



Dialogues of digital commons and  
equitable resilience

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## **Abstract**

During the first wave of 2020 pandemic, a rise in numbers and popularity of commons-based initiatives was observed worldwide, either in digital or cyber-physical form. From the open-source distribution and production of healthcare equipment to the installation of community fridges, such initiatives have influenced the resilience potential of communities. This research analyses disasters as an outcome of vulnerability and risk and seeks links between resilience and commons-based initiatives. It places the emergent digital and cyber-physical commons-based initiatives within metropolitan ecosystems and proposes the measurement of their reflections on the resilience of greater areas. That way, an equitable perspective on resilience measurements is proposed through the analysis of bottom-up initiatives and the inclusion of underrepresented groups. The paper consists of a literature review in the fields of resilience, social capital, commons-based initiatives and ecosystems, providing examples from Boston (MA, USA), Medellín (Colombia) and Athens (Greece). This research, being published after the first shock and within the constant stretch of the 2020 pandemic, aims at opening a discussion and adding to the academic knowledge a more equitable resilience perspective, as well as supporting and framing the impact of commons-based initiatives.

## **Résumé**

Pendant la première vague de la pandémie de 2020, une augmentation du nombre et de la popularité des initiatives fondées sur les biens communs a été observée dans le monde entier, sous forme numérique ou cyberphysique. De la distribution et de la production ouverte d'équipements de santé à l'installation de réfrigérateurs communautaires, ces initiatives ont influencé le potentiel de résilience des communautés. Cette recherche analyse les catastrophes comme un résultat de la vulnérabilité et du risque et cherche des liens entre la résilience et les initiatives basées sur les biens communs. Elle place les initiatives communes numériques et cyberphysiques émergentes au sein des écosystèmes métropolitains et propose de mesurer leurs effets sur la résilience des grandes zones. De cette façon, une perspective équitable sur les mesures de résilience est proposée par l'analyse des initiatives ascendantes et l'inclusion des groupes sous-représentés. L'article consiste en une revue de la littérature dans les domaines de la résilience, du capital social, des initiatives basées sur les biens

communs et des écosystèmes, en fournissant des exemples de Boston (MA, USA), Medellín (Colombie) et Athènes (Grèce). Cette recherche, publiée après le premier choc et dans la perspective constante de la pandémie de 2020, vise à ouvrir le débat et à ajouter aux connaissances universitaires une perspective de résilience plus équitable, ainsi qu'à soutenir et à encadrer l'impact des initiatives basées sur les biens communs.

**Keywords:** Commons, Public space, Urban space, Community, United states, Greece, Colombia, Private / public

**Mot-clés :** Biens communs, Espace public, Espace urbain, Communauté, États-Unis, Grèce, Colombie, Privé / public

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# Dialogues of digital commons and equitable resilience

Danai Toursoglou-Papalexandridou

## Introduction

The COVID-19 pandemic caused and intensified a multiplicity of disasters on communities within global metropolises (medical , social, economic disasters, etc.). At the same time, within this context, a multiplicity of initiatives emerged which enabled the commoning of physical and digital goods (Pazaitis et al. 2020; Frazer, Shard, and Herdman 2020; Zastrow 2020). These initiatives created spaces of solidarity through which individuals and communities could transform and thus prove resilient. On the other hand, many metropolises around the world showcased once again inequitable responses and discriminatory policies that disproportionately affected the most vulnerable. How could we interconnect the knowledge and responses of such communities towards more equitable metropolitan resilience? This paper consists of a literature review identifying connections between community responses through the commons and metropolitan resilience.

Global researchers define disasters as the outcome of vulnerability and risk (Pelling 2011; Berman, Quinn, and Paavola 2012; Bernier and Meinzen-Dick 2020). In this research, vulnerability is analysed through the diverse factors of metropolitan inequities that cause it (Somers 2008; Anderson 2013; Castles 2005). Vulnerability as lack of accessibility to material and immaterial goods is understood as the main source of disasters when combined with a diversity of hazards (Imperiale and Vanclay 2021). In this paper, inequity is identified within the metropolitan environment in the context of the COVID-19 pandemic at three distinctive levels.

Within this context, metropolitan resilience is understood through the capacity of the metropolises to minimise inequities, as well as protect and include the most vulnerable. It is an evolutionary, lengthy, and transformative process (Martin and Simmie 2010; Adger 2003; Vale and Campanella 2005; Shaw 2012; Aldrich 2012). It is analysed as the capacity of the metropolis to sense, include, and support smaller granularities.

This paper is exploring the ways that diverse emergent commons-based initiatives are capable of minimising or reversing the outcomes of the metropolitan inequities that led to the disasters. The commoning of goods during COVID-19 (information, material goods, open-source designs among others) supported many vulnerable communities in their effort to transform, giving them access to resources that they were lacking, thereby reversing the cause of their vulnerability. The proposed resilience outcomes at the community level are associated with the three forms of social capital (Aldrich 2012).

The specific characteristics of such initiatives that make them relevant to the context of COVID-19 are subsequently identified. The extensive use of digital tools due to physical distancing measures rendered the informal initiatives parts of ecosystems. With the participation of initiatives at complex networks of connected intelligence (Komminos 2019), we can predict an increased complexity of social capital networks. This research suggests that through those networks, the scalability of the outcomes of the initiatives is made possible. The creation of positive outcomes or negative externalities of social capital are expected to rely on the form of such initiatives, their internal characteristics and the bonds they form (Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014).

Policy-makers in metropolises—as centres of social and economic activity and centres of inequities—should comprehend the importance of commoning within the communities and their potential to express vulnerability and risk and thus, express upcoming disasters and provide potential solutions. It is the support on a greater scale and the inclusion of communities that will lead to more equitable results from the resilience response and, thus, actual resilience on a metropolitan level. If we understand disasters as the result of inequity, we cannot claim resilience through discriminatory measures.

This paper provides a missing link between the commons and metropolitan resilience, which can prove vital in the context of ever-increasing and intensifying shocks and metropolitan inequities. It is identifying the role of

commons-based initiatives in community resilience, especially in the context of COVID-19, and questioning their role within metropolitan ecosystems. At the same time, it analyses the characteristics of such initiatives that define the positive reflections on greater areas. I will analyse literature on resilience, communities, metropolitan inequities and commons-based initiatives, and seek the gaps that need to be filled in order to advance the understanding of the coexistence of the aforementioned terms within the metropolitan reality.

