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Session: Poster Session

Urban Resilience & Critical Infrastructures

Challenges for Urban Governance

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Abstract:

Resilient Cities heavily depend on the continuous functioning of Critical Infrastructures such as transportation, communication, electricity, and water supply/disposal. In case of disruption (e.g. deriving from floods or earthquakes), quick restoration of these technical systems is an essential prerequisite for any recovery strategy. Regarding long-term planning and climate change adaptation, Critical Infrastructures need to ensure continuous service provision for diverging future scenarios as well as they are themselves subject of desired transformative change. In short, any urban resilience strategy needs to actively integrate the management of Critical Infrastructures in one or another way. Because infrastructure services are often operated by- and infrastructure networks are often in the hands of private companies, an integrated approach of urban and infrastructure resilience poses challenges to urban governance. These challenges have been discussed with participants of the Resilient Cities 2017 Congress in Bonn using a participatory poster presentation. Participants were asked to provide suggestions for focus areas, instruments, and actions which could help to better integrate the management of critical infrastructures in urban resilience approaches. It became clear that the discussed governance challenges are of critical importance for designing and implementing urban resilience strategies and that there is no blue-print solution for solving them.

Keywords:

Critical infrastructures, urban governance, urban resilience

1 Interdependencies of Cities and their Critical Infrastructures

Critical infrastructures (CI) form one of the backbones for modern societies. Largely invisible and taken for granted (Star, 1999) or perceived as boring and culturally banal (Graham, 2010) they provide those services that enable modern living in the first place. In the event of failure or breakdown, however, they become visible (“unblackboxing”) and can pose the social order of a city, region, or country at risk (ibid, 18). Hence, CIs are often defined due to their effects in case of failure: „if disrupted or destroyed, [they] would have a serious impact on the health, safety, security or economic well-being of citizens or the effective functioning of governments” (Bouchon, 2006). Whilst CIs are often defined by nation states (national CI), discussions if and how cities could or should define their own, maybe divergent, CIs (urban CI) are rather limited. Those CIs, that are regularly listed within a city context are often referred to as networked CIs (Neuman, 2006) and include energy, transportation, water supply/disposal, and information/communication.

Not only does urban living depend on CI systems. The other way around, CI systems depend on the urban sphere as it is those economic hubs and densely populated areas which count for large parts of service demands and which are often homes to infrastructure provider’s administrative headquarters. At the same time, it is exactly the economic density, population density, and spatial agglomeration of different CIs in cities which makes these places particularly vulnerable to infrastructure failure and cascading effects. In terms of generating innovative solutions for pressing problems such as resource scarcity, security, and safety, however, cities bare the creative potential needed to substantially transform and adapt infrastructure systems.

Monstadt (2009, p. 1929) highlights the constituting role (restricting, enabling, or even stimulating) of networked infrastructures for urban governance (for example through engineering routines, user practices, skills and procedures, or regulatory institutions). The other way around, networked infrastructures are dependent on social routines, institutional settings, and governance decisions (Star, 1999). This makes it possible to describe CI systems as complex, adaptive, and socio-technical systems (Axelrod and Cohen, 2000) and, hence, “complex collections of interacting components in which change often occurs as a result of learning processes” (Rinaldi et al., 2001). Moreover, it becomes clear that due to the dependence of modern urban systems on critical infrastructures and the importance of the urban scale for critical infrastructure systems, it is not possible to approach UR without CIR and vice versa.

However, an integrated approach of urban and critical infrastructure resilience raises a range of governance challenges. This becomes particularly critical considering institutional

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restructuring processes in the course of privatisation, deregulation, and liberalisation. Which administrative levels and what actors should be involved and how? Which policy instruments and measures should be used? How should coordination across different policy domains and different infrastructure sectors be organised? Answering these kind of governance related questions is necessary if urban resilience is to be approached with the appropriate seriousness.

