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Learning from collaborative processes to design the urban green transition

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Collaborative city-making and planning has been at the forefront of urban praxis and research for decades now. More recently, the pandemic crisis has emphasized how cities could benefit from proximity-driven policies for regenerating neighborhoods and triggering social innovation initiatives. The historically layered cities, collectivist culture and grassroot political vitality of the Mediterranean context are fruitful grounds for the development and the experimentation of such practices. The major European political strategies and programs, such as the European Green Deal, the New European Bauhaus and the "100 Climate Neutral and Smart Cities by 2030" mission, identify citizens' engagement as a crucial factor to foster an effective green transition. Innovative approaches, practices and policies are needed for such a process to be consistent with the vision of energy as a social need and a democratic requirement: inclusive and affordable measures can build on already tested participatory and transversal experiences of collaboration in urban governance.
This paper addresses the topic of innovative co-planning and co-design processes by analyzing practices and tools from three case studies/initiatives implemented in Bologna (Italy), both to more consolidated application realms – urban greening, cultural heritage, public spaces, and to emerging energy/green transition domains. Such an inquiry will benefit from the research experiences of the interactive platform "Urban Innovation Lab – Bologna another way", and two H2020 projects, ROCK – Regeneration and Optimisation of Cultural Heritage in Creative and Knowledge Cities (GA730280), including co-designed and co-constructed actions, and the ongoing GRETA-GReen Energy Transition Actions (GA101022317), involving energy citizenship pathways. The aim is to recognize and analyze implemented tools and replicable strategies, to question and open up to the potential transferability of the lessons learned on collaborative processes to effectively address climate challenges in the Mediterranean context.

KEYWORDS: citizen engagement, co-design tools, urban green energy transition, participatory practices.

INTRODUCTION

The discourse over participatory practices in urban processes is far from new: in the 1960s the writings of Jane Jacobs testified for a plural and collaborative way of "building and dwelling" cities [1], opposed to the rationalist attempts to delegate to planning authorities the acts of organising urban spaces and, by so doing, regulating urban life. Europe has been at the forefront of both research and practice of participation, building upon the post-war ethos of solidarity and cooperation among states [2] and a historically grounded political democratic culture [3], even more strongly perceived in Mediterranean Europe.
A Mediterranean discourse over participation can be established for a threefold reason: first, because it is possible to identify, at least for some countries, a distinctive Mediterranean welfare regime, "not only because of […] geographic proximity but also due to common historical and cultural legacies" [4]. Second, because of the underlying collectivist culture characterizing its socio-anthropological scenario [5]. Third, because the informality underlying the social economy of Mediterranean cities has made it possible for many grassroot movements to emerge [6] such as vernacular adaptive reuse, circuits of commerce and solidarity, which have eventually been absorbed and institutionalized by local governments into policies and politics of participation [7].
Therefore, the Mediterranean basin has historically proven a fertile ground for participatory urban governance. Cooperation, however, has shown some limitations in methods and scope. While methodological limitations are beyond the aim of this paper, the latter are particularly relevant today:

participatory practices have mostly focused on matters of societal concern, engaging citizens in the co-production of services, in the co-design of urban spaces and in culture-led acts of urban regeneration.
The manifold environmental crises which Mediterranean cities are now facing, including heatwaves and the rising cost of energy services [8], are still tackled institutionally and with regulatory tools only, with very few initiatives being activated with the involvement of citizens. This, despite the inherently social nature of energy needs [9] and the emphasis that the European Commission is placing on citizens' engagement as a crucial factor to foster an effective green transition – as envisioned by programs such as the New European Green Deal strategic plan [10] and the New European Bauhaus initiative [11].The decades-long participatory experience of local administrations and of citizens in Mediterranean Europe has provided effective pathways to collaboration in tackling urban issues. The paper deals with methodologies and lessons learned from Italian experiences carried out in the single geographic scenario of Bologna, that can be taken as a relevant example of how knowledge on participatory processes can be capitalized in the green transition of cities, and how this transition can be accelerated through collaborative practices.

