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Co-design and Urban Resilience: Visioning Tools for Commoning Resilience Practices

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Abstract

In response to the environmental and social challenges of an uncertain future, practitioners and communities across Europe and beyond have started to engage with the concept of ‘resilience’ and experiment with forms of local resilience. However, many of these initiatives tend to remain localized, isolated projects, with little capacity to instigate broader change and at risk to disappear by not having the means to become sustainable in the longer term. We suggest that one way of sustaining and scaling local resilience practices is by developing digital tools that could enable connections and knowledge sharing across locations, through commoning in the digital realm. In this paper we introduce the specific co-design process we devised with the aim to develop an initial ‘brief’ for potential tools. By creating a co-design process that is situated, mediated, networked and open-source, we argue that the commoning process initiated in this project has the potential to evolve and expand, beyond the project time and initial user base – an essential quality in the context of collectively enhancing urban resilience through knowledge sharing and mutual support.

Keywords: resilience practices; commoning; resourcefulness; situatedness; network-based scaling; digital tools

1. Introduction

Positing that ‘commoning’ resilience practices is a necessary step in the process of achieving greater urban resilience, this paper introduces a co-design process, aimed at defining a set of digital tools that could enable connectivity and exchanges between presently dispersed resilience initiatives. In order to identify potential tools, the co-design process involves potential users (i.e. practitioners and communities who have a key role in driving such initiatives) in defining the types of local knowledge produced and the kinds of capacities needed in order to advance their resilience practices. Furthermore, we argue that co-designing tools with some of those for whom they are intended (potential users) and allowing the process to be open and replicable are key to ensuring the continuity and expansion of the commoning process beyond this project, our involvement as researchers and designers, and the initial user base. The paper thus extends co-design to the domain of urban resilience by defining a specific process that is directly related to the aim of commoning resilience practices.

The discourse of ‘resilience’, which was first introduced in the 1960s-70s as an area of ‘new ecology’ and broadly relates to the way in which societies adapt to externally imposed change (Joseph 2013), has (re)gained prominence and popularity among the wider academic community, policy-makers and grassroots activist groups alike. Particularly given the unknown and unpredictable effects of climate change (IPCC 2015) and the multiple and interlinked challenges of resource depletion, loss of welfare and financial crises, cities are now seen to face a ‘resilience imperative’ (Lewis and Conaty 2012).

The past decade has seen a proliferation of resilience work, both within academia and the wider policy arena, which has been met with some critique. For example, it has been argued that resilience represents the preferred means of maintaining business as usual in the context of climate change (Diprose 2015), promoting “responsibility without power” (Peck and Tickell 2002, p.386), or placing the onus on individuals and communities to take responsibility for their own social and economic well-being, thus normalizing neoliberal ideology (Joseph 2013).

In parallel, however, ‘resilience’ has also been used to frame particular forms of activism, through the activities of community groups and environmental campaigns (MacKinnon and Derickson 2013). Such grassroots articulations of resilience typically involve the use of the term for designing community-driven approaches to environmental and social issues, utilising resilience as a vehicle for imagining and creating alternatives to the mainstream society (Cretney 2014). In this case, resilience tends to become contingent on commoning processes (PetrescuPetcou and Baibarac 2016), where ‘commoning’ is understood as the social process that creates and reproduces the commons (Linebaugh 2008). By fostering new social and economic values, grassroots resilience initiatives are seen to have an important role in ‘re-commoning’ the assets necessary for a community to sustain collective activities in the neighbourhood and beyond (Brown et al. 2012).

Yet, while the number of small-scale resilience experiments has increased in the recent years (Bresnihan and Byrne 2015), only very few projects seem to have the means (e.g., financial, know-how, legal and technical advice) to become sustainable in the long term, scale or acquire strategic capacities to transform the systems in which they operate (Petrescu, Petcou and Baibarac 2016). At the same time, in order to show viable alternatives to the prevalent neoliberal system, there is a need to overcome the ‘local trap’ (Purcell 2006) in which many grassroots resilience initiatives tend to fall, due precisely to their vulnerability to scarce resources. The ‘local trap’ assumes that localizing decision-making is inherently more likely to bring about more socially just and ecologically sustainable outcomes than other scales, which fails to recognize that the outcome actually depends on the political agenda(s) of those who are empowered by the particular scalar arrangement employed. To address this issue, it is important to foster trans-local relations between sites of experimentation and create opportunities for sharing local ‘resourcefulness’ (MacKinnon and Derickson 2013) – understood as the specific knowledge developed locally – which could support other groups and projects, sustaining a collective process of enhancing urban resilience (Goldstein 2012). The notion of resourcefulness situates resilience in a more

positive light, relating it to the agency of empowerment and governance of the community, and therefore also to the governance of common resources (Ostrom, 2009).

The need to ‘common’ resilience practices emerges in this context. We suggest that enabling networks to emerge and sustaining processes of commoning could benefit these practices both on an individual and collective level. On the one hand, it could enhance the sustainability of local initiatives, enable them to scale and generate new iterations through replication and multiplication. On the other hand, it could enable connections between initiatives across locations, facilitating knowledge sharing and mutual support, and building collective agency to generate larger scale change.

As a way of addressing this need for commoning, we set out to identify the kinds of ‘resourcefulness’ that could be shared across locations, and subsequently imagine and define a set of digital tools that could prompt and sustain this commoning process. The use of digital technologies can sustain links and communication across remote locations and make local practices themselves more resilient. Also, commoning these practices into the ‘digital commons’ (Bollier 2014) shares key aims with the open-source movement in software development, including that of democratising knowledge and access to information and to the means for knowledge production (Bradley 2015).

