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# How can resilient infrastructures contribute to social justice?

## Preface to the special issue of sustainable and resilient infrastructure on resilience infrastructures and social justice

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### ABSTRACT

Over the past two decades, the attention for resilience has increased dramatically and resilience has become the leading paradigm for considering risks and uncertainty in complex systems. Resilience is now commonly used within a broad range of fields. The concept has not only attracted the attention of academics; decision-makers across disciplines, sectors, and scales, also organize their risk strategies around the idea of resilience as resilience is often thought to lead to a better – that is, a safer and more just – society. However, the alleged link between resilience and justice is controversial. Some scholars argue that the resilience paradigm primarily benefits those people who are already reasonably well-off at the expense of disadvantaged groups. The focus in this special issue is on the relation between resilience, specifically ‘resilient infrastructures’, and social justice. While written from different disciplinary perspectives, all are centered around the question of how resilient infrastructures can contribute to social justice

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Over the past two decades, the attention paid to resilience has increased dramatically and resilience has become the leading paradigm for considering risks and uncertainty in complex systems. Resilience is now commonly used within a broad range of fields, including disaster and crisis management (Alexander 2013; Aldunce et al., 2015), natural hazards research (Burton, 2015; Zhou et al., 2010), and urban planning (Meerow et al., 2016; Zaidi & Pelling, 2015), to mention just a few fields. The concept has not only attracted the attention of academics; decision-makers across disciplines, sectors, and scales, also organize their risk strategies around the idea of resilience as resilience is often thought to lead to a better – that is, a safer and more just – society (Béné et al., 2017). However, the alleged link between resilience and justice is not uncontroversial. Some scholars argue that the resilience paradigm primarily benefits those people who are already reasonably well-off at the expense of disadvantaged groups (cf. Cote & Nightingale, 2011; Davoudi, 2012; Doorn, 2017; McEvoy et al., 2013). The focus in this special issue is on the relation between resilience, specifically ‘resilient infrastructures’, and social justice. Although the different contributions are written from different disciplinary perspectives, all contributions are centered around the

question of how resilient infrastructures can contribute to social justice?

### 1. Overview of the contributions

The first contribution in this Special Issue is by Michael Nagenborg, whose aim is to map out the relationship between resilience and justice, specifically in the context of urban resilience to natural disasters (Nagenborg, 2018). The underlying premise of the paper is that there are different, partly contrasting, views on resilience, some of which are more easily reconcilable with justice than others. The first view of resilience, also discussed in the contribution by Doorn et al. (2018) and referred to as ‘narrow resilience’, is resilience which is ‘bouncing back’ to some state of equilibrium. Here, we see potential tension between resilience and justice if the state of equilibrium is considered unjust. For Nagenborg, this is also a matter of scale: resilience at the city level all too often does not take into account the needs and rights of all inhabitants and city users. A second view of resilience, often termed ‘bouncing forward,’ recognizes that the process of recovery after some disasters also provides a window of opportunity. In the aftermath of disasters, additional (financial) resources become available to rebuild a city and these

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may be allocated in such a way that they actually improve the situation of the most vulnerable groups. The third view of resilience discussed by Nagenborg links resilience to uncertainty, with resilience viewed as a capacity that allows systems to adapt to unexpected future changes. But also here, resilience in the sense of adaptability may backfire if it blocks progressive developments that aim to improve the situation of vulnerable groups. Hence, according to Nagenborg, for resilience to work in the face of uncertainty, *transformation* should be recognized as a vital feature of resilience, thereby allowing room to include justice concerns in post-disaster planning.

