

A Citizen-Led Spatial Information System for Collaborative (Post-)pandemic Urban Strategies: The Ponticelli Experience, Naples (Italy)

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Abstract. The strong socio-spatial implications of the covid-19 pandemic and the physical distancing measures have emphasised the fundamental role played by socio-digital networks in sharing and urbanising information. Worldwide, the emergence of shared survival needs led to the self-organisation of local communities in care infrastructures for mutual aid, psychological support, sharing experiences and storytelling, often based on crowd-sourcing and crowd-mapping platforms. From the (post-)pandemic urban planning perspective, the growth of this phenomenon has implied the call for spatial research to reconsider ICTs and collaborative spatial information systems as strategic tools to support vulnerable communities and public engagement in collective matters. This contribution aims to define an open-source database to be used and implemented by citizens and social operators to provision territorial care systems and mutual aid initiatives. The adopted methodological approach proposes a citizen-led spatial information system, where updated information, perceptions and preferences can be spatialised and collected, building a crowd-sourced and sharable system of territorial knowledge, useful for collective actions and the development of sustainable and effective strategies in emergency conditions. The obtained results refer to data about mutualism in public space, collected during the pandemic period in the Ponticelli district, the eastern periphery of Naples, Italy. They are to be framed within the broader on-going European HERA research project "PuSH: Public Space in European Social Housing".

Keywords: Mutualism · Public space · (Post-)pandemic city · Citizen-led spatial information system · Crowdsourcing · VGI

1 Introduction

1.1 Mutualism and the (Post-)pandemic City

Mutual aid, shared resources, local democracy, and an open network are the components that redesign relationships, public spaces, and city life [1]. Mutualism is a movement

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born around the second half of the nineteenth century, in Europe, as one of the first forms of spontaneous association of the working classes [2]. Since the outbreak of the covid-19 pandemic, mutual aid has worldwide produced new systems of care and addressed the need for transformative changes to take place in terms of scaled-up solidarity practices connecting self-organised social movements and building their power [3]. Spade [3], insisting on the fundamental distinction between solidarity and charity, defines mutual aid as a *collective coordination* based on solidarity projects that aim to meet each other's needs and solve problems through collective action in collective space. During the first Italian lock-down period determined by the pandemic, March-April 2020, mutual aid practices [4] created networks of spaces, both physical and digital, and informal supply chains [5], providing people with basic survival services, as well as with psychological, spiritual and cultural support [6] and overcoming, in many cases, the deficiencies caused by the privatisation of the public care services [7]. The socio-digital phenomenon defined as neo-mutualism [8] refers to these recent experiences of collaboration, which, answering to new needs, integrate the realm of social relationships and cooperation with that of the network society [9].

As in this difficult time, solidarity can represent a response to the crisis [10], catalysing emancipatory changes starting from social action and addressed towards the transformation of society [11]. According to this perspective, rather than a compassionate gesture, it should be considered as a bond of reciprocity that is established between those who provide a good or service and those who receive it. Beyond the good, solidarity is achieved through the sharing of a value that allows us to pass from a compassionate logic to a bond of fraternity, in which happiness is not expressed in terms of the individual but of community and therefore of public happiness [12]. The solidarity economy represents the core around which various forms of economies revolve, in particular the social economy [13]. The term *social economy* [14] appeared, for the first time, in France during the first third of the 19th century, and has evolved in meaning over the years. The social economy is, first of all, a collective response to common challenges [15]. It deals with issues and realities related to economic, social and cultural poverty [13]. It does not only deal with the procurement of material goods such as food, clothes, medicines but carries out a process of self-determination. In fact, it aims at the autonomy of individuals through culture and work [14]. It is based on principles of democracy, cooperation and reciprocity, re-distribution, social and cultural emancipation, and it operates by turning criticalities into opportunities [14]. Social actors and citizens can activate forms of social economy, through cooperation processes, that define a continuous dialogue between individuals and society and generate common and community values [16]. Moreover, the social economy is driven by actors belonging to the Third Sector [14]. Institutions of the Third Sector are voluntary organisations, associations, social enterprises, mutual aid societies, foundations that pursue civic, solidarity and social utility purposes by carrying out one or more activities of general interest without the purpose of profit [17]. In recent years, and in particular, with the Covid-19 emergency, we have witnessed the overcoming of the concept that saw this sector as a reality that would make up for the shortcomings due to the State and the Market, to the other two economic systems as well as to the social one [18].

