) (Figure 1), provides a way to evaluate how co-production processes of existing and new knowledge perform over time by understanding the current institutional conditions and building reflectivity and
transformation through their long-term application. Therefore, it is also recommended as a way to develop the necessary assessment of how co-production processes work for cities and resources (e.g. water, energy, etc.), thereby providing an opportunity to test design proposals in multiple sustainability contexts and organisational structures while allowing for new insights into agreements and processes to attract the most beneficial actors in addressing urban sustainability problems.

A critical basis for the term "co-production" that informs this framework is approaching knowledge as “a claim or an idea or belief that someone, whether an individual or a community, takes to be true, or at least relatively more true than other kinds of statements, and therefore of sufficient merit to guide his, her, or their reasoning or, especially for our purposes here, action” (Muñoz-Erickson et al., 2017; 6) which comes from a sociological view that recognizes the complex judgments, concepts, frameworks, implicit skills and values that make up knowledge, instead of seeing them as mere simple statements of truth. Dynamic social processes participate in knowledge-making, so that it is the result of articulation, deliberation, negotiation, and valuation of specific epistemological claims, highlighting the important epistemic claims and how they are built, assessed, discussed, and approved as knowledge (Shapin, 1994; Muñoz-Erickson et al., 2017).

Building trust and a common understanding of the goals amongst researchers and concerned parties is essential to the process (Clark et al., 2016; Muñoz-Erickson et al., 2017). Working with a diverse group of relevant actors with different skills and resources across project components, including formulating and determining knowledge needs and questions, is also critical to productivity (Reyers et al., 2015; Muñoz-Erickson et al., 2017). These practices and an open, thoughtful and transparent framework that fosters mutual social learning are as important as the project’s specific outcomes (Fazey et al., 2013; Muñoz-Erickson et al., 2017). Nevertheless, these different concepts of co-production of knowledge also showed that the difficulty encountered in changing patterns of thinking or how cities think; "what local people know about the city, how they know and experience the city, how they envision the city” (Muñoz-Erickson et al., 2017; 6), is because knowledge arrangement is intertwined with the social organization of cities so that transforming cities requires a simultaneous change of how knowledge production is arranged and used in policy-making.

As knowledge co-production brings various types of expertise and multiple institutions that differ in their organization, aims, and degrees of accountability, the framework presents complexities of knowledge systems under three categories; organizational, operational, and political, shown in Figure 7. The social, institutional, and environmental complexity of cities contrasts with the simple approaches that link producers of knowledge and its users. However, institutional structures capable of reasonably integrating institutional, ecological complexity and city dynamics are more suited to developing practical sustainability strategies and a long-term change.
Moreover, main principles or "design philosophies"; context and inclusiveness, adaptability and reflexivity, and knowledge–action network (Table.3; p.32), were stated some questions and strategies under each, to highlight considerations that ensure a successful design and implementation of knowledge co-production initiatives. However, there is a need for additional empirical research efforts to examine how these philosophies can help innovation in practice and assess the results in promoting sustainability and resilience in cities (Muñoz-Erickson et al., 2017).

Constructing institutional reflexivity is critical to avoid a lack of success in the future and build more adaptive knowledge systems. It is the idea that those who produce and use knowledge recognize and think about how to do it (Miller, C. and Muñoz-Erickson, 2010; Muñoz-Erickson et al., 2017) This includes allowing for a critical examination of all kinds of presumptions and practices that underlie the production and use of knowledge for sustainability (Hendriks and Grin, 2006; Muñoz-Erickson et al., 2017). However, the reflexive approach to improving the knowledge production process increases the "efficiency paradox" as it indicates a balance between openness and closure (Voss, 2006; Muñoz-Erickson et al., 2017; 12). Whereas closure is critical to productivity and acting, the timing can lead to a stalemate. Therefore, the timing and the structure of mechanisms are fundamental to achieving balance through an iterative process (Muñoz-Erickson et al., 2017).

In contrast to isolated networks—which are made up of homogeneous isolated unit–network theory asserts that creativity and innovation are better provided by different polycentric networks, where there is more possibility to reinforce existing capacities and connections where links are weak and to build up new ones where they are missing. Hence, efforts to create new knowledge systems must consider the characteristics that enhance central pluralism and expand opportunities for transformation (Grove et al., 2016; Muñoz-Erickson et al., 2017).