The second paper in this Special Issue is written by Neelke Doorn, Paolo Gardoni, and Colleen Murphy. Like Nagenborg, Doorn et al. (2018), they also recognize the different views of resilience and their paper starts with a discussion of the origins of the term, resilience, and the evolution of its definitions across disciplines. Building on the specific meaning of resilience in resilience engineering as ‘the potential of a socio-technical system to perform its functions’, they contend that resilience is a formal concept in need of ‘normative content’ (Doorn, 2019). They propose the capability approach to provide this normative content – an approach also mentioned in Nagenborg’s contribution. In the second half of their paper, Doorn et al. elaborate three central questions for operationalizing resilience in infrastructures: (1) What kind of functionality do we want to be able to maintain or recover in the aftermath of a given hazard? (2) What are the appropriate metrics to quantify/characterize the resilience? (3) What are the roles of the individual components of each network and of the dependencies/interdependencies in regard to the overall resilience of the physical infrastructure? The first and second questions especially require quite a few ‘value-laden’ choices, which in turn provide opportunities for providing the normative content of resilience in general and for addressing social justice concerns in particular. For example, whether or not social justice concerns receive a prominent embedding will be dependent on the choice of the required functionality of the physical infrastructure and its operationalization. The authors give the example of a transportation network. If the functionality of this network is defined and operationalized in terms of accessibility, it may be better able to contribute to social justice than if it is defined in terms of the maximum attainable speeds at which one can drive on particular roads. There are also better or worse ways of including social justice concerns in the metrics quantifying resilience. In line with Nagenborg’s argument that social justice requires that the needs and rights of *individuals* be assessed and that resilience should not only be assessed at the city level,

Doorn et al. argue for indicators that allow an assessment of capabilities at the individual level, be it through a process of disaggregation of indices that assess overall resilience (Murphy & Gardoni, 2007) or via direct measurements of capabilities of each individual (Tabandeh et al., 2018). The third question – that is, the one about interdependencies – also touches upon normative questions. In order to assess a system’s resilience and its impact on social justice, the role of humans in the infrastructures’ performance should be assessed and vice versa. Humans are as crucial for infrastructures to function, as infrastructures are crucial for human functioning. The authors provide the example of education, which increasingly depends on the quality of the communication and information technology infrastructure, but education is also needed to maintain and develop the infrastructure itself. This interdependence between physical infrastructure and human capabilities is not static, but evolves overtime and in the face of shocks such as natural hazards. Doorn et al. argue that, although the assessment of these interdependencies is in itself not necessarily a value-laden question, the interdependencies should be linked to ‘societal needs’. Here, again, the way these societal needs are defined and operationalized *is* value-laden. Hence, also here, the authors see opportunities for addressing considerations of social justice.

The third paper in this Special Issue is written by Comes et al. (2017). Comes et al. focus on the specific context of disasters and the role of Information and Communication Technologies (ICT) in disaster-ridden communities. The authors use a historical analysis of the role of information in disaster management to illustrate the specific role that ICT can play in disaster relief. Starting with the establishment of the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) in December 1991, Comes et al. distinguish three periods: 1991–2005, 2005–2015, and 2015 – present. The first period can be characterized by an increase in international humanitarian actors, diversification of resources and activities, which prompted a need for coordination, better understanding of the situation, including the needs of the affected population and the aid being provided. In most disaster-aid programs, information was in short supply. In the second period, much more information became available but this information primarily served the humanitarian community and other closely related formal actors and less so the local communities. It is only since the third period began that the information needs of the local community have been taken seriously. Providing communities access to timely, relevant and accurate information, can allow them to take ownership of their own recovery process. Here, ICT can play a facilitating role in helping communities

‘to make sense of crisis,’ either by providing information internally within the community or by connecting communities externally with other communities and actors. It is in this third era that resilience and social justice become two sides of the same coin: only when access to information is fairly distributed and institutions and organizational practices are designed in such a way that they enable humans to develop their full potential, can community members have the chance to increase their understanding of a crisis situation and be able to engage in response and recovery efforts.