Open-source philosophies and practices have recently entered fields such as architecture and design, as illustrated by the WikiHouse¹. Furthermore, the potential for an ‘open-source production of urban commons’, which could democratise urban development, has also been noted by the ‘temporary micro urban commons’ projects, such as those initiated by the groups Rebar², a design-art-activist group, and AAA³, a studio for self-managed architecture (Bradley 2015). When used for the creation and safeguarding of urban commons, technology can help address pressing urban problems (e.g., poverty, inequality, environmental degradation), as illustrated by small-scale socio-technological interventions, such as the 596 Acres platform⁴ (Hollands 2014). The platform was initially designed to turn Brooklyn’s 596 acres of under-utilized publicly owned land into common use by a range of community groups and individuals for activities such as gardening. The platform’s online environment, effectively a ‘knowledge commons’, has been crucial in the endeavour to repurpose vacant land, by connecting people to each other, matching skills, and sharing information and experience about how to transform vacant lots into sustainable growing plots (Radywyl and Biggs 2013). The success of the project, which in a few short years and with few resources gained widespread support and legitimacy from various urban stakeholders, is argued to be illustrative of how “linking urban and digital commons can support the replication, consolidation and wider legitimacy of novel community practices” (ibid, p.160).

As distinct and complementary to platform such as 596 Acres, we propose not only to provide tools for commoning resilience practices but also to co-design them with potential users in ways that can ensure the continuity of the commoning process – and the further development of tools – beyond this project and our involvement as researchers and designers. This approach addresses calls for re-localizing both knowledge and the means for its co-production within the actual communities who will safeguard the commons (Antoniades and Apostol 2014). At the same time, building on the open-source movement, we see the process

of commoning resilience practices as a form of ‘commons-based peer production’ (Benkler 2006), which is necessarily based on collaboration among large groups of individuals, open access to information and also to tools for innovation (Benkler 2006, Bollier 2008).

The co-design process introduced in this paper involves potential users in all the design stages, including initial discussions to better understand local resilience contexts, local resourcefulness and needed resilience capacities; sessions of making through prototyping and reflection on the outcomes. Furthermore, the co-design process is framed by four key principles drawn from the literature, which are directly connected to the overall objective of commoning resilience practices.

We commence by discussing these principles and the methodology adopted for developing the tools. To illustrate the co-design process, the paper focuses on the initial visioning stage, which was aimed at involving potential users from three different city contexts in defining types of resourcefulness that could be commoned, resilience capacities needed and related needs for tools. We conclude by re-positioning the findings emerging from this initial co-design stage in the context of the overall process and reflecting on the specificities of co-design in the context of urban resilience.

2. Framing a co-design process for commoning resilience practices

The need to engage with multiple stakeholders when aiming to enhance resilience in practice and operationalise the concept as part of urban development or regeneration approaches has become an imperative (Beilin and Wilkinson 2015, Boyd and Juhola 2014, Cretney 2014). At the same time, issues of power and social inequalities can make it difficult for some stakeholders (particularly from socially and economically deprived urban areas) to have a voice in defining more resilient futures or informing these visions with their needs and wishes (Welsh 2014). This highlights a need for making visible multiple perspectives, working across many levels and with the involvement of diverse actors who engage with aspects of urban resilience in everyday practice and in diverse settings.

The co-design process we have devised for developing the digital tools introduced here acknowledges the need to work with various urban stakeholders (such as practitioners, city officials and ordinary inhabitants) and to bring together diverse knowledges and skills. The process is framed by four key principles, which we consider to be directly related to the aim of commoning resilience practices.

- (1) **It is a ‘situated’ process** (Jasanoff 2004, Haraway 1988), which acknowledges the ‘local’ as an important site for experimentation and knowledge production through experiential practice (Petrescu, Petcou and Awan 2010, Ingold 2013), also recognizing that design necessarily comes from ‘somewhere’ (Suchman 2002). The tools will be collaboratively produced, through participatory design methodology (Szebeko and Tan 2010). This will include co-defining local contexts of ‘resilience’

and needs for tools with potential users, based on their direct experience of engaging with this concept in practice and creating opportunities for them to share the specific knowledge developed locally.

- (2) **It is a mediated process** as we ‘intervene’ in local contexts through practitioners who have an awareness of local resilience needs and have established relationships with local communities over time. By providing a ‘space’ where knowledge is developed through local experimentation, these ‘communities of practice’ (Wenger 2010, Wenger 1998) offer opportunities to investigate practices and processes as both subjects and objects of the co-design process. We design with, and for, existing practices (Björgvinsson 2008), using participatory action research methods (Reason and Bradbury-Huang 2000) and leaving the process open to enable new communities and practices to emerge.
- (3) **It is a networked and relational process** (Latour 1996, 2005), which facilitates connections and communication between various groups. With a logic distributed participatory design (Lorimer 2016), we employ the concept of networks as ‘means’ for diffusing knowledge across scales and locations, for sustaining dynamic relations between group members and supporting common endeavours. Managing connectivity is an important quality for maintaining resilience within systems made of small structures (Biggs et al. 2012). As such, we are designing ‘strategically’ (Hill 2012) the networks as both subject and output.
- (4) **It is an open-source process**, which acknowledges the collective ownership of the knowledge produced and the means for knowledge production (Bradley 2015, Benkler 2006). These will be circulated back into the communities from where they emerged, while at the same time remaining open to allow others to adopt them and continue the process of co-production of knowledge beyond the life of the project and the initial user base (Botero and Hyysalo 2013, Schoffelen and Huybrechts 2013). This aspect of the process is intended at stimulating opportunities for ‘recursive engagement’, defined as “the capability of a public of being able to take care of the infrastructure that allows its existence as a public” (Teli et al. 2015, p.20). At the same time, the process builds on the ‘new commons’ movement (Foster and Iaione 2016, Benkler and Nissenbaum 2006), which is seen as a ‘path’ towards new forms of production, use and governance of shared urban resources. We thus understand the tools as digital commons, and their production and use as a way of ‘commoning’.

