

Introduction—The Hacker, the City and Their Institutions: From Grassroots Urbanism to Systemic Change



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Abstract In the debate about smart cities, an alternative to a dominant top-down, tech-driven solutionist approach has arisen in examples of ‘civic hacking’. Hacking here refers to the playful, exploratory, collaborative and sometimes transgressive modes of operation found in various hacker cultures, this time constructively applied in the context of civics. It suggests a novel logic to organise urban society through social and digital media platforms, moving away from centralised urban planning towards a more inclusive process of city-making, creating new types of public spaces. This book takes this urban imaginary of a hackable city seriously, using hacking as a lens to explore examples of collaborative city-making enabled by digital media technologies. Five different perspectives are discussed. Hacking can be understood as (1) an ethos, a particular articulation of citizenship in the network era; (2) as a set of iterative and collaborative city-making practices, bringing out new roles and relations between citizens, (design) professionals and institutional actors; (3) a set of affordances of institutional structures that allow or discourage their appropriation; (4) a critical lens to bring in notions of democratic governance, power struggles and conflict of interests into the debate on collaborative city-making; and (5) a point of departure for action research. After a discussion of these themes, the various chapters in the book are briefly introduced. Taken together they contribute to a wider debate about practices of technology-enabled collaborative city-making, and the question how city hacking may mature from the tactical level of smart and often playful interventions to a strategic level of enduring impact.

Keywords Smart cities · Citizenship · Civic media · Participatory urbanism
Planning and urban design · Hacking and hacker cultures

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1 The Parallels Between Hacking and City-Making

‘Hacking’ has long been part and parcel of the world of computer science, ICT and media technologies. From radio amateurs in the early twentieth century to the US west-coast computer culture that gave rise to first personal computers in the 1970s and the rise of the free/libre and open-source software (FLOSS) movement in the following decades, users have been figured as active creators, shapers and benders of media technologies and the relationships mediated through them (Roszak 1986; Levy 2001; von Hippel 2005; Söderberg 2010). In general, hacking refers to the process of clever or playful appropriation of existing technologies or infrastructures or bending the logic of a particular system beyond its intended purposes or restrictions to serve one’s personal, communal or activism goals.

Where the term was mainly used to refer to practices in the sphere of computer hardware and software, more recently ‘hacking’ has been used to refer to creative practices and ideals of city-making: spanning across spatial, social, cultural and institutional domains, various practices of ‘city hacking’ can be seen in urban planning, city management and examples of tactical urbanism and DIY/DIWO urban interventions. Various authors have by now described the rise of ‘civic hackers’ (Crabtree 2007; Townsend 2013; Schrock 2016), where citizens are cast in the role of tech-savvy agents of urban change, usually working towards the public good. For instance, in the guise of monitorial citizens (Schudson 1998) that make use of open data to hold governments accountable (Schrock 2016); or as coders that take part in programs like *Code for America* to create apps or websites that can help solve problems posed by local authorities (Townsend 2013); or alternatively, as participants in hackathons that code more speculative prototypes to spark discussions around issues of concern (Lodato and Disalvo 2016).

Furthermore, moving beyond the application of technology to civic life, the ethos and spirit of various hacker movements have been invoked to describe new forms of bottom-up, grassroots and collaborative city-making. Lydon and Garcia (2015) connect their tactical urbanism paradigm to the iterative, learning-by-doing approach of the hacker movement. Caldwell and Foth (2014) describe the emergence of DIY-placemaking communities around the world, partly inspired by hacking cultures and their ethos of shaping, bending and extending technologies to their needs, often beyond their intended use. In professional circles, Gardner (2015) sees a similar shift in the profession of architecture at large. Architects are moving from the position of ‘the self-conscious designers of modernism, with its unassailable belief in social engineering’ to an ethos of hacking, projecting their imaginations of better futures onto the ‘full and buzzing activities and structures’ of the existing world. Examples are abundant. In Raleigh, North Carolina, a student in landscape architecture and urban planning, Matt Tomasulo, set up a guerrilla wayfinding system to improve the walkability of the city that has gained traction around the world (Lydon and Garcia 2015). In São Paulo, a group of concerned citizens occupied the Lago Da Batata, a central city square in the gentrifying neighbourhood Pinheiros. They reactivated it as a public sphere by programming it with

various activities, epitomising a broader reclaim-public-space movement in Brazil (Montuori et al. 2015; de Waal and de Lange 2018). In another example, in Rotterdam, The Netherlands, an architectural office appropriated a vacant office building in Rotterdam's Central Station District, while also revitalising its derelict surrounding public space through the construction of a partly crowd-funded pedestrian bridge that relinks various sites in the area (Gardner 2015).