<table>
<thead>
<tr>
<th>Framework Concepts</th>
<th>Definition or Use in Knowledge Systems Analysis</th>
<th>Example</th>
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<tr>
<td>Organizational Complexity</td>
<td>When knowledge systems are in a complex decision-making landscape that involves a multiplicity of interacting actors and viewpoints, and complicated rules of procedure. Oftentimes knowledge and decision-making become tightly coupled to one another, such that integrating new knowledge into this form of closed system can be a very difficult undertaking.</td>
<td>Decisions involving ecosystem services typically involve trade-offs among ecosystem services and multiple stakeholders and organizations. Knowledge of the trade-offs among ecosystem services is often absent from or neglected within disconnected decision-making processes, leading to decisions that have unexpected or problematic outcomes. The UN Framework Convention on Climate Change coordinates across multiple experts and organizations the various tasks of emissions inventories, including defining which emissions to count and allocate to responsible parties, the standardization of those methods, and the review processes by independent experts from other countries to ensure transparency. Boundary work and orchestration are also crucial functions to ensure legitimacy and credibility across multiple institutions and forms of expertise.</td>
</tr>
<tr>
<td>Operational Complexity</td>
<td>Conditions under which highly dynamic social work is necessary to carry out the core functions of knowledge systems, involving diverse participants and organizations, and requiring careful coordination across the system's many organizational components.</td>
<td>The knowledge claims underlying EIA regulatory decisions have been widely contested by both industry groups and environmental organizations, depending on which group perceived an interest in undermining EIA credibility on any given policy issue. Further layers of organizational complexity, e.g., the presence of the EPA Science Advisory Board, often exacerbate knowledge conflicts rather than mitigate them by presenting another opportunity for divergent views of the proper use of scientific advice to make and become subject to critical commentary by policy actors.</td>
</tr>
<tr>
<td>Political Complexity</td>
<td>Conditions of high interconnection between knowledge production and the exercise of political power, especially in the presence of conflicts within or between organizations. In the adversarial political context of the US, in particular, the connection of science and expert advice within many facets of decision-making in the US federal government is an illustration of the political complexity of knowledge systems.</td>
<td>The knowledge claims underlying EIA regulatory decisions have been widely contested by both industry groups and environmental organizations, depending on which group perceived an interest in undermining EIA credibility on any given policy issue. Further layers of organizational complexity, e.g., the presence of the EPA Science Advisory Board, often exacerbate knowledge conflicts rather than mitigate them by presenting another opportunity for divergent views of the proper use of scientific advice to make and become subject to critical commentary by policy actors.</td>
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Figure 7 Layers of complexities in knowledge systems after Muñoz-Erickson et al. (2017)
4. Conclusion

The article directly links artistic means of engagement as methods of activation with urban planning and sustainability. The need for a new approach towards global issues like climate change and lack of mutual understanding between various stakeholders of the city and authentic engagement are all introduced as part of the bigger need to realise change and social transformation on the ground. Also, this is linked to the need to move from passive spectatorship to immersion that provides more flexible, reflexive and catalyst methods of research, engagement and cities making. The main goal is that cities and processes that are set on track to be more sustainable but not guaranteed to be liveable will ultimately not be sustainable as those who experience it are human beings whose needs are more than just good function. Given its transformative focus, the study invites for ways in which innovative engaging two-way interactions could achieve more by moving from silo efforts to synergy (i.e. a combined effort produces more than separate efforts), as interactions are made more visible and shaped by combining the catalyst power of architecture and art with unique features and the capabilities of technology. The study suggested many ways of integrating place based and art based approaches to be done purposefully to ensure attachment and belonging as well as multi-influence spheres on a wide range of people as well as the city’s life, resilience and image or atmosphere. Also, using a reflexive and reflective research approach is recommended as the paper advocates better alignment with human nature and stronger consideration of the social aspect to re-define the people in the city as a human, rather than mere users; and promote the integration of a rather needed scrutiny in upcoming governance models as they progress goals that require (and depends on) changing human behaviour and attitude.
5. References