Building on these theoretical principles, the research approach is to work in real urban contexts, in three European cities (i.e. London, Paris and Bucharest), together with local practitioners and tapping into their networks (e.g., communities and civic groups involved in resilience-related projects). The tools prototyped in these three cities are intended to be open and flexible so that they can be easily replicated, adapted and re-appropriated in other contexts, enabling the continuation of the co-design process beyond the project by making the technology an object of collaboration and co-production in itself (Teli et al. 2015). The

different characteristics of the three urban settings together with the diverse resilience challenges addressed by the local practitioners offer opportunities for identifying various types of resourcefulness that could be commoned and capacities that may be needed in order to allow these initiatives to flourish – and thus, for imagining diverse tools.

The three selected cities are European capital cities that provide geographic and social diversity, different cultural and political framings and traditions, and various degrees of awareness and support for resilience initiatives. In this sense, whilst not fully comprehensive, they are considered to sample a range of metropolitan contexts across Europe (i.e. new or re-developed neighbourhoods, in London; disadvantaged suburban neighbourhoods, in Paris; and post-communist neighbourhoods, in Bucharest). The local practitioners are typically architectural practices⁵ (Figure 1), and also NGOs and other civic groups in Bucharest, who share a strong interest in enhancing resilience through the direct involvement of local communities.



Figure 1: Resilience practices in Paris, London and Bucharest

These practitioners provide the ‘entry points’ into the three city contexts, in terms of obtaining a better understanding of the cultural and political framings shaping their activities and the challenges they face. This is an important aspect of the co-design process, as it allows the prototyping of relevant tools within a relatively short project timeframe⁶. At the same time, this approach allows opening up the project through access to the practitioners’ local networks and physical sites where to carry out the initial prototyping of tools.

2.1 Co-design methodology

Acknowledging that the intended outcome of design is to introduce change in everyday practices (Shove et al. 2007), which are intertwined with systems affected by developments outside design (Botero and Hyysalo 2013), our co-design strategy is to develop the digital tools with potential users. This is a three-stage process: *visioning*, *prototyping* and *reflection and transferring*.

The *visioning stage*, on which this paper is focused, includes a series of workshops with local practitioners and community groups who are key drivers of resilience

initiatives in their cities. The aim of this stage is to better understand the local contexts, identify forms of resourcefulness that are specific to their practices and define key needs for tools together with them as potential users. The needs for tools are connected to the types of capacities that the participants consider necessary in order to enable them to advance their resilience practices at different scales. Involving users in co-defining a vision for the tools to be prototyped enhances their agency in the co-design process. They shape not only the 'output' but also forms of stewardship (Hill 2012) for the tools, which can stimulate the kind of recursive engagement needed so that the users can take ownership of the design and the further development of the technology (Teli et al. 2015).

The *prototyping stage* consists of research residencies in each of the three cities to deepen the engagement with potential users. This stage is aimed at conceiving and testing a number of tools by working closely with potential users and engaging with their projects 'on the ground'. Focus is placed on hands-on workshops to 'make' the tools together. In our co-design process, we see 'making' not as a way of testing a specific concept, but rather as a way of eliciting tacit knowledge, fostering dialogue between diverse stakeholders and investigating the context, more than proposing a solution (Seravalli 2013).

The *reflection and transferring stage* includes a series of collective workshops, which bring together participants from the three cities. This stage is aimed at refining and amplifying the locally informed tools so that they gain wider relevance, beyond the initial context and user group, through 'generativity' (Schoffelen and Huybrechts 2013). Enabling other users to expand the initial set of tools by formulating their own adaptations and re-appropriations, which are relevant to their own needs and contexts, is seen as a necessary condition in distributed urban commoning processes (Iaione 2016).

In this article, we focus on the visioning stage as an illustration of the overall co-design process and crucial moment for shaping the tools prototyped later. This stage represented the first step in the process of first understanding the specificities of local resourcefulness that could be commoned at different scales (including the missing resilience capacities) and then defining potential useful tools together with local practitioners and community groups forming the initial user base.