What these examples have in common is that the term hacking is used to evoke a participatory alternative to top-down smart city technology implementations. Hacking suggests a novel logic to organise urban society through social and digital media platforms. It suggests a move away from centralised urban planning towards a more inclusive process of city-making, creating new types of public spaces. This logic of hacking is touted as slightly subversive, informal, yet highly innovative and is associated with collaboration, openness and participation. The term can be used to highlight critical or contrarian tactics, to point to new collaborative practices amongst citizens mediated through social media, or to describe a changing vision on the relation between governments and their citizens. In sum, these discourses on hacking and the city may pave the way towards a new paradigm for smart cities, urban informatics and urban governance: *a hackable city* that combines bottom-up (albeit often professionally initiated) civic organisation with the opening up of top-down government structures and procurement processes.

The articulation of civic hacking is especially interesting in this regard. *Hacking* in these examples refers to the inspiration found in the playful, exploratory, collaborative and sometimes transgressive modes of operation found in various hacker cultures, constructively applied in the context of civics and politics. At the same time, it also connotes the centrality of digital media technologies as tools for mobilisation, communication and civic organisation. As Saad-Sulonen and Horelli (2010) point out, many self-organising civic groups rely on extensive ecologies of digital artefacts, even if their activities themselves are not centred around technology. In addition, the adjective of *civic* denotes that these activities not only concern societal issues, but should also be understood as taking on a less adversarial position than 'regular' activists (or some hacker cultures for that matter) (Hunsinger and Schrock 2016; Schrock 2016). Civic hackers are seen as working with—or trying to reform—governments and other institutional actors to address societal issues, such as inequality, community representation, housing affordability and sustainability. The civic hacker, Schrock (2016) writes, seeks 'to ease societal suffering by bringing the hidden workings of abstract systems to light and improve their functioning.'

With this volume on hackable cities, we aim to build upon these discussions and further explore the affordances of digital media, urban informatics and smart city technologies for practices of collaborative city-making in the era of the network or platform society (Castells 2002; van Dijck et al. 2018). It contains chapters based on revised and extended papers presented at the ninth edition of the Digital Cities workshop series, titled *Hackable Cities: From Subversive City-Making to Systemic Change* held on 27 June 2015 in conjunction with the 7th International Conference on Communities & Technologies (C&T) in Limerick, Ireland (de Lange et al. 2015). In these contributions, hacking is used as a lens or metaphor to explore both concrete

practices and theoretical, critical explorations of collaborative city-making, usually using digital media technologies. The book continues the conversation and discussion threads started at the Digital City 7 and 8 workshops, which culminated in a volume focussing on the citizen's right to the digital city (Foth et al. 2015a).

We find hacking a useful lens to explore these emerging practices of collaborative city-making, as it can be understood in five ways. First, hacking can be understood as an ethos, a particular articulation of citizenship in the network era. In a hackable city, citizens are organised into urban publics (de Waal 2014) or collectives (van den Berg 2013) around particular themes. Working together, they attempt to appropriate, improve upon or restructure existing arrangements, varying from the programming of public space to the production of energy or the organisation of welfare provisions.

Second, hacking can be understood as a set of specific practices and ways of collaboration that can be described, analysed and conceptualised. Here, we also see a shift in the roles and relations between citizens, professionals and institutions. In many instances of civic hacking, professionals such as architects or designers are in the lead, presenting themselves as 'urban curators' or 'community orchestrators'.

Third, the lens of hacking allows to shift attention from these practices to a set of affordances of institutional structures that allow or discourage their appropriation. A hackable city does not just refer to civic organisations aided by digital technology, but also to the 'hackability' of systems of urban infrastructure, governance and polity. To what extent have institutional parties found ways to open up their workings for interventions ('hacks') by civic actors?

Fourth, hacking can also be understood as a critical lens, bringing in a normative dimension and notions of conflict and power struggle. To what extent are these collaborative practices truly democratic and inclusive? What kind of 'city hacks' should be encouraged and which ones are unwelcome, and who decides about that?