1. PAPER STRUCTURE AND METHODOLOGY

The paper will examine innovative collaborative and co-design processes with the aim of understanding the replicability, scalability and applicability of this knowledge and the related tools and practices to address more effective green transition actions in contemporary cities.). The metropolitan city of Bologna is a reference for several reasons: its positioning in the Mediterranean area has turned it into a strategic crossroad and an ideal testing ground for strategies addressing cross-cutting issues at the Mediterranean and European level; its long and established tradition of grassroot activism and collaboration [12], which provides abundant data about participatory processes and multi-stakeholder governance; its active commitment in fostering and implementing policies aimed at sustaining both Green and Digital transition. Such effort led to the recent nomination of the municipality among the 100 European cities adhering to the EU-funded mission "100 climate neutral cities by 2030 by and for the citizens" [13]. Each selected city will have to develop and implement a "Climate City Contract" that will constitute a co-created political commitment to the EU Commission, to national and regional authorities, but especially to their citizens. Thus, communities' involvement is among the main evaluation criteria of the candidates, crucial for the success of the mission by virtue of citizens' role as key political actors, users, producers, consumers or owners of buildings and transport means.
Aware of the strict relation between the environmental transition process and participation of citizens, and thanks to its longstanding experience in both realms, Bologna is working towards citizens' broad involvement in the care and regeneration of urban public spaces, aiming at combined improvements in terms of quality of life and spaces, accessibility and climate resilience [14].
The three case studies, described in the next paragraph, were selected to cover a broad typology of initiatives, and to investigate the methods and tools that were used: a major focus is dedicated to consolidated application realms for participatory practices, such as culture, the commons, regeneration, adaptive reuse of spaces, urban governance. In so doing, specific attention will be devoted to the experience gained within the authors' direct research activities, that have been including applications and experimentations in the built environment that imply inclusive planning and design practices implemented in the city of Bologna. Cases are illustrated with the aim of recognizing, analyzing and comparing recurrent and transversal aspects – highlighting the participatory approach, field of application, actors/stakeholders involved, objectives, results obtained, and strategies related to the collaborative processes adopted, which could be replicated in the Mediterranean context, contributing to a just ecological transition.

2. INSIGHTS FROM THREE COLLABORATIVE EXPERIENCES IN BOLOGNA

2.1 The H2020 Rock project: shaping urban futures through collaborative heritage transmission

The experience of the H2020 ROCK - Regeneration and Optimisation of Cultural Heritage in Creative and Knowledge Cities (GA730280) project, in which the Bologna Municipality was the coordinator and one of the demonstrators, has been useful to test the model of 'Collaborative City' [15] thanks to the involvement of a dense network of stakeholders and local actors, supported by enabling technologies and open data. The added value of such initiatives is that they exemplify how citizen engagement in urban regeneration and environmental sustainability issues are intertwined, as are the social or behavioural dimensions and the physical one, concerning the built environment.
In the frame of ROCK project and in collaboration with the city agency "Foundation for Urban Innovation" (FIU), the Department of Architecture of the University of Bologna and the Municipality carried out some experimentations distributed in city-central underused or neglected public spaces, triggering regeneration

processes that featured social inclusion, accessibility and sustainability, with a substantial focus on environmental solutions and greening actions for the mitigation of Urban Heat Islands (UHI).
Co-design, self-construction and co-management were at the basis of the methodology: most of the transformations were temporary pilot experimentations, not only co-designed but also co-constructed by citizens and university students. The technological constructive systems were low-cost and did not require specific skills, in order to be applied by non-professionals. Such experiences demonstrate the possibility to influence long-term urban dynamics, attempting to slow down the threat of climate and global changes with small local and easily implemented efforts, and to re-activate communities as well as places.

2.1.1. “The Five Squares” re-use and greening co-design project.

The ROCK project developed a coordinated a synergic set of pilot actions in the historic Bologna University area, to test a sustainable urban regeneration approach pivoted on local Cultural Heritage (CH) and based on co-creation/participatory processes, enabling technologies/tools and greening solutions.
Piazza di Porta Ravegnana, Piazza Rossini, the terrace of Opera House in Piazza Verdi, Piazza Scaravilli and Piazza Puntoni, were involved in “The Five Squares” workshop developed within the programming of the “Bologna Design Week” and “Researchers’ Night” in September 2019. The workshop followed the preparatory phases previously set-up by the ROCK project, such as the U-lab participatory laboratory, based on the Living lab methodology [16], and the applicative premises, such as the temporary installation “Malerbe” (Piazza Scaravilli, 2017–2019). Malerbe experimented the effects of the combination between physical transformations and innovative uses of public spaces, making CH more accessible and testing greening solutions [17] (Fig. 1 - a). The “Five Squares” co-design workshop was followed by two temporary but impactful implementation actions: “Green Please! The meadow you don’t expect”, a first redefinition of the Piazza Rossini square, and the “U-Garden”, providing a new set-up of the Opera House terrace (Fig. 1 - b). The first one, in particular, connects the experimentation of greening solutions, local communities' engagement practices and monitoring tools to evaluate the project impacts [18].
The interest raised by the “Green Please’" temporary installation, that substituted a parking area with a vegetable meadow, led to a successive phase of transition, "Green Please 2.0! The green you don’t expect”, that will finally accompany the square to the permanent transformation into a pedestrian and regenerated space, under the pressure of citizens that embraced the new setup of the square. This the second temporary transition project (realized by FIU, with the scientific collaboration of the Department of Architecture - University of Bologna and BAG Studio) represents a further development of the previous one, embedding more in-depth educational, social and awareness purposes on ecological issues, environmental and common CH care (Fig. 2). Another relevant aspect of the ROCK pilot actions is that the physical transformations and the citizens’/stakeholders’ involvement were supported by the use of enabling technologies that allowed to monitor the environmental – and indirectly social - impacts of the envisaged and implemented transformations. Environmental microclimatic simulations were performed using the software ENVI-met [19] in order to analyse different greening solutions and to evaluate the optimal configuration both in terms of mitigation of the UHI phenomenon and in terms of outdoor comfort conditions improvement. Moreover, monitoring visitors’ presence was allowed using crowd analysis sensors to evaluate space usability, before and after the interventions.