The following part of this paper is a description of the scope and questions set for this research. A brief analysis of the methodology used follows. Part 3 contains the literature review; this part is analysing international literature on resilience. It contains an analysis of disasters and explores literature on Community and Metropolitan Resilience. In the next part, commons-based initiatives are presented as an alternative paradigm, exploring their significance in the global literature. A discussion on the intersection of the terms of resilience and commoning, identifying connections among commoning practices and disasters as well as gaps in literature, together with an introduction of future work follow and a conclusion section that wraps up the research analysis and its outcomes. The paper concludes with a part on the limitations of this research and looks into recommendations that can further evolve the topic.

## **Problem and scope**

Based on the analysis of the previous part, this research focuses on the following question: how do commons-based initiatives affect resilience on diverse spatial scales in cases of disasters?

Based on this question, I am forming the hypothesis that commons-based initiatives, as parts of metropolitan ecosystems, can promote and lead to more equitable resilience metrics and responses on the metropolitan level.

I am focusing on commons-based initiatives, as their emergence and popularity increased during the pandemic, and initiate my research from this level of granularity.

Towards the identification of answers to the main research question, I will investigate the following subqueries throughout this literature review:

- What causes disasters?

- How is resilience defined on the metropolitan level and how does it relate to smaller granularities?
- What are the characteristics of the commons that link them with the diverse levels of resilience?

The text refers to academics in the fields of resilience, social sciences, policy-making, community studies and urbanism. It also serves as a tool for worldwide commons-based initiatives to better understand the importance, the potential and the impact of such efforts. This research refers to policy-makers, while it underlines poor practices but also indicates potential resources towards a more equitable approach. It aims at exposing the threats of a poor understanding of disasters and resilience that has led to inequitable responses worldwide.

Being published exactly after the first shock and within the constant stretch of the 2020 pandemic on various aspects of metropolitan reality, the goal of this research is to strengthen academic knowledge, open a discussion as well as support resilience processes.

## Methodology

The literature review is based on a methodology that combines mapping literature review methodology (King and He 2005; Paré et al. 2015; Petersen, Vakkalanka, and Kuzniarz 2015) and comparative literature review, as well as critical review (Paré et al. 2015). The project achieves inclusive results through the analysis of well-known, new or less published authors and the analysis of literature from many disciplines. The novelty of this paper lies in the fact that it is composed with the participation of the author in three distinctive academic institutions and three diverse departments. It also combines literature composed in four languages. This way, a multidisciplinary approach is achieved, focusing on the topic in its entirety and providing unique mapping, comparison and criticism.

Papers of global literature composed in English, Greek, Spanish and Italian are mapped based on the keywords of this research (“commons”, “resilience”, “connected intelligence” and “social capital”). Articles are identified and compared to compose a holistic overview of the global thought and to highlight gaps in the existing literature. Within this process, according to the criti-



cal literature review methodology, the diverse approaches to the topic are examined based on global paradigms and research.

Due to the nature of the topic (i.e. referring to an ongoing event), except from the current literature referring to the pandemic, a multiplicity of articles referring to historic events related to this one are being examined. The literature review is complemented by examples from Boston (MA, USA), Medellín (Colombia) and Athens (Greece) that create links between the contexts of the literature from these three countries during COVID-19. The examples result from research in literature as well as in three institutions in each respective countries.

This literature review includes papers from scientific journals, conference proceedings, reports and published laws.

The material was researched through online databases and journals. Additionally, the paper has been highly fuelled by attending conferences and courses as well as through research in University Libraries at Aristotle University of Thessaloniki (Thessaloniki, Greece), Northeastern University (Boston, MA, USA) and Universidad Pontificia Bolivariana (Medellín, Colombia). The cooperation with three universities enabled the access to physical and digital libraries with highly diversified content, as well as access to other University libraries in the respective cities. The participation in distinctive academic departments in each university ensured an interdisciplinary approach (Department of Spatial Planning and Development, Department of Economics and Department of Architecture and Urban Planning).

Following the identification of the articles, I found and analysed the most prominent ideas of each field, capable of interconnecting diverse fields and disciplines. I followed an interdisciplinary approach towards the identification of gaps and the proposition of novel links.

This paper has the scope to superimpose the different approaches as well as the approaches that connect the terms. It identifies potential links in literature, gaps in the analysis of the topic and opens a multidisciplinary discussion.

## **Disasters, urban inequity and the quest for resilience**

### **Definition and source of disasters**

This paper focuses on the context of the COVID-19 pandemic from the beginning of 2020 until the end of the same year. The virus was declared a “Public Health Emergency of International Concern” (PHEIC) at the second meeting of the International Health Regulations Emergency Committee on January 30, 2020 (World Health Organisation 2020). In the proceedings of the meeting, the need to support low and middle-income countries is explicitly stated, recognising the potentially disastrous effects of socioeconomic vulnerability.

Within global literature, disasters have been analysed as events that suspend activity on the scale of the community (Aldrich 2012). They have also been defined as events that provoke changes within a community and interfere with daily activities.

From a sociological perspective, disasters are understood as failures of social systems (Erikson 1976; Federici 2019). Following this approach, a variety of research on resilience and Disaster Risk Reduction (DRR) has underlined that disasters are never natural (Bacigalupe 2019; Aldrich 2012; Vale and Campanella 2005; Imperiale and Vanclay 2021). Federici, among others, analyses disasters as the outcome of social structures (2019). Disasters are characterised as endogenous (Auerswald et al. 2006), due to their nature of emerging from within the system (urban environment, communities, metropolises, etc.).

In literature, hazards are classified as natural, socio-natural, medical/health, industrial, infrastructural, technological, and sociopolitical (Imperiale and Vanclay 2021). This research does not focus on a distinction between “environmental”, “social” and “economic” disasters as, based on the previous analysis, a multiplicity of these can emerge from a single hazard. Such an approach is considered vital in the context of the COVID-19 pandemic and the multiple disasters that followed said medical hazard.

Within this research, the disasters are understood as the result of the contact of a hazard with vulnerability (Pelling 2011; Berman, Quinn, and Paavola 2012; Bernier and Meinzen-Dick 2020). The translation of a hazard into a disaster, according to Imperiale and Vanclay (2021), is the outcome of

vulnerability and risk<sup>1</sup>. The authors underline that vulnerability includes cognitive and interactional weaknesses. These consists of, among others, the loss of sense of community and belonging, as well as limited access to resources, ties and decision-making processes<sup>2</sup>. These same properties have also been widely analysed in literature as the outcomes of urban inequity (Anderson 2013; Somers 2008).