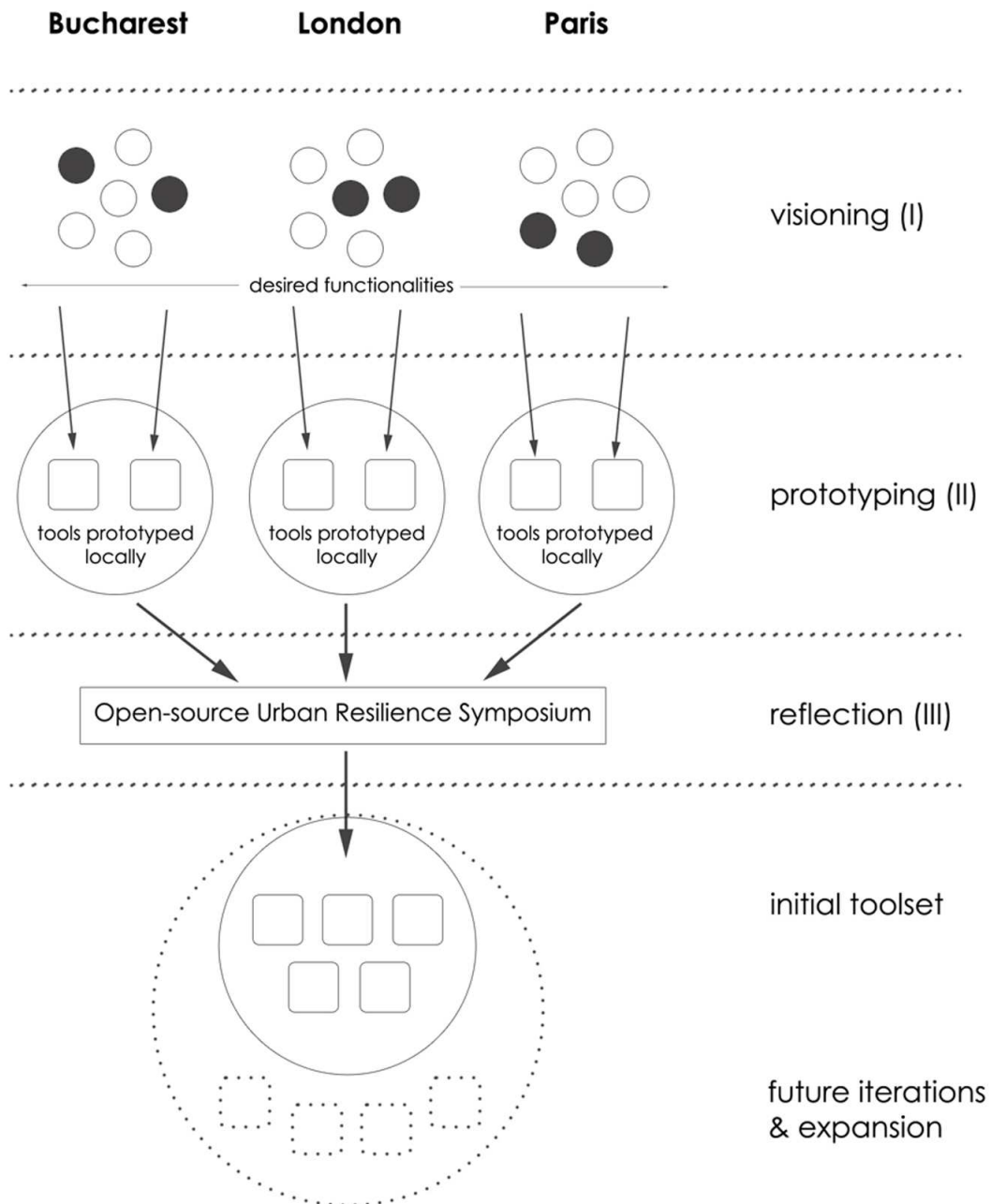


Figure 2: Co-design strategy

2.2 Visioning potential tools

The co-design process started with one workshop in each of the three cities, intended at familiarising the participants with the aims of the project and enabling them to inform the overall vision and directions for the tools with their experiences of local conditions and resilience needs. The aim was to involve the potential users not only in the co-design of the outputs but also in that of the ‘problem’ (Hill 2012), which can enhance the usefulness of the tools and at the same time create the conditions for their continued use and expansion. Reflecting the concept of recursivity (Teli et al. 2015), the initial participants will

remain involved in all subsequent stages of co-design, while the intensity of their involvement is intended to increase with each stage, eventually creating the conditions for them (and potentially also others) to take over the tools and continue the co-design process beyond the project.

The methods used as part of the workshops included:

- individual presentations, based on a number of questions sent in advance and aimed at prompting the participants to reflect on their practices and projects through the lens of urban resilience; and
- collective brainstorming sessions, aimed at identifying common interests and needs that could inform functionalities for the tools (e.g., kinds of knowledge specific to each practice that could be shared, knowledge gaps and needs, and ways in which such knowledge could be mutually shared between groups and initiatives).

Combining individual reflection with collective brainstorming sessions has an important role in identifying a common basis for discussion (Baibarac 2015) – or a ‘common language’ that allows participants to ‘translate’ generic, or abstract terms (such as, ‘resilience’) into their own words and practices and thus enable a collective ‘construction’ of a theoretical concept. Furthermore, the workshop methodology had a generative aspect (Avital 2011) by allowing the participants to articulate the usually tacit and implicit aspects of their resilience practices (Sleeswijk-Visser 2009) and share their work with others in a context that is not typical for them, which is often due to time pressures or geographical distance.

The workshops resulted in local definitions (or dimensions) of resilience, which highlight the kinds of resourcefulness typical for each practice, and an initial ‘brief’, or categories of functionalities for potential digital tools that could enhance practitioners’ resilience capacities in their specific contexts and in relation to their local practices through processes of commoning (Table 1). Defining these functionalities was aimed at enabling a selection of potential tools to be prototyped as part of subsequent research residencies in each of the three case study cities. Reflecting the ‘situatedness’ of the co-production approach, the workshop methodology was adapted to each case study to facilitate an articulation of the specificities of resilience in these contexts and accommodate different types of participants to the workshops.