Last, in response to the critical approach, hacking can also be embraced as a form of action research in which academics stage participatory research projects that iteratively explore the affordances of digital media for collaborative processes of urban planning, management and social organisation, to contribute to liveable resilient cities, with a strong social fabric.

The perspective of this book on the hackable city combines these five perspectives and brings out both normative (what should a hackable city look like?) as well as practical perspectives (how could such an approach be enacted?) in the application of technology to city-making. This is important. As the notion of hacking is ported from the field of software development to civic life, it is used ambiguously, loaded with various ideological presumptions. For some, it exemplifies that citizens have started to embrace a new 'hacker ethic' of decentralised governance, reputation-based meritocracy and playfulness. Urban hacking is then about empowering citizens to organise themselves around communal issues and empowering them to perform aesthetic urban interventions. For others, it raises questions about governance: what is the legitimacy of bottom-up movements? How can traditional practices of democratic politics be remade to make room for civic initiatives? For yet another group, the term is mostly a masquerade for neoliberal politics in which libertarian values appear in the discursive sheep's clothing of participatory buzzwords like 'Web 2.0', 'collective

intelligence', 'crowdsourcing', 'open-source ethics', or 'sharing economy'. Furthermore, a key question that remains largely unanswered is how 'city hacking' may mature from the tactical level of smart and often playful interventions to a strategic level of enduring impact.

The latter is one of the most important foci of this book. The contributing authors have described and analysed various tools, practices and trajectories that seek to leap the gap (or in some cases have failed to do so) between subversive, often isolated practices of city-making enabled by digital media and the promise of systemic change towards more democratic and collaborative cities that have been brought up in discourses around hackable cities. As such we want to contribute to the further development of the debate around civic media, civic hacking, smart cities and smart citizens. We want to move this debate forward from the (promises of) practices of computer-aided community organisation to a more systemic understanding of the interactions between institutional actors such as local governments and bottom-up civic initiatives in the context of democratic societies.

2 Hacking Against the Smart City

In that debate, more than just an empirical category, the hackable city can be understood as an urban imaginary concerning more democratic and collaborative forms of urban planning and city-making. This imaginary can be placed against another, more dominant vision on the role of technologies in the future city: that of the smart city (Ampatzidou et al. 2014; de Waal et al. 2017). Although definitions of smart cities also vary widely (Hollands 2008; Allwinkle and Cruickshank 2011; Caragliu et al. 2011; Nam and Pardo 2011; Chourabi et al. 2012; Brynskov et al. 2014; Kitchin 2014a; de Waal and Dignum 2017), in dominant visions of the smart city, technologies such as digital sensors collecting urban data, online platforms and the application of various algorithms are presented as more or less neutral tools that can optimise the management of urban infrastructures and resources or even solve urban problems, such as traffic congestion, parking, and safety.

This approach has been criticised for various reasons. Many have pointed out that such an approach is based on a top-down and technocratic 'solutionism' that serves the interests of companies rather than citizens (Greenfield 2013; Morozov 2013; Ampatzidou et al. 2014; de Waal 2014; Foth et al. 2015a; Cardullo and Kitchin 2017; Morozov and Bria 2018). Many smart city schemes seem to underwrite neoliberal approaches of urban governance in which 'the logic of choice, consumption and individual autonomy' is favoured and the market is seen as the best way to determine what is best for the city (Cardullo and Kitchin 2017). In reality, the most prominent form the smart city has taken is that of a 'platform society' (van Dijck et al. 2018). This term highlights the fact that various urban infrastructures such as transport and traffic management are now turned into dynamically priced and algorithmically governed on-demand consumer services made available through platforms such as Uber and Airbnb. It is internationally operating corporate actors that provide these services,

who have set up their own schemes of governance, including the management of identities and reputation systems.

The criticism here is not about data being used for optimisation of urban processes per se. It is about data analytics being used in urban governance and management through the application of non-transparent algorithms, instigated by non-democratic actors that cannot be held accountable by the public, and that it is initiated without democratic debate about the underlying values these systems serve (Kitchin 2014b; Foth 2017). This smart city vision of neutral technologies providing ‘urban solutions’ negates or at least depoliticises the intrinsic conflicts at play in processes of optimisation. After all, who defines the optimum, and whose interests does this optimum serve? As Brynskov and Foth have argued, cities are wicked problems that cannot be solved by the application of an algorithm (Foth and Brynskov 2016; Foth 2017; Estrada-Grajales et al. 2018). Whereas the rise of digital media technologies initially led to optimistic accounts of a ‘participatory culture’ (Jenkins 2006), in which citizens would be empowered by technologies of communication and collaboration, Foth (2017) has pointed out that instead we face the emergence of a data-driven ‘algorithmic culture’ (Striphas 2015) that may bypass democratic processes of governance, transparency and accountability. It is time, therefore, Foth et al. (2015a) argue, that citizens reclaim their ‘rights to the digital city’.