(a) (b)

Fig. 1. The ROCK project temporary experimentations: “Malerbe” in Piazza Scaravilli during the self-construction workshop on July 2017 (a) and “U-Garden” on the terrace of the Municipal Theatre of Bologna, during the opening event, July 2019. (Credits: ROCK Project).

Fig. 2. The “Green Please 2.0” installation in Piazza Rossini, completed in June 2020. (Credits: ROCK Project).

2.2 The *Atelier* of ‘Urban Innovation Lab’, Bologna: a community space to co-design the future of urban transformations.

"Urban Innovation Lab – Bologna another way” [20] represents a further display of useful tools and strategies in collaborative processes fostering awareness, knowledge sharing and community involvement on topics of common interest for the contemporary cities. The Lab - inaugurated in December 2021 and developed within the “Quadrilatero della Cultura” (Cultural District) programme [21] - is a permanent, multimedia and interactive installation presenting an original storytelling of the metropolitan city of Bologna and its changes over time. The freely accessible spaces are distributed in different halls between the Palazzo Comunale (City Hall) and the Salaborsa library, connected and fully integrated with the surrounding open public spaces located in the heart of the historic centre. The design, curatorship and prototyping are the result of a collaborative process coordinated by FIU and carried out by a multi-disciplinary research team involving different Departments of the University of Bologna, the Municipality, several cultural institutions, and professionals.

Contents and data, equipment and technologies, traditional and innovative visual storytelling strategies characterize in a specific and integrated way the five environments, which articulate the Lab. The *Gallery*, entry threshold to the visit route, is a dynamic and interactive narration of the city from the 1900s to date, tracing the changes and combining historical images and maps with current ones; the *Boulevard* offers an immersive experience in the contemporary city of flows, connections and infrastructure; the *House* hosts data and information on places, topics and visions of the city (e.g., the city in motion, the city of greenery, the city in transformation, etc.), displaying the contents on a large maquette supported by AR; the *Studio* is a data-room for thematic in-depth study and data visualization on the city, based on diagrams and maps from the Bologna Urban Atlas; and, finally, the *Atelier* is as a workshop area where to imagine and contribute to the future transformations of the city.

The Lab is not simply an exhibition space but stands as an interactive experience directly involving the wide target of visitors and users that daily cross the area - including professionals, researchers, university students, citizens, schools, tourists, and so forth - in data collection and content co-production.

To that end, the *Atelier* is the environment that presents the most marked vocation as operative platform for community engagement, reflecting the horizontal and collaborative approach of the Urban Innovation Lab.

The *Atelier,* inspired by places of experimentation such as the craftsman’s workshop or the designer’s office, is a laboratory area for research and discussion with a specific focus on transformation processes involving urban public spaces. The same concept guided the two main elements that define the layout of the room and support the co-design activities: an instrument wall that collects the contents, and a worktable enabling analog and digital design interactions. With the aim of addressing all the different components involved in urban transformation processes, and strengthen the engagement of a wide range of potential stakeholders, the *Atelier* provide several activities - guided tours, talks and workshops - and supporting tools, including an illustrated glossary, a materials database, an atlas of best practices at different geographical scales, a small library, a board for educational activities, a digital archive and touch screens to experiment co-design experiences on some strategic areas of Bologna (Fig.3).