1.2 Socio-Technical Systems, ICTs and Crowd-Sourcing

The covid-19 pandemic implications can be referred to territorial systems as well as social ones. Indeed, the paradigmatic urban geographies of places, services and uses undoubtedly changed, implying the need for urban studies to rethink the (post-)pandemic city [19, 20] as a complex socio-technical system, based on different network infrastructures of hybrid digital and physical spaces, diverse social actors, and interdependent relationships [21]. The socio-technical system perspective considers technology and ICTs as the connective interphase linking the material and the social [22], addressing two related fields of enquiry. On the one hand, the reciprocal influence of social processes and technology use refers to both innovation and opportunities for new social practices [23, 24]. On the other, the strong connection existing between this approach and the socio-ecological system literature emerges, since both engage with properties of complexity, multi-scalarity and adaptation [25]. In particular, it is worth noticing how the definition of cities as complex systems is shifted by the biological world and by urban ecology [26], which identifies in the system's ability to self-produce - or autopoiesis [27] - its intrinsic characteristic, that is responsible for the organisation of the network structure of mutual interactions among the sub-systems and the elements that compose the system. Considering also physical and urban systems as capable to self-produce [28, 29], social ecology [30] stresses how this ability is due to the social diversity, mutual interdependence and connectivity of the social ecosystems or eco-communities [31], which are aspects differently detectable in the socio-technical system dynamics as well [32]. Three types of socio-technical systems can be distinguished in reference to the smart urban realm and, in particular, to the pandemic period [33]: corporate-led forms of platform urbanism; state-led platforms for service management and provision; citizen-led initiatives. This contribution analyses the latter as an alternative to the first and useful application of systems of crowd-sourcing and interactive mapping [34] for collective purposes.

If, during the last year, the spontaneous growth of mutual aid infrastructures determined a shift towards the rethinking of the collective and political meaning of caring city [35], an analysis of the digital instruments, which were used to realise those socio-spatial infrastructures, could, as well, lead to a strategical reconsideration of participatory mapping and crowd-sourcing of spatial data [36] as instruments for co-learning and collective empowerment. Participatory mapping methods involve collaborative spatial surveys, differently referred to as participatory GIS (PGIS) [37], public participation GIS (PPGIS) [38], or volunteered geographic information systems (VGI) [39]. These methods, enabling a framework of knowledge-building shared among all the involved actors, can be used to report specific criticalities and opportunities related to a place, as well as to analyse different perceived aspects of urban life, such as wellbeing [40] or cultural ecosystem services (CES) [41]. Participatory GIS has been used in governmental policy development and collaborative planning to engage with the public and guarantee transparency of the decision-making processes [42]. Furthermore, these methods were recently used in bottom-up strategies and community empowerment projects, in which the same processes of data collection, map creation and information co-production came into being strategic tools for self-determination and self-organisation [43, 44]. VGI can be instead considered as deriving from expert-mediated spatialisation of geographic data voluntarily provided by individuals [45]. Finally, crowd-sourcing, not only entails

a collaborative online activity, but constitutes an open call addressed to a broad and heterogeneous public, undertaking a task by bringing their work, experience, knowledge and receiving back a benefit, in terms of services, collective need satisfaction, or social recognition [46].

1.3 Research Questions

This research, learning from the experience of collecting qualitative data about social resilience and mutual aid initiatives during the first Italian lock-down period, through ICTs instruments within the district of Ponticelli, eastern periphery of Naples, Italy, has been driven by the following main questions:

1. How can strategic planning systems support vulnerable communities under social crises and fit the new needs of the (post-)pandemic urban society?
2. How are ICTs and crowd-sourcing to be used for community engagement, ensuring social justice and preventing form the exacerbation of existing disparities?
3. How should spatial decision support systems (SDSS) be implemented in order to enable much broader accessible information on socio-spatial systems?

This contribution aims to propose the activation of an open source and citizen-led decision support system, to be used by citizens and social operators in the development of mutual aid socio-spatial infrastructure and territorial care systems, as well as in the implementation of an always-in-the-making, collaboratively produced and shareable system of territorial knowledge.