Table 1. Dimensions of resilience and functionalities for tools.

	Bucharest	London	Paris
Locally specific dimensions of resilience	<i>Civic activation</i> of neighbourhoods to enhance civic engagement and foster new civic institutions	<i>Access to land, human and financial resources</i> to enable resilience experimentation and foster the development of ecologically and socially focused economic practices	<i>Self-management and networking</i> of resilience hubs to facilitate up-scaling of resilience practices to city and regional levels
Capacities for local resilience	<ul style="list-style-type: none"> • Resource sharing • Partnerships and collaboration • Knowledge sharing across a network of similar practices 	<ul style="list-style-type: none"> • Self-management of individual initiatives and site coordination • Interaction with surrounding communities • Learning and knowledge sharing with other similar sites in the city 	<ul style="list-style-type: none"> • Self-management of local hubs • Generation of new iterations/hubs and network expansion
Functionalities for tools	<ul style="list-style-type: none"> • Sharing project processes • Sharing local knowledge and know-how • Education and training • Network interaction 	<ul style="list-style-type: none"> • Internal organisation • Coordination • Sharing project processes • Sharing local knowledge and know-how • Sharing economic and organisational models 	<ul style="list-style-type: none"> • Internal organisation • Sharing project processes • Sharing economic and organisational models • Education and training • Network interaction • Access to external experts
Scales of tools	<ul style="list-style-type: none"> • Local/city • Trans-local/regional 	<ul style="list-style-type: none"> • Micro-local • Mobile/permeable • Local/city 	<ul style="list-style-type: none"> • Micro-local • Trans-local/regional

In Bucharest, the workshop (Figure 3) had ten participants representing cultural and civic organisations. These included the architectural practice studioBasar (the main local partner) whose work is focused on the civic activation of public space through temporary civic and cultural interventions, NGOs (i.e. the Resource Centre for Public Participation (CeRe); Komunitas, and interdisciplinary laboratory of non-formal education, socio-anthropological research, urban and community activation; and Greeninitiative, an environmental NGO promoting eco-education, green building and living, and sustainable development), a contemporary arts centre focused on interactive exhibitions addressing social and environmental issues (Tranzit) and representatives from the local School of Architecture (UAUIM).

While some of these practitioners had met or collaborated before as part of other projects, this was the first time when they came together as a group to share experiences and identify common themes of interest around the theme of resilience – an aspect that highlights the networked and relational nature of the co-design process. A common thread that brought them together (and in direct relation to the former communist past of the city) is the aim to enhance civic engagement in neighbourhoods and facilitate the emergence of alternative civic institutions that would sustain it. Collaboration and partnerships between practitioners and existing institutional networks (e.g., schools, academic institutions or public libraries) represents an important aspect of resourcefulness in this context as they can provide the necessary base within neighbourhoods through which to foster and sustain civic engagement processes.

The workshop was held at Tranzit arts centre and started with individual presentations, during which the participants presented their projects in a specific format that we structured to include: their understanding of urban resilience in the context of Bucharest, how they addressed this concept in their work, plans for the near future, opportunities and needs for achieving these goals. Asking the participants to prepare the presentations in advance of the workshop had a ‘primer’ role in order to immerse them in the area of interest for the project and also as a way of obtaining a better understanding of their current practices and experiences (Sanders, Brandt and Binder 2010). The presentations were followed by a collective brainstorming session, focused on identifying shared needs (or necessary capacities) and types of digital functionalities, which could inform an initial ‘brief’ for the tools to be prototyped in the following stage. Some of the needs included: “database of common resources”, “guides” and “case studies / examples” (Figure 6).



Figure 3: Bucharest workshop, April 2016

In London, the workshop (Figure 4) had fifteen participants, including the architectural practice Public Works (the main local partner) and some of their collaborators (typically, social entrepreneurs) involved in the R-Urban Wick project⁷, which experiments with circular loop economies and temporary uses of space (e.g., unused public land or in the process of being redeveloped). The workshop was held at the Mobile Garden City site, the current temporary site where R-Urban Wick comprises a number of mobile units made up of converted shipping containers and hosting diverse experimental projects run by community groups and individuals (e.g., a bicycle repair workshop and tool sharing unit, an experimental cafe using produce from the garden and surplus produce from a large wholesale market located nearby, a bio-digester unit and a classroom unit for experimental teaching and learning).

This temporary use of sites for experimentation is a key characteristic of the R-Urban Wick project, each experiment resulting in methods and techniques that are used to inform subsequent iterations, while aiming to guide local planning officials when redeveloping the sites. Differently than in Bucharest, the London workshop participants had worked together on different projects, some located also in other parts of the city, according to land availability. Their shared interest (in direct relation to the urban spatial and social contexts in London) is the development of alternative economic practices that could enhance community resilience, particularly in socially deprived areas. Access to land where communities can experiment with alternative practices is a key aspect of resourcefulness in this context, together with access to financial and human resources to sustain the sites of experimentation over time.