The *Atelier* periodically addresses different and transversal topics significant in describing domains and challenges of contemporary cities, ranging from creative and cultural collaboration, social inclusion, health and life quality, greenery and sport, sustainable infrastructure, ecological transition, and so forth. The topics are investigated by the users both in free and mediated mode, supported by the knowledge instruments. The open and operative abacus of strategies and solutions, presented in the form of good design practices referring to case studies or experimented through the laboratory activities, covers among others: ephemeral and temporary actions able to transform the perception of places and enabling a mix of uses; intervention on mobility system introducing new dynamics in urban context, promoting safer pedestrians and cycle paths; reactivation or recovery of neglected or abandoned small buildings and areas as shared facilities; enhancement of green areas and parks with different vocations and equipment; networking programs as tools to define different spaces as coherent and recognizable systems. What is considered as relevant is not only the physical transformation of places, but all the aspects involved in the project in terms of actors involved, actions, processes, uses, impacts and results.

(a) (b)

Fig. 3. The *Atelier*, pictures of the environment (a) and co-design activities supported by the available equipment, the panel of instruments and the worktable (b). (Credits: UNIBO).

2.3 The H2020 GRETA project: facilitate the energy transition through the active participation of citizens

GRETA - Green Energy Transition Action is a H2020 Research Innovation Action (GA 101022317) started in 2021. It has proven a particularly timely support framework in the light of the rising energy cost, the subsequent increase in energy poverty levels and the EU imperative to reduce import dependency through clean, affordable energy. The GRETA project aims at producing comprehensive and actionable insights to support the design of EU policies that more effectively engage citizens in the energy transition. It wants to contribute to the improvement of the understanding of the energy citizenship phenomena, within and beyond energy communities, with the final goal to design and test mechanisms for behavioural change. These mechanisms, conceived and to be tested within the project, are the Community Transition Pathways (CTPs): routes that support individuals and communities in transitioning between different levels of citizenship engagement and in enhancing positive energy citizenship behaviours (Fig. 4). GRETA is investigating how CTPs can strengthen and regulate the relations among the actors involved in the transition through Energy Citizenship Contracts (ECCs). ECCs are a specialisation of the Climate City Contracts envisaged by the “100 climate neutral cities by 2030” mission, to support the multi-level co-creation process of cities’ transition.
GRETA is working within six case studies in different European Countries, including in the Mediterranean area (Italy, Spain, Portugal), adopted as pilot experimentation of specific actions, policies and tools which include the adoption of renewable energy resources, use of electric vehicles, monitor their energy consumption, co-planning of mobility programmes, and an empirical citizen consultation on the emergence of energy citizenship. The Italian case study is located in the Pilastro/Roveri district in Bologna, a mixed-use area (industrial and residential) where strategies are being tested for tackling injustice and exclusion. Engagement mechanisms have been established that are expected to elevate the community to a more active engagement level. The on-fields initiatives are designed and managed in synergy with the parallel project GECO – Green Energy Community project (EIT Climate KIC TC_2.2.15_190736_P125-1) that is working to create the first energy community of the city [22] [23].

The "GRETA lab" [24] represents the main instrument to approach energy transition issues, founded on the belief that citizens, companies and policymakers should have a key role in carrying out the energy transition. The lab consists in a set of incremental activities organized in different locations. The district, identified by the University of Bologna research team [25], acts as a testing ground for strategies, urban treks, roundtables with local associations and initiatives dedicated to energy saving, environmental justice, as well as the opportunities for the creation of an energy community.
The preliminary outcome of such a shared pathway (developed during a two-day workshop), is the draft of a co-designed Collaborative Energy Citizenship Manifesto, envisioning the necessary steps to pave the way for a just energy transition towards a low-carbon society, acknowledging needs, role, responsibilities and shared goals of the community living and working in the area (Fig.5). The participatory lab highlighted the main barriers to overcome: a cultural change in life habits and behaviours, greater institutional accountability and the creation of alternative governance mechanisms. In addition to this, the open relationship built among the participants during the implementation of the “GRETA lab”, have proven the workshop and the other activities to be effective enabling instruments, to bring out the ‘energy’ and the power of local communities in recognizing, sharing and participating to the common goals subtended to green energy transition.