Vulnerability as a cause of disaster is both the outcome of and the reason why socioeconomic inequities are amplified and expressed in their most apparent form following a shock (López 2021; Somers 2008). The disastrous outcomes of hazards have been proven to have:

- disproportionately affected the most vulnerable (Boston Area Research Initiative 2020; Imperiale and Vanclay 2021; UNDRR 2019; Barca, Casavola, and Lucatelli 2014).
- added to and stretched pre-existent vulnerabilities (Bacigalupe et al. 2020).
- led to an inequitable response both on Urban and State levels (Aldrich 2012). Examples from metropolises in the US, Colombia and Greece within the year 2020 are provided in the following paragraphs.

If we observe the outcomes of the COVID-19 pandemic in diverse metropolises worldwide, we can state that the already vulnerable communities suffered disproportionately (BARI 2020; (Fortuna et al. 2020; Smith and Judd 2020)). These outcomes have been explained mainly by the lack of access to healthcare, education opportunities, material resources, information as well as participation and accountability in decision-making processes (Bacigalupe et al. 2020). For example, in the Boston neighbourhoods, which are characterised as vulnerable due to racial inequities and lower economic metrics, proved to have been disproportionately affected by the COVID-19 pandemic when compared to neighbourhoods characterised

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<sup>1</sup>Vulnerability is commonly defined as “a measure of the propensity of an object, area, individual, group, community, country, or other entity to incur the consequences of a hazard” (Coppola 2015, 33).

<sup>2</sup>The authors provide as examples of cognitive weaknesses: psychological susceptibility to fear, anxiety, panic; lack of sense of community; lack of sense of place; lack of sense of risk. Examples of interactional weaknesses are the following: lack of social inclusion; lack of social cohesion; weak local governance; poor housing and infrastructure; poor land use (Imperiale and Vanclay 2021).

by higher economic metrics. There was a gap in the metrics both in the number of COVID-19 cases and the percentages of recovery (BARI 2020).

The pandemic, being added to pre-existent vulnerabilities, has intensified the socioeconomic stretches within neighbourhoods of the metropolises. It has been observed that the informal neighbourhoods of Medellín, Colombia have suffered more intensely from economic stretches and social unrest. Only 18% of the individuals continued working during the lockdown measures of 2020 (Medellín Mayor’s Office 2020). The metropolitan area was counting 414,000 unemployed individuals from March to May 2020, which is 158,000 more than the same months of the previous years<sup>3</sup> (“Medellín Cómo Vamos” 2020). The majority of the unemployed individuals were located in the informal neighbourhoods that are characterised by lower economic indicators. The lockdown measures paired with the citizens’ inability to participate in economic activities due to a lack of access to internet connectivity and transportation, as well as health vulnerabilities, have led to further economic stretches in the aforementioned communities.

Legislations and decisions that followed the response have been observed to have deepened the vulnerabilities instead of supporting the vulnerable population in their resilience efforts (BARI 2020; (Dorn, Cooney, and Sabin 2020)). Legislations that deepen the inequities in the metropolitan environment have been created in the shadow of the pandemic and with the excuse of the provision of safety in times of insecurity, many times targeting the most vulnerable as “the other” in the process of development (Benfer et al. 2021). A lengthy lockdown was imposed on refugee camps in Athens, in times when the rest of the metropolis was resuming socioeconomic activities. This led to further marginalisation of the new-coming population, halting their already limited participation in educational and socioeconomic activities (Cossé 2020).

The communities within Athens, Boston and Medellín—identified as vulnerable in relation to the disasters that followed the COVID-19 pandemic—are placed in highly diverse socioeconomic and historic contexts. Following the previous analysis, in all three cases, vulnerabilities did not emerge from the characteristics of the communities themselves that are highly diversified, but rather from discriminatory approaches to decision-making in global metropolises.

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<sup>3</sup>The metropolitan area reached a 21.6% unemployment rate, 9.1 points more than the same months of 2019 (“Medellín Cómo Vamos” 2020).

Discriminatory urban and metropolitan policies result in what is analysed in literature as “levels of citizenship” (Somers 2008; Anderson 2013; Castles 2005). This understanding of citizenship strongly affects the right to the city, and thus accessibility, in cases of inequitable metropolitan governance. The different levels result from the differentiation of accessibility to services, resources and decision-making processes (López 2021), as well as from the creation of a sense of non-belonging (Castles 2005; López 2021; Somers 2008). As mentioned above, it is the same characteristics that lead to vulnerability. Thus, instead of the binary division of citizen and non-citizen within metropolitan legislations, researchers underline the diversification between “citizen”, “tolerated citizen”, “failed citizen” and “non-citizen” (López 2021), which leads to the creation of diversified levels of vulnerability.

This part analysed through global literature the association of disasters with vulnerability at the metropolitan level. The analysis highlighted literature associated with the sources of vulnerability, the way they lead to disasters and the way that disasters further extend vulnerability. The role of the metropolises in this process was explored through examples.

The following parts analyse literature and reports on resilience following this understanding of disasters.

### **The quest for resilience**

Resilience is a term analysed within interdisciplinary global literature in an exponentially increased number of articles (Berkes and Ross 2013, 2016; Davidson 2010; Folke 2006; Imperiale and Vanclay 2016, 2021). Several disciplines have adopted the term, from economics to mechanics and urban studies, leading to the creation of a variety of alternative explanations. In technological systems, resilience is mostly defined as a system’s potential to retain its form or to go back to its initial form following a disaster (Holling and Meffe 1996). This explanation follows the definition of the Latin form of the word resilience “resilire” (re- + salire= “to leap”) which, according to Oxford Dictionary, translates into leap/spring back/rebound. In sociological and urban studies, such a definition has been followed by some scientists but widely declined. Resilience in social and urban studies is understood as an evolutionary, non-linear approach that provides transformation potential (Martin and Simmie 2010; Adger 2003; Vale and Campanella 2005; Shaw 2012; Aldrich 2012). Resilience literature widely presents disasters as

a motive to build back better and enhance the adaptability of systems in future shocks (Imperiale and Vanclay 2021; Aldrich 2012; Collodi et al. 2021; Gyawali et al. 2020).