The proposed approach is to be conceived within the framework of an on-going research about mutualism in public space, with specific reference to the pandemic period, and in this paper, the results of a first phase of the research will be discussed. In particular, in Sect. 2, the methodological approach is explained; in Sect. 3, the case study is presented, focusing on issues of social vulnerability and isolation; in Sect. 4, the obtained preliminary outcomes of the research are discussed; in Sect. 5, pros and cons of the methodology are investigated.

2 Materials and Methods

To build an interactive spatial database that can be useful for citizens and public administrators to monitor and participate in mutual aid initiatives and care systems, as well as to propose activities, ask for a service and report stories and events, the adopted approach is based on the possibility to involve communities through the methodological steps, and is developed through the following phases (Fig. 1):

1. Collection of data and crowd-sourcing;
2. Processing of crowd-sourced data;
3. Database / volunteered geographic information system (VGI) building.

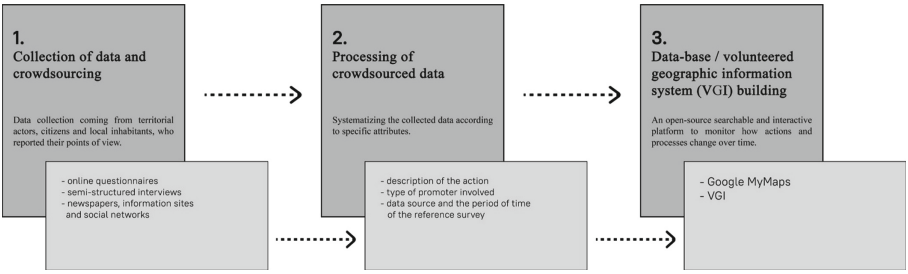

Fig. 1. Methodological framework and steps.

The first step concerns the identification and collection of soft data through different tools such as online questionnaires, semi-structured interviews and searches in newspapers, information sites and social networks. During the lock-down period, March-May 2021, questionnaires were sent online through the main social networks with the aim of collecting data on: 1. The use of physical and digital spaces during Covid, the type of relationship between people, closed in their homes, and physical-digital spaces; 2. The solidarity initiatives developed within the district, investigating the spaces, the social actors and the ways in which they took place; 3. The value attributed to spaces and activities before and during Covid, in particular the perception, the use, the social and cultural dynamics that characterise these spaces. This method involved the crowd-sourcing of information, thus allowing to collect data coming from territorial actors, citizens and local inhabitants, who reported their points of view, preferences and perceptions about the three mentioned themes. The semi-structured interviews were addressed to ten significant operators, who described the initiatives undertaken before the Covid emergency and during the lock-down. The interviews were carried out between May and June 2020, and described the spaces of mutualism, each with its characteristics and the type of urban rhythm that characterised them.

The second step involves systematising the collected data according to specific attributes. The mutual aid initiatives have been classified according to the description of the action, the type of promoter involved, the data source and the period of time of the reference survey. Furthermore, a particular focus was dedicated to the informal and self-organised initiatives, promoted by both NGOs and citizens, and strictly related to the health emergency. These specific initiatives have been detected according to the categories of health and sanitary kits provisioning, educational support, mutual aid and care provisioning, psychological support. As regards the spaces for sociality, mutual aid and care, where the above-mentioned initiatives differently took place, they have been analysed through the categories of planned public spaces and facilities, places for collective use, places for community use, and have been classified according to the type of spaces, the description obtained from the interview or questionnaire, the categories of place functions, people's activities according to the use of space, place perception, the data source and the period of the survey.

The database has been created through Google MyMaps, an open-source platform of Google, which allows to create searchable and interactive maps, accessible to anyone and with the possibility to modify and update information over time. The platform allows

to choose the type of base map and then to insert levels with different information. In each level it is possible to assign specific attributes to the elements. Therefore, the system turns out to be implementable and can monitor how actions and processes change over time. This third step has involved an expert-mediated spatialisation of the crowd-sourced data, collected as explained in the first methodological phase. In particular, a volunteered geographic information system (VGI) has been built by linking the information, voluntarily provided by citizens during the crowd-sourcing phase, to the spaces they referred to and, as a consequence, to precise coordinates, turning the narrative information into geographic ones. Then, different layers of the geographic information systems are obtained systematising the situated knowledge, gained by engaging in processes of storytelling [47] and narrative mapping and spatialisation of qualitative information.