The hackable city serves as a model to think through such an alternative imaginary. Whereas the smart city often takes a solutionist and depoliticised approach, introducing technologies as a means to ‘neutrally’ solve urban problems, the hackable city departs from the city as a political site. It highlights a vision of the city as a site of both collaboration as well as struggle and conflicts of interests. In this account, new media technologies enable citizens to organise, mobilise, innovate and collaborate towards commonly defined goals. Yet the hackable city also recognises the messiness of such a process, the conflicts of interest at play and the continuous struggle between the alignment of private goals, collective hacks and public interests. As an alternative imaginary, the hackable city is not a progressive alternative panacea to a neoliberal smart city that will by itself bring out a harmonious, inclusive resilient city, if only citizens would start using the right technological tools and governments would be willing to listen to them. Rather, as a lens, the hackable city aims to bring out the underlying dynamics and (sometimes conflicting) values at stake in city-making. It revolves around using the affordances of digital technologies to find new ways to organise civic initiatives and align these with processes of democratic governance and accountability in a society that is increasingly technologically mediated.

3 Hacking as an Ethos

In this process, the metaphor of the hacker opens up an alternative deployment of digital media technologies; it calls for citizens to take on ‘ownership’ (de Lange and de Waal 2013) in the process of city-making, defined as the degree to which city dwellers feel a sense of responsibility for shared issues and also have the capacity to

take action on these matters. Hacking is then in the first place understood as an ethos: a particular way of being in the world. Hacker cultures at large have been defined and described in various ways, ranging from a subcultural techno-cultural *jouissance* to models for participation-based governance (Powell 2016); from libertarian *cyberpunks* developing cryptography tools to safeguard private communication from government or corporate interference, to a countercultural post-hippie generation who consider computers as tools for liberation, expression and self-organisation, to the rise of communities engaged in the collaborative production of free and open software (Levy 2001; Turner 2006; Coleman and Golub 2008). In the case of civic hacking, a more particular instance of these hacker cultures is instantiated. A (civic) hacker is someone who does not take the world around them as it is but tries to remake it and improve upon it with all means at hand. Hacking is about playfully appropriating existing structures and systems, in an explorative and iterative way in a process of learning-by-doing. Civic hackers do so in a spirit of collaboration and sharing and in many instances work towards a common good (Ampatzidou et al. 2014; Estrada-Grajales et al. 2018; Travlou et al. 2018). They deploy ‘information technology tools to enrich civic life, or to solve particular problems of a civic nature, such as democratic engagement’ (Hogge 2010). Civic hacking ‘engages with political causes through designing, critiquing, and manipulating software and data to improve community life and infrastructures of governance’ (Schrock 2016, 583). Civic hackers, as one influential definition has it,

eschew efficiency, instead seeking to amplify and accelerate the natural sociability of city life. Instead of stockpiling big data, they build mechanisms to share it with others. Instead of optimizing government operations behind the scenes, they create digital interfaces for people to see, touch, and feel the city in completely new ways. Instead of proprietary monopolies, they build collaborative networks. (Townsend 2013)

The emergence of this ethos can be linked to a broader change in the definition of citizenship that has been summarised as a shift from ‘dutified’ to ‘actualising’ citizenship (Bennett and Segerberg 2013; Gordon and Mihailidis 2016a). The former refers to the collective enlistment of citizens in organisations such as churches and unions; the latter can be understood as the organisation of citizens in collectives around issues they are intrinsically motivated for (Levine 2016). Traditional ways of local community-based organisation of citizens and social capital have given way to the emergence of networked publics (Varnelis 2008), assemblages of networked-individuals (Wellman 2001) around issues of concern (Foth et al. 2016; de Waal and Dignum 2017; de Waal et al. 2017). According to Franke et al. (2015), this development should be understood as a reaction to the privatisation of the public domain. As traditional public and civil society organisations have become bureaucratised and more and more market-oriented, citizens try to reclaim the lost ground through commons-based self-organisation around themes such as health, education, or public space (Franke et al. 2015). Faehnle et al. (2017, n.p.) speak of a ‘self-organisation turn’, in which ‘active citizens adopt new roles and increasingly “shape and make” their cities through new self-organised forms of action, powered by the internet and social media networking.’