Based on this analysis, this research understands resilience on diverse scales (both the community and metropolitan one) as the capacity of a community/metropolitan area to transform and “bounce forward” in cases of disasters (Martin and Simmie 2010). This capacity leads to resilience in front of diversified threats, past and upcoming.

Additionally, the term resilience is being exponentially used in administrative and policy documentation, proving the wide need for a deeper understanding of its meaning. Many declarations and guidelines have been issued globally regarding resilience and risk management (IDNDR 1994; UNDRO 1982; UNISDR 2005, 2015) in front of the ever-increasing risk of disasters within urban environments. The United Nations, with these documentations, asked for a more equitable approach and reduction of the risks (Imperiale and Vanclay 2019a, 2019b, 2021). Through the 2030 Agenda for Sustainable Development (United Nations 2015), the term resilience is integrated within the Sustainable Development Goals (SDGs)<sup>4</sup> (Imperiale and Vanclay 2021; Le Blanc 2015).

The understanding of the importance of the term, but at the same time the threat of conceiving it as another buzzword, can be highlighted by the fact that from January 2020 to July 2021, more than 26,900 articles were published in Google Scholar, analysing resilience during COVID-19.

Many authors have underlined that resilience on greater scales (like the metropolitan) highly depends on the capacity to sense, learn, include and strengthen the transformation of smaller granularities (e.g., neighbourhoods; communities) (Armitage et al. 2009; Beratan 2007; Berkes and Ross 2013,

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<sup>4</sup>The following goals refer to resilience: SDG1 (end poverty in all its forms everywhere), SDG2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture), SDG9 (build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation), SDG11 (make cities and human settlements inclusive, safe, resilient and sustainable) and SDG13 (take urgent action to combat climate change and its impacts). Target 1.5 of SDG1 is rendering resilience as a central part of Sustainable Development Goals. It is promoting the resilience of the poor and those in vulnerable situations and the reduction of their exposure to climate, economic, social and environmental shocks (United Nations 2015, 15).

2016; Imperiale and Vanclay 2021). This approach is opposed to the understanding of resilience as the capacity for change on wider scales (like the metropolitan). Disasters were analysed as the result of vulnerability and, thus, resilience on greater scales depends on the capacity of the most vulnerable parts of the whole to equally survive.

The above analysis of resilience on an academic level highly contrasts the metropolitan and urban reality. As mentioned above, literature and research have, once again, proven the inequity that followed the pandemic in resilience-related measures globally (Boston Area Research Initiative 2020). This phenomenon has been observed in multiple disasters worldwide, like the ones that followed Hurricane Katrina (Aldrich 2012; Somers 2008; Bullard and Wright 2009), leaving the most vulnerable groups unprotected.

The following part of this paper focuses on the understanding of resilience in two scales and the ways that elements leading to community resilience can prove vital for more equitable metropolitan resilience. Metropolises are understood within this research as “agglomerations of ecosystems” (Komninos 2019), while, as previously mentioned, metropolitan resilience highly depends on the equitable resilience of its parts. The following part starts with community resilience which is analysed as a result of the co-existence of the diverse types of social capital. Through this analysis, the research seeks links in literature that enable the scale-up of resilience outcomes.

### **From community to metropolitan resilience**

Communities are vulnerable and at risk regarding disasters but they are also capable of resilience (Aldrich 2012; Vale and Campanella 2005; Imperiale and Vanclay 2021; Adger, W. Neil 2006; Gaillard and Mercer 2012). It has been demonstrated that a wrong perception and analysis of community resilience and an exclusion of communities in the resilience process can prove detrimental to their survival on diverse scales (Imperiale and Vanclay 2021).

Within global research, it has been highlighted that even if vulnerability and risk are the factors that lead to disasters, community resilience in case of disasters could not be predicted by mere vulnerability indicators (such as accessibility and socioeconomic metrics) in a variety of contexts worldwide (Aldrich 2012).

A social dimension of resilience, where citizens sense their vulnerability and respond accordingly (Adger 2003; Shaw 2012) through collective action, is considered essential throughout literature and especially when analysing disasters as the outcome of vulnerability. Resilience stems from the capacity of a community to sense, self-organise, connect and eventually evolve. The evolution potential of the community is considered endogenous, as mentioned above in relation to the disaster itself, and protects communities from a multiplicity of hazards in the long term. The provision of material aid from external actors has been highly criticised as an act that halts resilience (Aldrich 2012; Vale and Campanella 2005).

Organised communities have proven capable of setting priorities and influencing government policies within a multiplicity of disasters (Aldrich 2012). Towards the understanding of the factors that support communities in the resilience process, the term “social capital” is central and common to many authors (Aldrich 2012; Dow 1999; Hurlbert, Haines, and Beggs 2000; Nakagawa and Shaw 2004; Reininger et al. 2013; Shoji, Takafuji, and Harada 2019; Smiley, Howell, and Elliott 2018). The analysis of the term includes the aspects of interconnectedness on diverse levels.

According to Putnam, social capital includes the most prominent features of social interactions (networks, norms and trust) (Putnam 1995, 64–65) and enables the flow of resources and the coordination of action. It is understood as the networks and resources that people can access due to interpersonal connections. In different moments in time and socioeconomic global contexts, social capital was proven to be the element that defined the survival of communities through coordinated efforts and cooperative activities (Aldrich 2012; Aldrich and Meyer 2015; Cai 2017; Pfefferbaum, Van Horn, and Pfefferbaum 2017; Reininger et al. 2013).

The co-existence of the diverse forms of social capital is considered by many analysts to be the factor that defines the resilience outcomes<sup>5</sup> (Szreter and Woolcock 2004; Aldrich 2012; Putnam 2000; Hawkins and Maurer 2010). It is not only the cooperation among the community members that led to

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<sup>5</sup>In literature, social capital widely appears in its three forms depending on the level of connections: bonding, bridging and linking (Aldrich 2012; Poortinga 2012; Szreter and Woolcock 2004). Bonding social capital refers to internal community interactions, bridging social capital refers to interactions among communities and linking social capital refers to the connection of the community with external actors.



resilience in global contexts but also their potential to connect with diversified communities within an ecosystem and with relevant actors.

Social capital exists in its three forms in every community created in the cyber-physical urban landscape (Szreter and Woolcock 2004). The three forms of social capital, as well as the co-existence of them, result in highly diversified communities as well as outcomes in resilience (Poortinga 2012; Szreter and Woolcock 2004; Fransen et al. 2021).