3 The Case-Study

The analysed area is the district of Ponticelli, in the easter region of Naples, a hinge with the Vesuvian villages. Until 1925 the district was an autonomous municipality, but with the Great Naples Project, designed by Mussolini, it lost this status. The name of the district is due to the presence of the numerous "bridges" – Italian "ponte" - that crossed the Sebeto River, one of the main rivers present in the eastern area of Naples, of which very few traces remain today. Therefore, the district's origins are mainly linked to the fertility of the land, up to the Industrial Revolution, in which we are witnessing development of the city that sees its peak with the inauguration of the Circumvesuviana station in 1891. After 1925, the district began to host the first groups of social housing complexes, expanding in the 1980s following the earthquake and leading to the formation of different typologies of social housing building. This has led to a series of social, cultural and urban phenomena, ranging from the abandonment of public spaces to the proliferation of forms of organised crime, to the use of spaces as drug consumption areas, to the perception of the district as urban periphery.

In contrast to the district's cultural, economic and social poverty, since recent years and, particularly during the Covid-19 emergency, initiatives of mutual aid, psychological and spiritual support, and accessibility to digital tools for culture have been put in place operators active in the district. In fact, the district, in relation to the Naples and the 6th Municipality to which it belongs, presents, from a socio-demographic point of view, a high rate of school dropout, only 5,8% of the population of the district is in the status of student (over 15 years old) and a high rate of unemployed people (61,3%) compared to people of age and working condition (Fig. 2).

Another relevant aspect concerns unused public spaces and regenerated ones. In the district, there are two large green areas, the Fratelli De Filippo park and the De Simone park. The first is partly usable for free time and thanks to the presence of a community garden created by associations, while a part is in a state of neglection as well as the entire De Simone park. Many spaces within the district are abandoned, and in condition of decay, some of these are reused and regenerated through bottom-up processes, and therefore for initiatives by groups of citizens, associations and other social actors such as parishes, hospitals, committees. The goal of these initiatives is the re-appropriation of these spaces to give them back to the community.

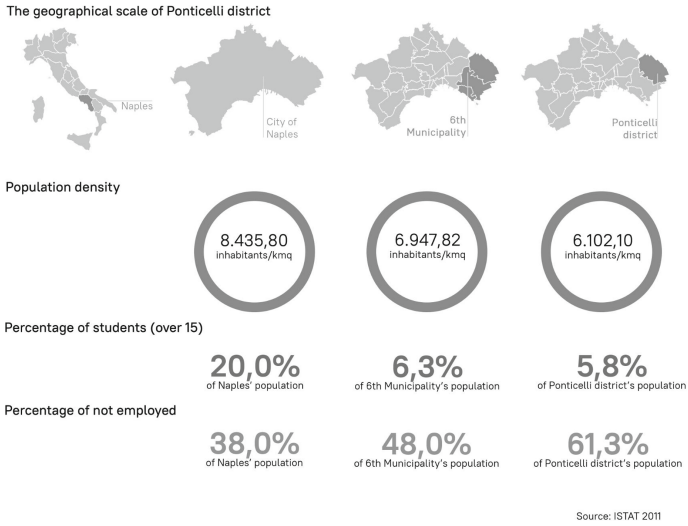

Fig. 2. Case-study district and statistical information.

The self-organised activities also involved the emergency period, in fact, material aid initiatives such as the delivery of food packages were accompanied by support actions through digital spaces. These spaces made it possible to translate what happened in the physical space, stopped and paused during the lock-down, in the digital one and allow to break down physical barriers such as the CoroNauti initiative organised by the non profit organisation "Maestri di Strada" which has allowed many young people to get together and continue the activities undertaken during the year. All this is based on the concept of a network, between different categories of social actors, physical and digital space, and between space, social actors and citizens.

4 Results

The collected soft data have been processed into spatial site-specific indicators of publicness, resulting in a growing open-source map articulated in three main categories: formal/informal spaces of mutualism; solidarity networks of stakeholders and initiatives; solidarity initiatives during COVID-19 crisis. The map has been realised with a google mymaps base and it is accessible at: https://www.google.com/maps/d/edit?mid=1-ZM0Dat8oDpT6kcH01NDyOWdhvlq2Uz&usp=sharing. It is composed of seven levels: 1. Administrative borders; 2. Planned public spaces and facilities; 3. Places for collective use; 4. Places for community use; 5. Solidarity associations and operators; 6. Solidarity network of cooperation activities; 7. Solidarity initiatives during COVID-19 crisis (Fig. 3).