Also here, the workshop started with each participant discussing their current projects from the perspective of how they engaged with the concept of resilience, focusing on key aims, challenges and opportunities for their own activities. However, differently than in Bucharest, here we also introduced an example of a potential tool (i.e. a local wireless

network that could improve the organisation of the site and communication between the various initiatives located within it). The example had inspirational and generative qualities (Sanders, Brandt and Binder 2010), aimed at creating a bridge between the needs identified by each participant and existing technological opportunities. The fact that the London site already contains a number of initiatives that form a larger project, together with the relatively high level of technical literacy of the participants, gave us the opportunity to imagine and give the example of a tool. The decision also built on the experience from the Bucharest workshop, the brainstorming sessions highlighting the value of using technological examples as an additional way of prompting discussion and reflection. This inspiration moment was followed by collective discussions on specific needs and related tools that could be prototyped during the subsequent residency stage. Key needs included: “learn[ing] and giv[ing] skills”, “spreading networks” and “mak[ing] sure local communities can use available resources” (Figure 6).



Figure 4: London workshop, June 2016

R-Urban Wick in London builds on the experience of R-Urban Paris⁸. This project was initiated by the main Paris partner, the architectural practice AAA in 2011, in the suburb of Colombes, in partnership with the local authorities and a number of organisations, as well as with the involvement of a range of local residents. The project is aimed at creating a network of ‘civic hubs’ – resident-run facilities that form local ecological cycles and engage local residents in everyday eco-civic practices (Petcou and Petrescu 2015).

The Paris workshop (Figure 5) focused on one of the more established hubs, Agrocité, which is essentially an agricultural unit comprising an experimental micro-farm, community gardens, educational and cultural spaces. In terms of organisation, Agrocité is a hybrid structure with some components run as social enterprises (e.g., the micro-farm and the cafe), while others are run by groups of local residents (e.g., the community garden, cultural and educational spaces) and local associations (e.g., a compost school, a network of local

farmers⁹). Importantly, a core group of local residents oversee and manage the site with advisory support from AAA.

The six workshop participants included the core group of residents who are active users of the Agrocité site and manage the hub, together with representatives from AAA (who also contributed to translating the discussion). The workshop methodology was adapted also in this case to take into account the nature of the site and its users. Agrocité is located in the Fosse Jean neighbourhood, a social housing estate, and its users include mostly retired and unemployed residents, with a majority of women who have limited access to, and knowledge of using, smartphones, computers and the Internet. The workshop involved a discussion around their current experience of running the facilities provided by the hub, including what they perceived as being the most challenging aspects and prompting the participants to imagine how the hub could work better.

While there was no specific focus on digital aspects in this workshop, the potential for using digital tools to improve hub self-management had previously been discussed by the Agrocité group and AAA, being highlighted as an important resourcefulness aspect. The management of the various activities comprised by the hub is done on a volunteering basis, with the volunteers coming to site according to their own time availability. As the volunteers are not all present at the same time, the coordination of activities and tasks becomes difficult and digital tools have the potential to facilitate better connectivity, scheduling of activities, and communication within the group and surrounding community. Specific needs mentioned by the participations include: “more independence for the cafe”, “better relationship garden – cafe - compost”, “online communication to attract more people” (Figure 6). Together with a lack of reliable funding sources, these organisational challenges diminish the sustainability of the hub, making it vulnerable to external changes, while at the same time reducing its capacity to generate new iterations and expand the hub network, which is a key aim of the R-Urban project.



Figure 5: Paris workshop, June 2016

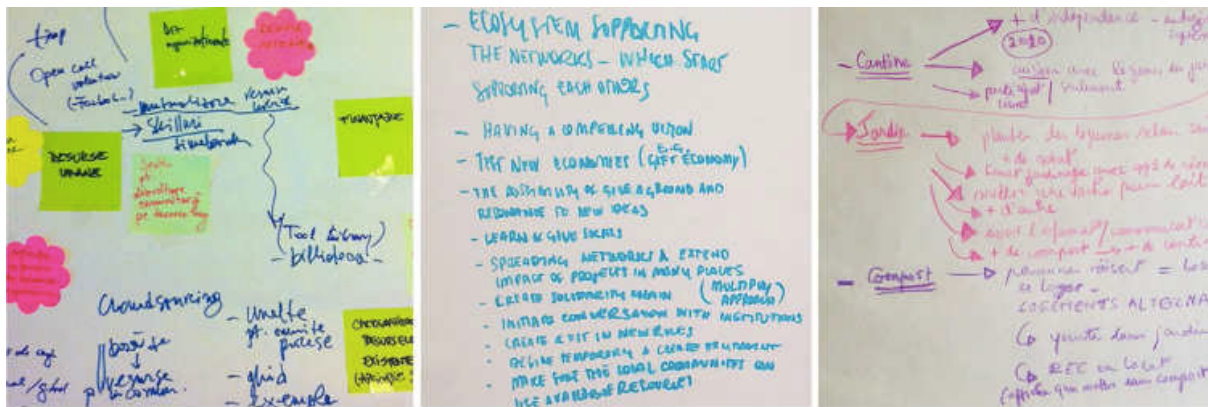


Figure 6: brainstorming sessions fragments (Bucharest, London, Paris)

2.3 Co-defining dimensions and capacities of resilience and scales of commoning tools

The initial stage of the co-design process re-confirmed that ‘resilience’ cannot be addressed only in generic or abstract, theoretical, terms, but that it has a strong local, situated dimension, which is linked to local contexts and needs – resourcefulness and necessary capacities for enhancing resilience practices (Wagenaar and Wilkinson 2013, Cretney 2014, MacKinnon and Derickson 2013). Involving potential users in this very first stage of imagining tools that could enhance their resilience capacities allowed them to articulate more clearly their needs, expressing their matters of concern (Di Salvo et al. 2014) and thus directly shaping the tools to be prototyped as part of the subsequent co-design stage (the dimensions of resilience and functionalities for tools are summarised in Table 1).