Social capital can either result in “positive outcomes” or “negative externalities” (Aldrich 2012). Negative externalities are the reason why many analysts conclude that communities are not always supportive, but can also prove negative and conservative (Manzini 2020). Thus, the concept of “negative externalities” invites analysts to look outside of the community level and understand the reflection of community processes on greater scales. The term raises questions as to whether such initiatives can lead to equitable survival opportunities in cases of disasters on greater scales.

With the addition of communication technologies in communities, many analysts identify a distinctive reality in terms of social ties compared to physical communication<sup>6</sup> (Hogan and Wellman 2005; Wellman and Leighton 1979; Wellman and Wortley 1990). It has become clear in research that most relationships formed in cyberspace continue in the physical space, leading to new forms of community that combine online and offline interactions (Hogan and Wellman 2005). The nature of hybrid communities is promising the emergence of diverse types of social ties and social networks. The addition of communication technologies promises to create more open and easily accessible communities and create more complex forms of social capital.

In the context of COVID-19 which led to physical distancing measures and reduced physical interactions, the hybrid form of community organisation was apparent in a variety of global contexts. The complexity that is created from the co-existence of physical and digital communication tools is explored within literature through the concept of connected intelligence (Komninos 2019).

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<sup>6</sup>Within digitally connected communities, ascriptive characteristics are not central. The sociable, supportive and identity-giving interactions are the main motives for community formation (Wellman et al. 2001).

### **From resilient communities to equitable resilient metropolises: connected intelligence and social capital**

Connected intelligence refers to the interconnection of human, collective and machine intelligence within ecosystems (Komninos 2019). Historic settlements have been built with the concept of collective intelligence. The addition of IT systems, that enhances the concept of connected intelligence, enables a more direct bottom-up involvement in the urban environment through the complexity of the newly formed links (Maahsen-Milan et al. 2013).

The theory of connective-collective intelligence was initially developed in the early 1990s by Pierre Lévy and Derrick De Kerckhove (Maahsen-Milan et al. 2013). Academics elaborated the concept of collective intelligence as a result of the availability of tools that allow or encourage interactions between individuals. The theory of connected intelligence evolved and was introduced along with the widespread use of the web, which allowed the shift from the whole to the connection nodes. It is not the sum but the connections that make the system intelligent according to De Kerckhove (1991). The web is what moves the collaboration forward from closed systems of collective intelligence towards more open spaces of interactions<sup>7</sup>.

Ecosystems are seen within literature as the element that promotes the digital transformation of cities through the concept of connected intelligence (Komninos and Tsarchopoulos 2013; Komninos et al. 2021). It is considered vital for the urban environment to integrate and create complementarity between human, collective and machine intelligence (Komninos, Kakderi, and Panori 2019). Within this reality, the formation of cities is seen as the inclusion of individuals, communities and institutions (Komninos, Kakderi, and Panori 2019). The concept of resilience on these granularities was also conceived as a process structured by the agglomeration of parts. We could argue that a new form of bonding, bridging and linking of social capital is created in the digitally-enhanced context. The boundaries of the three forms are being blurred, as individuals, communities and actors can be interconnected within complex social networks. With the understanding of positive outcomes or negative externalities as the result of exclusion/inclusion and solidarity, these networks enable the scalability of both the positive outcomes and negative externalities, depending on equity.

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<sup>7</sup>Mind, world and networks are seen by De Kerckhove as the three spatial environments that are interconnected by the web (2001).

According to literature, with the addition of smart technologies in the community processes, the engagement of groups is enhanced and the information transmission is accelerated (Komminos 2019). This underlines and enhances the effectiveness of the processes in cases of emergency due to disasters, rendering the bonds among individuals, communities and institutions as an effective tool towards resilience on greater scales.

The interconnectivity of all parts within complex networks is examined in literature as the source of metropolitan intelligence (Komminos, Kakderi, and Panori 2019). Metropolitan areas have been claimed to be the scale that, in this century, can lead to more inclusive levels of decision-making and a “metropolitan revolution” (Katz and Bradley 2013). Metropolitan areas are also the centres of economic and social transformations (Katz and Bradley 2013).

Within the metropolitan fabric, we can more directly observe inequities and, thus, experience disasters. By centralising and concentrating population, economic activities and energy within the metropolitan areas, the results of disasters have been accelerated and intensified (Perrow 2007). Resilience metrics, indicators and policies at the metropolitan level are, for these reasons, considered vital.

While examining the understanding of resilience in diverse socioeconomic systems and natural environments worldwide through the documentation of “The Resilient Cities Network”, we can observe a clear diversification in the way that global metropolises conceive the term. The diversifications can be linked to the cultural and social context, but also to political powers. Resilience in the face of violence through accessibility (Resilient Medellín), equity in front of economic and natural disasters (Resilient Boston) and economic relief and urban regeneration (Resilient Athens) are the main areas presented in the Boston, Medellín and Athens documentation accordingly. All three cities, as described above, showcased high vulnerability and inequity both as an outcome and in the response to the pandemic. According to the Global Resilience Institute, “resilience involves identifying and nurturing the capacity for communities to understand and better manage increasingly interconnected and interdependent systems that elevate the risk of wide-reaching and cascading failures when placed under stress” (Global Resilience Institute). According to the term, the reevaluation of the elements and means that lead to the desirable resilience outcomes in the local con-

texts is considered vital, independently from the diversity of the objectives. This would include the modification of the focus of resilience roadmaps and metrics towards the inclusion and the understanding of the complex links of metropolitan reality.

While the importance of citizen participation is widely highlighted in literature associated with policy-making, resilience, equity and urban transformations as well as it is predicted to play a vital role in EU policies over the next decade (Komninos, Kakderi, and Panori 2019), a direct interrelation within community initiatives and policy-making at the metropolitan level has yet to be examined. We know, from global research, that metropolises are formed through links between individuals, communities and institutions with the interconnection of intelligence. Still, there is little knowledge about the way human and community intelligence can be used within the urban environment in cases of disasters. According to this paper, such a connection would provide a tool for bottom-up assessments of the highly inequitable metropolitan policies that followed the pandemic, and promote more inclusive future practices. The community initiatives, as parts of metropolitan ecosystems, should be analysed as the enablers of citizen participation.