However, the normative debate around the implementation of a hacker's ethos in society at large is far from settled. As Coleman and Golub (2008; Coleman 2011) have convincingly demonstrated, various hacker cultures can be understood as various interpretations of Western liberalism. On the one hand, some groups can be placed in liberal and libertarian traditions of 'negative freedom', i.e. the freedom from coercion by the state and other actors. Hence, the focus various hacker cultures have placed is on cryptography and freedom of speech issues. Coleman links this vision to liberal visions that argue that the 'public good come from private vice'; that is, public benefits will emerge when individual actors are given the freedom to act out of self-interest. Curtailing the strive for individual rewards, be it through the market place or in the form of recognition and reputation, would be seen as not only an infringement on individual rights, but also undermining of the public good. It is not far-fetched to draw a line from this perspective to the Silicon Valley start-up scene and the libertarian ideology expressed by various tech entrepreneurs. These, too, have been placed in the tradition of hacker cultures, with their agile methods of software development and openness with regard to, for instance, the production of APIs that allow for various actors to join the ecosystem provided by these companies. As Rayner (2018, n.p.) claims in his book *Hacker Culture and the New Rules of Innovation*, the open-source movement 'democratised innovation, placing a vast realm of free or cheap software tools introduced hacker mindsets and practices into the startup ecosystem'. Hacker entrepreneurs now fill tech hubs, and this will automatically produce the public good, Rayner claims, because 'they bring out what is best in human beings—our social nature, our creative spirit and our capacity to innovate'.

Civic hacking has mostly been placed in a different tradition that centres on principles of 'positive freedom', that entail the creation of conditions for equality and individual freedom through collective action. The free software and anti-copyright movements can be placed in this tradition. Copyright here is understood as a mechanism to privatise knowledge and other forms of intellectual capital, curtailing the opportunities for individuals to learn, develop and express themselves. Free software, made available as a commons through peer production, does provide citizens with means for expression and mutual exchange. This version of liberalism puts public values at centre stage of economic production and social organisation. Or formulated differently, a free individual is a citizen that 'develops, determines, and changes his own desires and interests autonomously through self-expression, debate and reasoned deliberation' (Coleman and Golub 2008). A prerequisite is of course that citizens are enabled to do so. The establishment of public institutions that guarantee these freedoms, such as the provision of education and a well-functioning public sphere, take a vital role in these visions (Coleman ad Golub 2008). Referring to Richard M. Stallman's free software movement, Coleman and Golub (2008) see 'a liberal version of freedom that invoked the virtues of sharing and pedagogy'. For Stallman, hackers collaborating in the free software movement formed a collective that subscribed to shared norms and values.

It is this interpretation of hacking that has become a source of inspiration for various civic hacking movements. For instance, Medosch (2018) has shown how

current notions of the digital commons are derived from this particular interpretation of liberalism in hacker culture. These have manifested themselves amongst others in community-run wireless networks that emerged from the 2000s on. Here, hackers well-versed in technological skills worked together in wider social networks to establish a communal infrastructure that could serve as an alternative to dominant commercial ones. For Medosch, these initiatives illustrate that technological development is not an autonomous force but is shaped through ‘social exchanges and cooperative practices between communities of practitioners’ (Medosch 2018).

4 Hacking as a Practice of Collaborative City-Making

It is these practices that we turn to next. Hacking can not only be understood as a particular ethos, but also as a particular set of practices, consisting of new forms of civic organisation and professional engagement. If indeed civic hackers mobilise around issues of communal concern, employing ecologies of digital artefacts, what then are the platforms and practices through which they do so, and how can they be designed? As Gordon and Mihailidis have argued, our interest there should not so much lie in the reified features of the (digital media) platforms themselves, but in the practices through which they are enacted. In their analysis of civic media, which they define as ‘the technologies, designs, and practices that produce and reproduce the sense of being in the world with others toward common good’ (Gordon and Mihailidis 2016b), they bring out the notion of ‘communities of practice’. These communities of practice cannot be reduced to individual actions that are undertaken but bring out the ‘participation in an activity system about which participants share understanding concerning what they are doing and what that means in their lives and for their communities’ (Lave and Wenger 1991 cited in Gordon and Mihailidis 2016b). The notion of ‘hacking’ brings out such a broader (sub)cultural context.