This is suggested to illustrate the open-source principles behind the co-design process and the aspect of recursivity, as the participants can continue to remain involved in the further development of tools and the means for their expansion beyond the project. At the same time, the mediated nature of our approach suggests that the resilience aspects raised by the participants reflect also the needs of the communities with which the practitioners have engaged over a long time through their projects, thus representing wider-reaching matters of concern.

Furthermore, the brainstorming sessions, which helped identify functionalities for tools, reflect the networked aspects of the co-design framework by highlighting that commoning certain aspects of resourcefulness could enhance resilience capacities, both on a local and collective level. Some of these functionalities are specific to a particular local context and refer to aspects that are only partially replicable (e.g., internal self-management, coordination); yet, commoning local resources, like space, tools or volunteer hours, can enhance the resilience of a hub. Other functionalities, such as knowledge sharing and cross-disciplinary collaboration, reflect common needs and interests across networks, while commoning competencies and expertise (or resourcefulness) could enhance the collective resilience of individual practices.

Thus, by engaging with local resilience contexts through the mediation of practitioners involved in resilience initiatives on the ground, we started to notice a need for multiple (and interconnected) scales of tools that could support networking and commoning processes, both locally and across locations. Having this diversity of tools is important in order for them to be useful for various types of users (including their technical capabilities) and address diverse needs, in turn enhancing individual and collective resilience capacities. These scales of tools are visualised in Figure 7 and include:

- **the micro-local** (organisational) – commoning at the hub (unit) level: tools for internal self-management (e.g., coordination and internal organisation);
- **the local** – commoning at the city level: tools for interaction with other groups and hubs, institutions and organisations to form networks of mutual support, and enable resource sharing and the scaling of practices through multiplication (e.g., sharing project processes, local knowledge and know-how)
- **the trans-local** – commoning at the region level: tools for interaction between municipalities and also across cities, to form wider knowledge networks and enable advocacy capabilities (e.g., education and training, network interaction and communication).

The types of functionalities and scales of tools identified in this initial stage of the co-design process will inform the tools to be prototyped in the subsequent stage. The prototyping stage will then be followed by collective reflection sessions with the participants to assess the usefulness of the tools and define ways in which they could become transferable to other resilience contexts and sustain the commoning of resilience practices across locations.

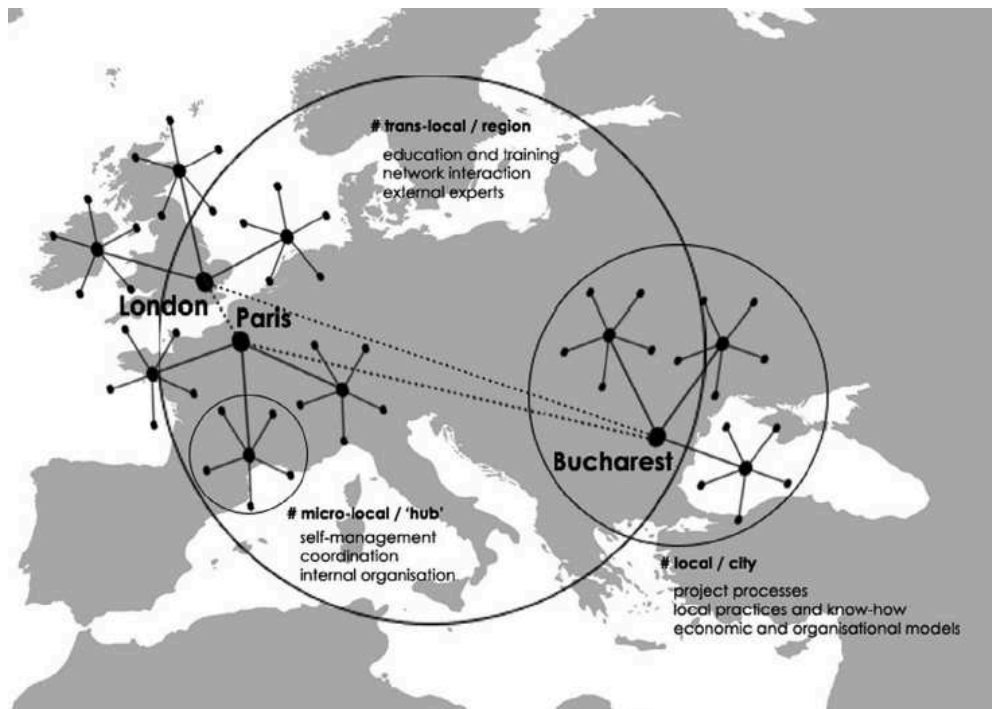


Figure 7: multiple scales of tools

3. Discussion and conclusions: commoning resilience practices through open co-design processes

As a starting point for this paper, we suggested that an important prerequisite for enhancing overall urban resilience is the commoning of local resilience practices, knowledge and know-how. Such practices, typically emerging from local experiments initiated by practitioners in collaboration with local communities, tend to be dispersed and disconnected, vulnerable to changes in local politics, development pressures and reduced funding, thus lacking the agency to instigate wider change.