## 2. The relation between resilience and social justice

Although approached from very different angles, the three papers have some striking commonalities. Both Nagenborg and Doorn et al. explicitly propose the capability approach as the metric of justice. Justice should not be assessed in terms of what people *have* but in terms of what people are effectively *able to do*. Although Comes et al. do not make this claim explicitly, their view of justice is also built on the capacities that people have to *do* things. For example, they link justice to empowerment and enabling people ‘to develop their full potential’ and ‘to engage in response and recovery efforts’, to mention just two examples.

The three questions of operationalization of resilience in the paper by Doorn et al. fit very nicely in Nagenborg’s view of resilience as a window of opportunity. Both papers are implicitly built on the idea that, although resilience and social justice do not automatically go together, there are ample opportunities for making them cohere. Here, Comes et al. come at it from a different angle when they define community resilience as ‘enabling a broad range of actors to acquire a relevant, consistent and coherent understanding of a stressing situation, empower decision-makers and trigger community engagement on response and recovery efforts, including long-term mitigation and preparation’. Where Nagenborg explicitly denies that resilience and social justice go ‘hand in hand’, Comes et al. see social justice as ‘part and parcel’ of resilience.

## 3. Complexity and interdependencies

All three papers highlight the complexity and interdependencies within resilient systems. Both Doorn et al. and Comes et al. place resilience within a complex context, which is characterized by many dependencies and interdependencies. Whereas Nagenborg emphasizes the interplay between infrastructure and the city itself,

Doorn et al. focus on the interdependencies between the infrastructure and individuals. For Comes et al., the complexity comes not only from the involvement of the large number of diverse actors in disaster relief but also from the complexity of the disaster itself and the abundance of information. ICT can play a role in making sense of this information. Central to the dependence of people on infrastructures is the ability of individuals to turn the available infrastructure to their own advantage, as emphasized by both Doorn et al. and Comes et al.

## 4. Recovery

All three papers discuss recovery, albeit somewhat differently. Both Nagenborg and Doorn et al. emphasize that the recovery does not mean a return to some pre-disaster state but that it should focus on bouncing forward. For Nagenborg, the phase of recovery provides what he calls a window of opportunity for addressing social justice concerns. Doorn et al. discuss how, in the recovery phase, individuals who have the ability to adapt may invent new ways to improve their well-being independently of the recovery of the built environment itself.

Unsurprisingly, with the focus on disaster relief, Comes et al. see recovery efforts as the very locus of both resilience and justice. Ownership of the recovery process allows communities not only to address immediate needs but also to identify, mitigate, and respond to critical events.

## 5. Taking stock and future outlook

The upshot of these three articles is that the question of how resilient infrastructures can contribute to social justice also provides a research agenda. Both Nagenborg and Doorn et al. highlight that, in order to foster social justice, it is important to have a good understanding of the interdependencies within resilient systems and the general interplay involved in improving justice in a city, which is partly a conceptual question but also one of modelling and assessment. There is currently little insight into the interdependencies within and between different infrastructures (and especially, into the interdependencies between human behavior and infrastructures, including adapted use of infrastructures) and the associated emergent behavior. Dynamic methods, such as agent-based modeling and evolutionary game theory, may provide a good complement to analytical approaches aimed at simulating the effect of changed infrastructure use on the resilience of the system as a whole.

Furthermore, both Nagenborg and Doorn et al. contend that the inclusion of justice considerations in current

resilience research requires a more detailed operationalization of social justice in the specific context of cities or local communities. The link between justice and resilience has been studied surprisingly little in political philosophy literature. A first step here would be to further explore how the capability approach can be operationalized in the context of urban or community resilience.

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### Notes on contributor

*Neelke Doorn* is distinguished Antoni van Leeuwenhoek professor “Ethics of water engineering” at Delft University of Technology, the Netherlands. Her research interests centre around the ethical aspects of water engineering and climate change, with a special focus on distributive questions posed by a resilience approach to climate and water-related challenges. She is an internationally recognized expert in risk ethics and especially known for her pioneering work at the interface of water and safety engineering and philosophy. She is the co-editor-in-chief of the international journal *Techne: Research in Philosophy and Technology*.

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