Amongst others, it draws attention to the production of knowledge and management of expertise, a central theme in many hacker communities. In the discourse around civic hacking, hackers are not just seen as mere appropriators who create a simple hack to solve a local problem. Hackers are more broadly envisioned as ‘experts capable of applying technical knowledge to bring about systemic change’ (Schrock 2016, 592), where the source of this expertise is widely debated. Hacker cultures centre around merit and processes of mutual learning, rather than officially sanctioned expertise, where know-how is often more important than knowledge. The point is not that expertise does not matter (quite the contrary, peer-recognition of one’s clever solutions is understood as a key reward), but rather that the process of producing knowledge and expertise is opened up. Hence, the often-made connection is between civic or urban hacking and processes of ‘open innovation’ and ‘living labs’. As Baccarne et al. have written, these living laboratory formats are understood as expression of a hacker’s ethic, as they ‘promote the idea that anyone is capable of performing a variety of tasks rather than relying on paid experts or specialists’ (Baccarne et al. 2014).

At the same time, and although they are often described as ‘bottom-up’, many practices of ‘hackable city-making’ are initiated by professionals, be they designers, architects or those working in the cultural and art sectors, bringing in particular sets of expertise, grounded in community organisations as well as in the application of design skills. These professionals have started to redefine their role; rather than grand designers they see themselves as ‘community orchestrators’ or ‘urban curators’ who organise publics around issues or places (van’t Klooster 2013; Beer et al. 2015; Gardner 2015). In a related discussion, recently Foth et al. have argued for design professionals to embrace ‘citizen-ability’ rather than usability as the main goal for interaction designers: design that promotes the ability as citizens to use technologies (Foth et al. 2015b). This perspective builds upon disciplines with longer traditions such as participatory design and extended planning (Saad-Sulonen and Horelli 2010). Similar to these approaches, professionals acting as civic hackers aim to bring out the local knowledge of stakeholders while bringing in their professional domain knowledge, in processes of open innovation.

This does not mean that authorship has vanished, but rather that it has shifted. It lies not in the signature designs they deliver, but rather in the stories and process of ‘imagineering’ around these projects (Gardner 2015). Alternatively, it can be found in the design of ‘dramaturgies’, defined by de Waal (2017) as ‘the design of local settings and stories and the orchestration of events by which collective action is organized in time and place’. Hacking as a lens can help to bring out the ‘thickness’ of situated practices involved in collaborative city-making, as well as point out the various roles and relations emerging in these processes.

5 Hackability as an Affordance of Systems

The notion of ‘hackability’ further extends these relationships. The goal of many urban hacks can be understood as part of a broader agenda of systemic change. Practices of hacking are not just about ‘infrastructuring’—the continuous reworking of technologies and infrastructures to adapt them to the needs and realities of particular users—but also about ‘institutioning’—attempts to rework the organisation and logic of institutions, existing or new, in relation to a project’s systemic goals (Pipek and Wulf 2009; Dantec and DiSalvo 2013; Huybrechts et al. 2017). Civic hackers, Hunsinger and Schrock have found, are increasingly willing to work with institutions rather than just opposing them, as the anti-authoritarian stereotype of the hacker has it. In their vision, civic hacking can be understood as practices that shape new spaces for collective action. ‘As technologies and their communities of practice changed’, they argue ‘new spaces were needed that reached beyond established collectivities of group, community, and organization’ (Hunsinger and Schrock 2016). The civic hacker can then be seen as an interstitial figure, perhaps even the ‘missing link’ between insular bottom-up movements and the top-down structures of government. That is at least the promise that belies in the figure of the civic hacker.