2 Governance Challenges of Managing Urban Infrastructure Resilience

Some studies on the relationships between cities and their infrastructures show how interest groups from outside the city heavily shape infrastructure control and governance (Adams, 2007), see a diminishing role of local authorities in urban infrastructure governance (Offner, 2000), argue that infrastructure governance is influenced increasingly by international financial players (Torrance, 2008), or conclude that local governments are pushed into public private partnerships due to a lack of authority and expertise (Bruijne and Eeten, 2007). Further, potential challenges for cross-sectoral urban governance of infrastructures might be individual defence mechanisms, organisational beliefs and rationalisations, and institutional design for crises management (Boin and McConnell, 2007). One of the most striking governance challenges, however, has been articulated by Star (1999, p. 382): “Nobody is really in charge of infrastructures”.

Deriving from a preliminary literature review in the field of CI management as well as from discussions within the Cascading Effects Conference in March 2017 in Brussels¹, some main governance challenges can be identified:

First, different actors deal with resilience issues in the urban sphere and concerning CI systems and they do not necessarily cooperate. Regarding actors involved in UR in general, it can be said that cities' action is often organised by international institutions like UNISDR, ICLEI, C40, the World Bank and so forth. Moreover, private institutions (like the Rockefeller Foundation), consultancies (like Arup), and companies (like Siemens) engage in the growing market of UR. Consequently, resilience toolboxes, frameworks, and agendas are shaped by these global institutions, not seldom for commercial gain and in the interest of business opportunity (Coaffe and Lee 2016, p. 10). In contrast, an international network promulgating CIR does not exist and CI protection is mainly organised at national government level (Ritter

¹ ‘The Cascading Effects Conference – understanding, modelling and managing cascading effects in crises’ took place on 16th and 17th March 2017 in Brussels, Belgium as a joint conference of projects funded by the European Union’s Seventh Framework Programme: CascEff, CIPRNet, FORTRESS, PREDICT and SnowBall.

and Weber, 2010) and operationalised at private company level. This is not surprising as the field of public security and safety is principally located at the national government level including the definition of 'national critical infrastructures'. Practically, it is most often the (private) infrastructure providers and network operators that are dealing with issues of protection (and sometimes resilience). New Public Management approaches led to an institutional reconfiguration that is not always of benefit for defining and implementing integrated resilience strategies. Consequently, local authorities often lack authority and expertise in managing Critical Infrastructures.

Second, service providers and network operators tend to protect sensitive data which might be important to share in order to detect interdependencies between infrastructure systems and other urban subsystems. However, mutual understanding of CI interdependencies heavily depends on knowledge of the other's system including sensitive and security related elements. Fostering cross-sectoral collaboration and breaking up silos proves to be one of the most persistent challenges in the interdisciplinary field of urban development and planning and becomes particularly visible in the infrastructure domain with often strictly separated sectoral planning and operating institutions.

Third, the concept of resilience is often interpreted differently in the domains of urban and infrastructure management. In infrastructure management discourses, resilience is often understood in an engineering sense referring to "the ability of a system to return to an equilibrium or steady-state after a disturbance" (Holling, 1973; Davoudi et al., 2012, p. 300) ("bouncing back"). In contrast, urban governance discourses regularly depict resilience in a more ecological or evolutionary sense related to adaptation and learning ("bounce forward")². Although, the success story of the concept can be ascribed to the term's interpretative flexibility (Baggio et al., 2015), these different understandings pose a tremendous governance challenge in terms of finding a common language to discuss across disciplines and sectors.