In the database, the formal and informal spaces of mutualism, recognised by the interviewees, have been mapped in the district and divided into the following three types (Fig. 4). 1. Place for public use: according to [48], public spaces are open places, accessible to all, where people carry out individual or group activities. These spaces can be

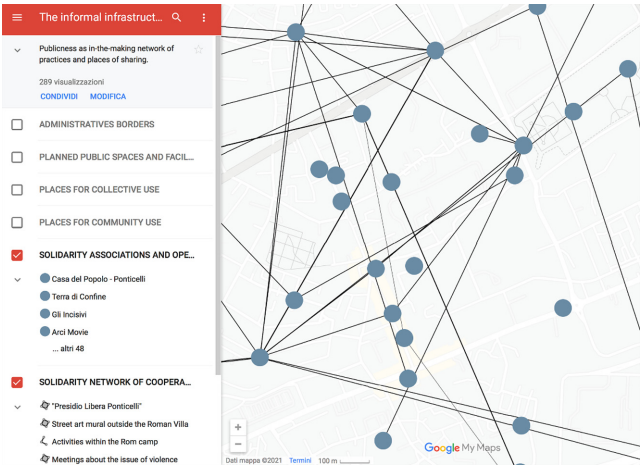

Fig. 3. Screenshot of the spatial database (Google MyMaps).

planned or discovered by chance and identified as public spaces by the community itself. 2. Place for collective use: according to [49], collective spaces are intermediate places in the city, between the private dimension and the public dimension. They are places where it is the collective use that makes the space collective. 3. Place for community use: according to [50], they are socially produced spaces that respond to the community's needs, ideas, and visions.

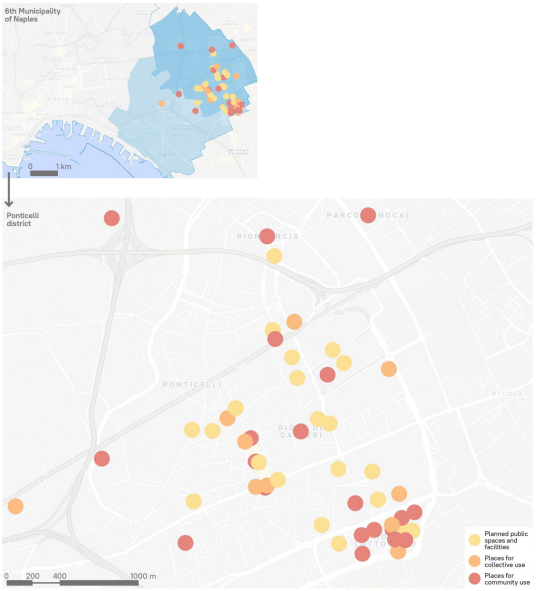

Fig. 4. Screenshot of the spatial database, formal and informal spaces of mutualism.

Then, local social actors have been mapped (Fig. 5). They are recognised by the interviewees as active operators in the complex social context of Ponticelli, promoting cultural and educational initiatives and events. The connections between them represent solidarity and cooperative activities and initiatives supported by the network of actors. The network of relationships gives us back the social vivacity of the district from the point of view of the present actors and the relationships that are created between them in terms of manifestations, events, activities and initiatives.

The mapping of the main solidarity initiatives developed during the Covid-19 was carried out by identifying four types of fields of action: activities related to people's health (32%), psychological and spiritual support (27%), mutual aid through the delivery of basic necessities (23%), collaborative processes related to culture and leisure (18%) (Fig. 6).

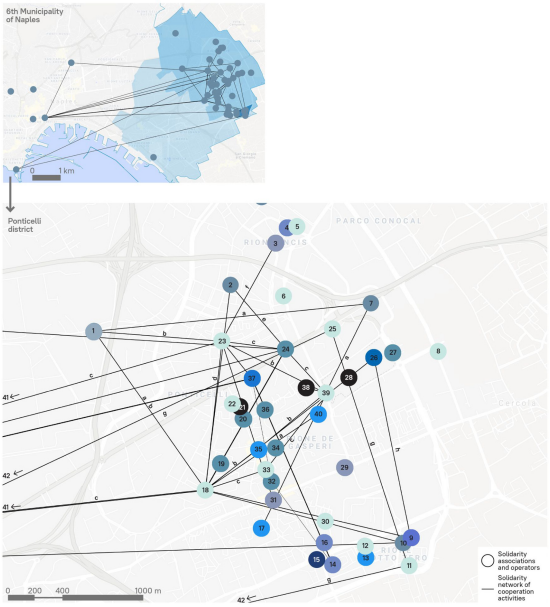

Fig. 5. Screenshot of the spatial database, spatial stakeholder network.