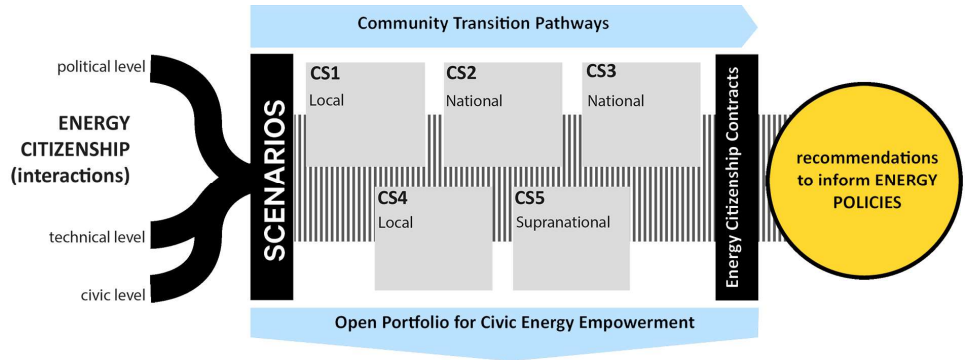

Fig.4. GRETA Project. Community Transition Pathways (CTPs) towards Energy Citizenship Contracts. (Credits: Infographic by Martina Massari, re-elaborated by the authors).

Fig.5. ‘GRETA lab’, co-design activities at the Pilastro-Roveri district in Bologna. (Credits: UNIBO)

CONCLUSIONS

The EU Green Deal has made it a founding milestone of its strategy “to make sure that no one is left behind” [26]. This means that policies will have to be designed, actions will have to be implemented, and strategies will have to be crafted that allow for a just transition, and for an equitable access of all citizens to greener economic, urban and energy systems. A vision that seems to be necessarily embraced in the Mediterranean basin, considering the drastic increase in the cost of energy to be faced in addition to the more consolidated dramatic consequences of climate change (i.e., rising sea levels, heat islands, drought, etc.). A process that has to be driven by a major commitment of institutions and businesses, combined to a true citizens’ involvement: this is not only a democratic requirement, but a crucial step in eliciting collective awareness and fostering large-scale behavioural changes towards sustainable lifestyles.
The role of citizens in making changes, especially at the urban level, has been incorporated into official politics for a long time now in many European cities, yet the field of energy transition and of the green economy is still lacking participatory tools and approaches that could make this transition more just and

inclusive. The present paper has posited itself as contribution at the crossroad between domains that have an established tradition of collaboration and emerging collaborative experiments in the energy field. Starting from direct research experiences carried out in the city of Bologna, three different projects with a focus on co-design and collaboration have been analysed on the basis on their domain / topic of intervention, the type of action, the involved stakeholders, the participatory approach and their results and outputs (Fig. 6): the aim has been to identify the major cross-cutting features and characteristics of participatory processes to be transferred into the energy domain and in actions oriented at cities' sustainable transition.

	The Five squares (ROCK)	The Atelier (Urban Innovation Lab)	GRETA lab (GRETA)
Topic / field of intervention	Public squares, quality of the public built environment, sustainable transformation of the historic city.	Creative and cultural collaboration, social inclusion, greenery and sport, health and life quality, sustainable infrastructure, ecological transition.	Green energy transition (energy saving, energy justice, energy communities).
Type of action	Temporary greening and reactivation actions.	Laboratory for experimenting and prototyping urban transformations.	On-site participatory process
Involved stakeholders	Citizens, students, researchers, institutions, third sector (associations, cultural organizations).	City agency (FIU), researchers, professionals, public and cultural Institutions.	Residents, students, researchers, energy companies
Participatory approach	Co-construction, co-design.	Space used for laboratory and collaborative activities.	Participatory labs
Results / outputs	The squares became pedestrian, temporary actions inspired middle-term and long-term urban solutions.	Hub of knowledge sharing and co-creation	Co-design of Energy Transition Pathways, Collaborative Energy Citizenship Manifesto

Fig. 6. The table summarises the three processes main features. (Credits: elaboration by the authors).

The research has illustrated that practices and tool such as co-construction, co-research, living labs, workshops and co-design actions contribute to fostering bottom-up stances, knowledge creation and sharing, awareness raising (with great potential in terms of behavioural changes). The positive experiences that are here recorded advocate for a scalability of these tools into other emerging domains (as has been the case especially with project GRETA and GRETA lab).
In the light of the intense stress put at Institutional level on citizen agency in sustainable urban transformations, an accelerated incorporation of these approaches and methodologies is necessary in order to tackle major urban issues such as energy justice, which cannot now be disentangled from the social issues that trigger it. Such a domain could greatly benefit from collaborative and multi-scalar environments of action and deliberation such as the ones described above, and can lead to reaching EU objectives on both social and environmental justice, as well as triggering a cultural change.

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