The commons-based initiatives, as a community formation and action that incrementally emerged during the pandemic, are being analysed in the following part. Literature on these initiatives is analysed and answers are being sought as to what connects them to the community response. Characteristics of such initiatives are being explored so as to seek their potential reflections on resilience on the metropolitan level when placed within ecosystems.

## **Commons-based initiatives**

Historically, many community initiatives emerged, in cases of shocks (Childs 2008). Such initiatives often emerge in low-income neighbourhoods with a higher density (Fransen et al. 2021), where shocks and stretches cause disproportionate disasters. The emergence of such initiatives has been described as an indicator of resilient communities (Magis 2010) or as a temporary expression of resilience (Fransen et al. 2021). Though, they have yet to be analysed as the catalysts of resilience, creating an understanding of how the diverse elements that compose them support or halt the survival of communities. Placing them within ecosystems, the aspect of the scalability of the outcomes is yet to be analysed in global literature (Randhir 2019).

Many of the initiatives that emerge in cases of disasters are based on the collective possession of goods (material and immaterial), as opposed to private ownership. This often stems from the need to provide an alternative paradigm to the inequities of the urban and metropolitan reality<sup>8</sup> (Federici 2019; Pazaitis et al. 2020; Cangelosi 2019). The commoning of resources creates spaces linked to the knowledge and experience of individuals, providing them with great adaptation potential when facing shocks and disasters (Schlosberg and Craven 2019). The capacity of commons to help rethink citizenship (Rodotà 2016) and create reciprocal links (Festa 2016) highly connects them to the sources of vulnerability and disaster.

The emergence of commons-based initiatives in eras of stretches and shocks is considered for certain global examples a new mechanism. For other examples worldwide, commoning can be observed as a practice throughout their history (Schlosberg and Craven 2019). Commons-based initiatives are not a new concept, especially in the global South, where they have been proven to be the driver of formation of the urban environment (Mundoli, Unnikrishnan, and Nagendra 2019; Monterroso, Cronkleton, and Larson 2019; Wade 1994; McCay and Acheson 1987).

In the case of Colombia, the commoning of resources as a tool towards resilience can be observed in the cases of the displaced farmers in the Metropolis during the 1960s (“Moravia: Un Escenario de Resistencia y Memoria” 2010; Torres Tovar 2007). The neighbourhood of La Sierra, among others, is composed of farmers, displaced due to the violence of the 1960s in the Colombian outskirts, who created a neighbourhood with the commoning of resources. Water and electricity were brought and managed by community members. This led to the recognition of the informal residencies by EPM (the public entity that manages the resources). The recognition was followed by changes in the plans of the metropolis, the recognition of the area as part of the urban fabric, the formalisation of their residencies and the support from the side of the administration. The non-hierarchical nature of such initiatives created a contrast to the reality of the metropolis of Medellin in the 1960s, providing higher resilience potential in a context of high socioeconomic pressures. This resulted in a more resilient community and Metropolis in total, recognising the previously informal settlements and moving towards more inclusive urban regeneration and policies for the future of the area (“Moravia: Un Escenario

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<sup>8</sup>Equitable access as opposed to socioeconomic inequities.

de Resistencia y Memoria” 2010; Torres Tovar 2007; Velásquez-Castañeda 2013). It is these individuals that the administration primarily considered as tolerated or failed citizens, due to their reduced capacity to be integrated into the economic reality of the city (López 2021) and led them to experience severe disasters.



Figure 1: Community Meeting organised by the author identifying commoning practices towards Urban Transformation and Resistance. Moravia, Medellin, Colombia. 19/2/2022. Photo by: Palacio Bastos Claudia Marcela

The commons are attracting increasing interest within global interdisciplinary literature (Cangelosi 2019; Goldman 1998; Dietz et al. 2002; Dolšak and Ostrom 2003; Linebaugh 2008; Hardt and Negri 2009; De Angelis 2010, 2017; Federici 2010; Mattei 2011; Bollier, Helfrich, and Group 2012; Marella 2012), as well as gaining attention among policy-makers (Cangelosi 2019). It is for these reasons that the term “commons” has multiple definitions. The categorisation of commons-based initiatives as such is a topic that has been widely analysed in literature (Bauwens and Pantazis 2018; Hudson, Rosenbloom, and Cole 2019; Foster and Iaione 2016).

The general definition followed by this research is that commons-based initiatives are ones that follow a different example from ownership and individual

property (Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014), towards the collective possession and management of resources.

Literature proposes that the diversification of the elements of “common resource”, “community” and “rules” (Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014) co-existing with “data” in the digital example (Lane 2020; O’Brien 2018), define the outcomes of the examined bodies. According to other analysts, such initiatives are structured by their “community network”, “infrastructure” and “datasets” (Choudary 2015).

The most common aspects of the discussed initiatives analysed in literature are the hierarchy and the formation of the community that takes part in the initiative. The structure and the levels of openness of the formed community (Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014) are central to global research.

The threats on both ends of openness in communities are highlighted, leading to a discourse on inclusion (Manzini 2020). Common purpose is an element of communities considered vital within global literature (Aldrich 2012; Komninou 2019; Manzini 2020), so as to define sustainable communities that act collectively. Additionally, the formation of communities with clearly defined objectives and common goals, as well as the acceptance of individuals independently of their sociopolitical characteristics are considered of great importance. The design principles of a commons-based community with well-defined boundaries and the compliance with shared stewardship practices within those boundaries are widely analysed by Nobel Prize winner economist Elinor Ostrom (1990) as part of the 8 design principles<sup>9</sup> that can lead to effective commons. The community created around the commons has to be sustainable and equitable (Beckwith, Sherry, and Prendergast 2018). We could argue that common purpose and openness of a community highly define the positive outcomes or negative externalities of social capital.

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1. Commons need to have clearly defined boundaries, 2. Rules should fit local circumstances, 3. Participatory decision-making is vital, 4. Commons must be monitored, 5. Sanctions for those who abuse the commons should be graduated, 6. Conflict resolution should be easily accessible, 7. Commons need the right to organise, 8. Commons work best when nested within larger networks.

The common source shared and the question of property and rivalry is also a common topic of analysis that defines the categorisation of commons-based communities as such.

The resources used as part of the commons can be widely diverse, including material and immaterial goods (Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014; Foster and Iaione 2016). According to reports, the most common resources that urban commons initiatives focus on in the EU are arts and culture, while other examples include food, inclusion of underrepresented groups and education (gE.CO Living Lab 2020). This research defines a common resource of the initiatives as any element that can be equally used and does not pertain to a state of possession of a certain individual or legal entity. The commons are community resources meant to be freely used by those in the community (Beckwith, Sherry, and Prendergast 2018).