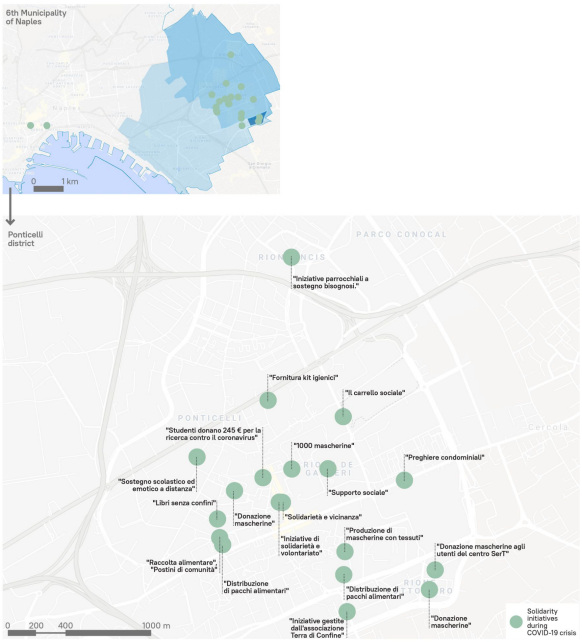

Fig. 6. Screenshot of the spatial database, solidarity initiatives during the first Italian lock-down period.

5 Discussion and Conclusions

The strong socio-spatial implications determined by the health crisis [51] and by the measures of physical distancing [52] have underlined the significant role assumed by the digital networks [53] and their capacity to share and urbanise information [54]. In fact, it is interesting noticing how the shared need to reappropriate the local collective dimension has determined the rapid definition of crowd-sourcing platforms, aimed at mutual aid and support and the collective recognition in a new sense of place identity [55]. This result was achieved through practices and experiences of storytelling and community resilience [56], which are progressively defining new social dynamics and hybrid local communities [57]. Then, in the definition of these processes, the digital, when equally accessible to all [58], plays an important role in shortening physical distances and promoting forms of inclusion and collaboration [59]. Moreover, during the recent health crisis, ICTs, spatial information systems and co-mapping instruments were widely used, not only by citizens but by experts and researchers as well, for qualitative data collection [60]. During this specific period, qualitative researchers faced the challenge of doing fieldwork while adopting social distancing measurement and without recurring face-to-face investigations [61]. The challenge became an opportunity, and many different technology-enabled tools, internet-based surveys, platforms for sharing information and for online questionnaires and interviews soon became new resources for qualitative data collection, aiming to grasp the lived experience of individuals during this difficult time.

The proposed contribution presents on-going research, started few months before the pandemic outbreak, which continuously had to adapt to the uncertainties of the period, using different and integrated investigation methods and instruments, in order to report a constantly updated frame of the very mutable analysed territorial context, everyday solidarity practices and changed use of space according to the health security policy. The collected data refer to a relatively short period of time, corresponding to the first Italian lock-down period. The need to extend this temporal frame to obtain a broader picture about the analysed social phenomena during the year 2020 is currently driving the research towards the definition of a more comprehensive database, collaboratively implementing the spatial information system. Further expected results involve the processing of indicators of mutualism and socio-urban resilience during the pandemic, through which addressing the measurement of intangible and cultural values [62, 63] of the urban solidarity spaces and the related tech-enabled initiatives.

Finally, since the last historical period drastically changed socio-spatial geographies of proximity and the system of use of urban space, the interpretation of the city as an adaptive complex system seems to be fundamental to consider its network structure, through which interdependent, tangible and intangible relationships between social actors and hybrid urban spaces are continuously re-established, in search of new dynamic balances. Then, the democratic relevance recently gained by ICTs, crowd-sourcing and crowdmapping for public engagement in collective matters [64], social self-organisation, and supporting vulnerable communities, made evident the need for strategic urban planning to conceptualise them as fundamental tools to grow co-produced knowledge about territories and, in particular, to develop sustainable and effective planning approaches in emergency conditions.

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