Fourth, governance challenges derive from the complexity of spatial and temporal scales that have to be considered and aligned. Usually, infrastructure systems do not stop at the administrative boundaries of a city but rather ensure resource flows in and out the city connecting it with its hinterland as well as with other cities. Therefore, in terms of integrated governance, close alignment of all scales (from household level to national level and beyond) is critical. Moreover, different temporal scales need to be considered. For example, long term

² Clearly, different frameworks of UR make use of (mixes of) different approaches (engineering, ecological, evolutionary) and the way UR is applied differs among different planning cultures (Spaans and Waterhout, 2017, p. 2) as well as from city to city (Johnson and Blackburn, 2014, p. 43) revealing different ratios of analytical and normative aspects. However, generally in the field of urban planning and development it seems fair to state that "[u]rban resilience is ultimately about change" (Coaffee and Lee, 2016, p. 5).

planning of urban development might stand in contrast to short term business interests of service providers. Moreover, responsibilities might have to be specified in temporal terms, for example along the different phases of the crisis management circle (preparedness, response, recovery, mitigation). Who is responsible for preparedness strategies? When does the responsibility of one stakeholder end and when does it start in times of crises?

This is by no means a complete list of governance challenges for integrating CI management and urban resilience strategies. However, it becomes clear that local authorities depend on the willingness of network operators and service providers to actively participate in the process. This challenge has been discussed with participants of the Resilient Cities 2017 Congress with the help of a participatory poster as well as in bilateral discussions and in open discussions in different sessions of the Congress. The results of these discussions are summarised and discussed below.

3 Towards an integrated approach of urban and infrastructure resilience

An integrated approach of CI management and UR would require coordination and cooperation across different policy domains, different infrastructure sectors, different spatial scales, and different time dimensions: First, policy domains dealing with service provision, urban planning, and infrastructure planning are as much concerned as policy domains of disaster risk management, and contingency planning. Second, a cross-sectoral approach would be needed for accounting for interdependencies of different CI systems and potential cascading effects. Third, a cross-spatial approach would be needed for acknowledging the different scales at which CI systems are managed as well as for urban – regional – national governance relations. Fourth, a cross-temporal approach would be needed to allow for dealing with different time scales at which governance decisions are made in CI systems and in urban governance per se and to recognise potential trade-offs between short term decision making and long term visioning.

The evaluation of the participatory poster reveals some hints on how CI management and UR could be integrated focussing on the governance challenge of public and private sector collaboration. Generally, it has been said that it is important to “explore transformative situations” or “windows of opportunity” and to consider “urban-rural connections”, “resource flows”, and “different governmental scales”. In terms of hard governance approaches financial incentives (insurance, internalisation of external costs (e.g. pollution) in decision making, taxing (e.g. fuel taxing), and strategic planning (holistic frameworks, business planning; coordination & facilitation institutions) received major attention. Moreover, regulation, standardisation, and information management are thought to be important. In terms of soft

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governance approaches, it has been said that stakeholder roundtables, simulations, and risk mapping can help to integrate CI providers in UR strategies. Generally, it was found to be of major importance to identify co-benefits and synergies, to foster creativity, to find a common understanding of the problem, to define winners and losers and to approach them adequately, as well as to learn from past events.

All participants agreed with the governance challenges stated in the poster and acknowledged the importance of cooperation with the private sector. It can only be assumed at this point that, as much as urban planners might benefit from insights in infrastructure-specific risks like technical failure and cascading effects, infrastructure planners and providers in different sectors might also benefit from the expertise of urban planners and developers in terms of citizen participation and disaster risk management. As the Chief Resilience Officer of Quito, David Jácome Polit, states in a panel on the “unexplored aspects of transportation in urban resiliences” (H1): “Ideally infrastructure providers and network owners are at the table from the start. The incentive should be: ‘we will identify your vulnerabilities together.’”

In this sense, the challenge is not to merely consider (urban) CIs in UR strategies but to collaborate with those people and institutions responsible for the management of these CIs. Only then, there is the chance of considering the actual risk factors and of approaching them in a well-coordinated manner highlighting synergies and co-benefits instead of getting lost in negative trade-offs of parallel, siloed activities. The goal must be to support local authorities in cross-departmental work, co-production processes, and private sectors collaboration. If local governments would increase their capacity in these processes, urban resilience levels would automatically increase.

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