Common resources are considered public goods (accessible to the public) and competitive (their use by one precludes their use by another) (Beckwith, Sherry, and Prendergast 2018). In the context of digital technologies, the concept of ownership has been analysed as in a state of flux (Bezaitis and Anderson 2011). This is an additional potential reason why the commons rose significantly (Frazer, Shard, and Herdman 2020; Zastrow 2020) in the context of the lockdown measures in the global North, where a multiplicity of activities was transferred online. Solidarity found expression in the commoning of resources that was enabled by the digitalisation of procedures. Resources like design were disconnected from their previous state of ownership, which was imposed by their material nature.

During the first months of the 2020 pandemic, individuals, groups, public and private bodies shared resources ranging from cultural and research content to material resources. Such actions promised equity in physical and mental health support, and the creation of solidarity production and research (Pazaitis et al. 2020; Frazer, Shard, and Herdman 2020; Zastrow 2020).

Examples of resources identified as bases of the commons in the context of the COVID-19 pandemic in Boston were the following: Physical Health Equipment Relief Crafters of America, Financial and Material Resources (Mutual Aid Jp and Roxbury, Mutual Aid Medford and Somerville, Dorchester Community Care), Social Support and Education Opportunities (Vital Village), Community Support and Advocacy (City Life / Vida Urbana), Equitable Expression of Needs and Solutions (Local Voices Network).



The value of commoning and open-source distribution, mainly in the area of design equipment, spread rapidly across the globe and was recognised by local and international bodies as a tool towards resilience (Biasin and Kamenjasevic 2020). New legislations emerged which in some cases enabled the free sharing of previously market-controlled elements, while in others led to the support of communities by higher levels of policy-making.

In response to the shortage of protective equipment and following the emergence of ever-increasing groups focusing on commons-based peer production, the EU voted a framework enabling the provision of equipment through these cyber-physical communities, away from the monopoly surrounding the pharmaceutical sector (Commission Recommendation (EU) 2020/403). In Boston, the commoning of data, legal support and action roadmaps to individuals affected by the pandemic led to the creation of the “Moratorium of Evictions” (“Moratorium on Evictions and Foreclosures Forms and Other Resources” 2020) on the state level.

The controversy that rose on an international level among governmental bodies regarding the rise of the patent of the COVID-19 vaccine and the open distribution of its production specifications can also be added as a vital step towards the understanding of the importance of the commons in cases of disasters (Pietromarchi 2021). This was initially proposed by India and South Africa to the World Trade Organisation and it was widely supported as well as rejected by diverse governmental bodies (Médecins Sans Frontières 2020).

In the past, relevant modifications of laws towards the commoning of elements can be observed in the global North, with the most recent of those focusing on the digitalisation of information. As an example, the US government issued an executive order (“Making Open and Machine Readable the New Default” 2013) that states that government information should be openly shared through data when there is no privacy concern.

The incremental use of new technologies and online communication enables a more widespread, inclusive and easily accessible creation of communities based on shared concerns. It also enables synchronous and asynchronous collaborations (De Filippi 2015). The rise of diverse platforms through new media worldwide facilitates the appropriation of the urban fabric (Ampatzidou and Molenda 2015) in diverse localities. At the same time, new media enable a more informed and immediate response to threats and shocks and support resilience (Zastrow 2020; Biasin and Kamenjasevic 2020). This adds

to the capacity of the community to utilise and form a vital part of connected intelligence networks, as analysed in the previous part.

The commons-based initiatives underline the importance of collective intelligence, creating a space of cooperation, engagement, and participation (Randhir 2019; Bauwens, Kostakis, and Pazaitis 2019; Bollier 2014). The cyber-physical commons-based initiatives provide spaces that connect human intelligence with the material resources of the communities and the capabilities of the medium. Commons-based initiatives expressed through a digital or cyber-physical space are parts of wider ecosystems (Randhir 2019; Bauwens and Pantazis 2018) within the metropolitan reality, co-existing with other initiatives. They are associated with initiatives of Commons-Based Peer Production within ecosystems (Bauwens and Pantazis 2018), as well as diverse initiatives and platforms irrespectively of their mode of operation (Komninos 2019). The objective of creating something mutually beneficial (Benkler 2006, 2011) as opposed to profit renders them important spaces of resilience within ecosystems.

Based on the above analysis, the commons have the propensity to create spaces capable of resolving the elements that lead to vulnerability and, eventually, disasters. At the same time, while they are spaces of collective intelligence, they include the capacity to sense vulnerability and risk and transform accordingly. With the addition of digital tools, as parts of connected intelligence networks, they have been identified capable of creating changes on greater scales.

It is this property that renders them vital in the creation of measurements and policies in cases of disasters on greater scales. They serve as sensors (Randhir 2019) of the reality, as well as mediums towards participatory policy-making that can ensure equity in the participation.

## **Discussion and future work**

With the constantly increasing occurrence and severity of disasters in metropolises worldwide (Guha-Sapir, Below, and Hoyois 2017; US Global Change Research Program (USGCRP) et al. 2018), rethinking the term of resilience is more vital than ever. The COVID-19 pandemic underlined the fragility of the centres of economic and social activity as well as their negative side as centres of inequity and thus epicentres of disasters. At the

same time, metropolises were the centres where most community solidarity initiatives emerged, in a commons-based form, providing an alternative to the inequitable approach and response. According to the above analysis, the action of commons-based cyber-physical initiatives, when combined and expanded through connected intelligence networks, promises to contribute to the equity of Metropolitan resilience policies, evoking transformations to the multiple levels of social capital.

In this paper, I analysed literature through more than 150 works from all over the world in order to create an overview and better understand the examined terms and links.

Starting from the analysis of disasters as a result of community vulnerability, this paper underlines that metropolitan resilience can only be understood through the equitable resilience and participation of the communities that form it. In other words, a metropolis cannot be considered resilient if the same vulnerabilities that caused the disaster are being reproduced and even amplified in response. Unfortunately, as mentioned throughout the text, many global paradigms have proven to have highly ignored and amplified the inequities causing vulnerability and risk to already vulnerable communities.