As a way of addressing this need, we set out to imagine and define a set of digital tools that could enhance the resilience of such practices by creating conditions for longer-term sustainability, scaling through replication and the capacity to operate beyond the neighbourhood scale. We explore tools that could achieve this on an individual level, through improved self-organisation and management, and also collectively, through commoning resourcefulness across locations, by bringing together the knowledge and know-how developed locally into the digital realm.

As approach to identifying potential tools, we devised a specific co-design process, which takes into consideration the situated nature of resilience, engages with this concept through the mediation of local practitioners involved in resilience initiatives, aims to bring together multiple knowledges and experiences on resilience, and remains open to future iterations and participants – in other words, a situated, mediated, networked and open-source co-design process. This process frames our co-design methodology, which involves potential users in all aspects of design, from the initial definition of local contexts for resilience and visioning potential tools, to prototyping and reflecting on the outcomes.

In this paper, we focused on the first stage of the process (i.e. visioning), which involved potential users in defining an initial ‘brief’ for the tools to be prototyped in the subsequent stage. Extending the co-design process to the stage before the ‘fuzzy front end’ (Sanders and Stappers 2008) is particularly important in projects aimed at designing digital tools with and for ordinary people, and which are likely (or intended) to affect their everyday life practices. While technically and design-savvy groups may be more open and happy to take ownership of the design process (for example, some of the London groups), many types of users who are not accustomed to technology (such as the local residents running *Agrocité*) can easily be left behind.

Yet, practical know-how developed through everyday resilience practices, such as gardening or composting, represents valuable knowledge that could be shared across locations. Engaging different types of users from the outset and enabling them to shape the vision for potential digital tools according to their local practices enables them to produce forms of stewardship (Hill 2012), which in turn creates the conditions for the continued use of the tools. This is in line with frameworks of public design of digital commons, which encourage starting the design process with ‘matters of concern’ (Latour 2003) and stimulating

forms of engagement that empower the users to take ownership of the design and development of technology (Teli et al. 2015).

To account for the ‘situatedness’ of resilience, the visioning stage involved adapting the co-design methodology to the types of participants, the notions and focus of resilience in the contexts in which they operate, and the capacities they identified as important to enhance in order to advance their practices and urban resilience more generally. In Bucharest, the participants involved civic and cultural organisations, in London, social entrepreneurs, and in Paris, active users of a suburban resilience hub. While the methods and workshop formats were adapted to the participants’ technical skills, understandings and practices of resilience, the goal of this initial co-design stage remained the same – that is, to identify what might constitute a possible selection of tools that could be adapted to different locations and be accessible to a diversity of users with varying technical abilities.

The visioning stage of the co-design process allowed us to better understand the local dimensions of resilience, the challenges and needs for enhancing resilience practices and also the various scales of tools that would be necessary. Grasping these aspects, particularly the multi-scale nature of the tools, could not have been possible without direct engagement with local practitioners, their projects and physical sites of experimentation. Engaging with local practitioners, who have a key role in resilience initiatives in three different city contexts and have developed a strong awareness of local communities’ needs over time, provides a model of how digital tools can be locally mediated in the process of making.

The various scales of tools appeared to mirror the necessary degrees of commoning of resilience practices, according to the types of resourcefulness, knowledge produced and needed. For example, some information, such as internal administration processes or ‘raw’ sensor data from a prototype biodigester, may not be useful if shared with other hubs, as it would be difficult to replicate in other contexts. Yet, organisational models, design guides, construction techniques and other types of know-how produced through local experimentation (or, the knowledge produced and the means for producing it, rather than mere information) become valuable if shared as digital commons: they can enhance the resilience capacities of other initiatives and advance collective resourcefulness.

While experimentation and temporality are common features of initiatives such as those addressed here, it is important to be able to ‘trace’ resilience practices through commoning processes. Doing so can support new connections and networks to emerge in relation with existing ones, strengthening existing practices, leading to new iterations and potentially resulting in broader system change through distributed networks (Benkler 2006). The process can improve its relational agency in time, involving the collaboration of more and more participants in the making and sharing of tools.

To ensure the continuity of the commoning process, it is important not only for the tools to be transferable but also for the co-design process to remain open so that others can adopt it and create new tools guided by its principles, technology becoming an object of collaborative practices and co-production in itself (Teli et al. 2015). Although further

research is needed, we suggest that this can be achieved by planning and co-designing for openness and incompleteness (Sennett 2010) through processes that allow future users to take ownership of, and inform an initial set of tools with their needs and desires, while having the means to sustain and expand the digital commons. One such example is creating a co-design process that is situated, mediated, networked and open-source, which can allow an initial technological proposition to evolve and expand, beyond the initial project and user base. While not new in terms of methodology, we argue that this specific co-design approach is innovative through extending co-design to the domain of urban resilience and by being intrinsically linked to the aim of collectively enhancing urban resilience through commoning local resilience practices across scales and locations.

Notes

1. <http://www.wikihouse.cc/>
2. <http://rebargroup.org/>
3. <http://www.urbantactics.org/>
4. <http://596acres.org/>
5. The architectural practices are: Atelier d'Architecture Autogeree (AAA), Paris (www.urbantactics.org); Public Works, London (www.publicworksgroup.net) and studioBasar, Bucharest (www.studiobasar.ro).
6. The project has a total duration of two years.
7. <http://r-urban-wick.net/>
8. <http://r-urban.net/en/>
9. <http://www.amap-idf.org/>

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