This literature underlined through the examples of Boston, Medellín and Athens, that, during COVID-19, inequity was present on three levels:

1. The disaster disproportionately affected the most vulnerable.
2. It added to and amplified pre-existent vulnerabilities.
3. It was followed by an inequitable response both on Urban and State levels.

In this context, a variety of commons-based initiatives emerged or gained popularity. Within literature, it was identified that this was not the first disaster through which their appearance occurred. Though, their popularity and extent were significantly amplified and globalised.

The reasoning for the appearance of commons-based initiatives during disasters, as identified by this research, can be found in the following 3 points that connect them with resilience:

1. Commons provide an alternative paradigm to the one that caused the vulnerability and thus the disasters (equitable accessibility through col-

lective possession of resources). For this reason, they can be considered part of the response.

2. Commons are managed by the community itself. Based on the community's capacity to sense vulnerability and risk through connected intelligence, such communities have a flexible form capable of responding to disasters.
3. They include the capacity to create networks and flow of resources. Thus, they are spaces capable of generating diverse forms of social capital.

Additionally, the following 3 points provide reasoning for the incremental popularity of such initiatives in the disasters that followed COVID-19 and are associated with the extensive use of digital technologies due to lockdown measures:

1. Many resources were disconnected from their prior material nature, towards a digital form. This caused a state of flux in the sense of ownership providing more opportunities towards commoning.
2. The communities were made more open and easily accessible due to their digital (or cyber-physical nature) and thus rose in popularity.
3. Commons-based initiatives were made a part of the connected intelligence networks of urban and metropolitan ecosystems, which enabled the scale-up of their impact. According to this final reasoning, one could argue that there is no evidence that more commons-based initiatives emerged during the pandemic as compared to other disasters. It might be the scalability of their outcomes that made them more apparent within the urban and metropolitan reality.

The above 6 points are not only the reasons for their emergence but also the characteristics of such initiatives that prove them to be tools towards resilient communities and metropolises.

Within this research, the reflections of commons-based initiatives on greater scales through public policy during COVID-19 were presented. International literature analysis and the links identified suggest that the participation of such initiatives within ecosystems and connected intelligence networks led to added complexity and extent of social capital ties.

As an amplified and modified system of social capital connections on diverse levels, this interconnection promises not only positive outcomes but also negative externalities of social capital. Both terms are results of solidarity and inclusion or exclusion of individuals and groups and, thus, are understood within this research as reflections of the initiatives on greater scales. This paper proposes that in the cases of initiative based on the commoning of goods the negative externalities are, up to an extent, minimised due to the collective management of resources. Collective possession is significantly more inclusive than private ownership. On the other hand, the structure and the levels of openness of the formed community define the capacity of the initiatives to be inclusive and express solidarity. Thus, these elements are expected to be factors that define the positive outcomes or negative externalities when placing the initiatives within ecosystems.

For these reasons, it is vital to underline the importance of such initiatives in cases of disasters and to analyse the complex networks that form them and interconnect them, in literature. The following gaps were identified in literature:

1. The lack of measurements of the influence of commons-based initiatives on the resilience of communities.
2. The lack of an analysis that identifies their role within connected intelligence networks that can prove the scalability potential of their outcomes in cases of disasters.
3. The lack of the association of the characteristics of such platforms with the positive outcomes or negative externalities of social capital.
4. The lack of a link between commons-based community initiatives and metropolitan resilience.

The creation of the missing links and analysis will provide greater equity in the response that follows future disasters. Policy-making and decisions that define communities need to be assessed by the communities themselves and be connected with their capacity to understand their vulnerability and sense the risk. As analysed above, communities worldwide managed to identify and act in front of the risks of the COVID-19 pandemic much more effectively than metropolitan policy-makers. Additionally, while questioning the identified gaps and through future work on the topic that takes into account community actions and actors of the territory, the initiatives analysed will

be provided with information and tools towards more effective response to upcoming threats.

This paper will be followed by further research and data analysis of the impact of commons-based initiatives on community and metropolitan resilience in three global cases with big sociocultural diversifications. Community initiatives and metropolitan policies will be analysed in Boston (MA, USA), Medellín (Colombia) and Athens (Greece). The results will be interrelated towards the understanding of similarities and differences of the cases and provide contextualisation potential.

## **Conclusion**

This research raised the question of tools that can lead to more equitable metropolitan resilience and sought potential answers on the commons both as expressions of and as alternatives to vulnerability. With an interdisciplinary and global literature review, a variety of prominent views were analysed. The connection of the commons with policy-making at the metropolitan level is possible due to the existing ecosystems and the understanding of connected intelligence. The wide literature on social capital in all its forms when combined with global research on connected intelligence can prove vital towards the transition from resilient communities to more equitable, and thus resilient, metropolises.

This paper focuses on literature that approaches resilience in front of disasters as an evolutionary process (Martin and Simmie 2010). Disasters were analysed as the result of social structures (Federici 2019; Pazaitis et al. 2020) that lead to vulnerability and risk. Metropolises were identified as the epicentres of inequity, and thus disasters, but also as the centres of transformation (Katz and Bradley 2013). They are analysed in this research as agglomerations of ecosystems (Komninos 2019). Metropolitan resilience, in this context, was identified as the equitable resilience of its parts. Commons-based platforms were analysed as indicators and enablers of social capital (O'Brien 2018; Aldrich 2012). These initiatives, with the addition of information and communication technologies, are presented as part of cyber-physical ecosystems (Komninos 2019) and, thus, as potential enablers of equitable metropolitan resilience.

This research refers to academics in the fields of social sciences, economics, spatial engineering, data sciences, etc., as well as community organisations, activists, individuals interested in supporting their communities within current and future stretches and shocks. It also underlines the importance of the commons, not only for the communities within which they are developed but also on broader scales.

### **Limitations of the research and research recommendations**

The research evolved while the stretches caused by the 2020 pandemic were still ongoing, in parallel with other shocks and stretches in diverse localities. Resilience was identified as a lengthy process. Thus, this work does not have an overall view of the final outcomes of the initiatives examined on communities and metropolises. It rather consists of an initial analysis of the events at the time they were occurring and connects them with relevant literature.

Future research on the long-term outcomes of the initiatives on resilience on both the community and the metropolitan scale is considered vital. The field would benefit greatly from further analysis regarding the measurement of the impact of commons-based initiatives at the metropolitan level and the creation of a pathway through which these initiatives could lead to positive outcomes on a larger scale.

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