Whether or not that promise is realised is not only a matter of hacking practices, but also about the openness of systems and institutions to these hacks. Hacking is not just about the practices of making-do, collaboration and appropriation, but also about the affordances of the infrastructures or systems at play. The notion of ‘hackability’ shifts the attention to the structures of these systems. To what extent do they allow or even welcome ‘civic hacks’? And to what extent do they ward off attempts at systemic change? To stick with the metaphor: do local governments provide APIs or even their source code? Or do they instead build firewalls? Research so far shows a mixed picture. As we will also see in this volume, governments around the world have started experiments in opening up the process of city-making, encouraged by various (policy) frameworks and visions of ‘energetic societies’ (Hajer 2011), ‘spontaneous cities’ (Urhahn Urban Design 2010), ‘the participation society’ (Tonkens 2014), ‘do-democracy,’ (Ministerie van Binnenlandse Zaken en Koninkrijkrelaties 2013) or ‘responsive cities’ (Goldsmith and Crawford 2014) and ‘big society’. What these visions have in common is that they encourage governments to be more responsive to citizens and/or professional initiatives. In these visions, governments set up the larger policy frameworks, defining public values in democratic procedures. Yet they open up the field of execution to various actors—collectives of civic hackers—that can contribute to these goals. In turn—inverting Schudson’s analysis—governments themselves become monitorial governments, using for instance technologies of big data and social media to dynamically tune their policy-making process to societal developments.

The implementation of such visions of hackable cities has proven to be difficult. The logic of institutions and the fluid, networked assemblages of civic hackers around issues of concern are difficult to reconcile. Government usually seek to follow standard procedures working towards clearly defined indicators of success, in line with the underlying democratic logic of accountability and predictability. After all, governments need to be accountable, protect their citizens and act as reliable partners. Bottom-up initiatives of civic hackers tend to be much more open-ended in character, working iteratively, and do not care much for extended procedures. In the spirit of hacker movements: they just start without a clearly defined end goal, and adjust their plans on the way (van den Berg 2013; Beunderman 2015). Governments have also a hard time recognising collectives of civic hackers as potential partners. As they often involve professionals, they are not always seen as entitled to grants for bottom-up communities (Van den Berg 2013). And when it comes to policy execution, so far governments often prefer to work with larger, established parties. For instance, research by Joost Beunderman shows that in the UK the opening up of city-making processes through instruments as *Right to Challenge* and *Right to Bid* has mainly profited private outsourcing companies (Beunderman 2015). As de Waal, de Lange and Bouw conclude (2017), to embrace the ideal of the hackable city and its practices of collaborative city-making, much more experimenting and learning is needed at the institutional level. Again, the notion of ‘hackability’ provides a lens to bring out the attempts of institutions to embrace practices of collaborative city-making, as well as a way to bring out the conflicting logics and processes of negotiation between institutions and collectives of civic hackers.

6 Hacking as a Critical Lens and an Action-Based Research Approach

So, a heavy load rests on the shoulders of civic hackers. They are to self-organise around issues of communal concern, improve the world step-by-step, challenge existing paradigms of knowledge and expertise on the way, while working towards systemic change and reinvigorating democracy. Meanwhile they have to face challenges with regard to their legitimacy and negotiate their contributions to public values with institutions of (local) governance.

Are we perhaps asking too much of this by now mythical tribe? Various criticisms have pointed out that the rhetoric of participation at the heart of the civic hacker's ethos runs the risk of 'responsibilisation' (Iverson 2011), befitting a broader neoliberal trend of the dismantlement of the welfare state. Rather than making societies more democratic, it could lead to a situation in which governments step back from their duties to safeguard public values, outsourcing the management and responsibility of essential public provisions to civic initiatives (Thomas et al. 2016), whereas the citizens that are most apt to take on these challenges are those that are highly-educated and already well connected with local institutions (Tonkens et al. 2015). In addition, one could question the legitimacy of these civic initiatives. As Hill (2016) has posed, they may be social, but are they democratic? These collectives may claim their 'rights to the city', (Lefebvre 1996; Mitchell 2003; Harvey 2008) but whose rights are they exercising exactly? After all, Thomas et al. argue that the right to the city is a collective one, rather than an individual one, that should be incorporated in 'the collective exercising of power in the processes of urbanization' (Thomas et al. 2016). Furthermore, various authors have argued that it would be naïve to expect that self-organisation would automatically lead to positive outcomes. On the contrary, open systems, Rantanen and Faehnle write, are always vulnerable to misconduct and manipulation (Rantanen and Faehnle 2007).

What these valuable criticisms demonstrate is the conflation of two discussions and fields of study around civic hacking. On the one hand, hacking as we have described it here is both a practice and set of affordances that can be studied empirically and critically as 'community of practices'. On the other hand, the notion of a hackable city brings out a normative debate about democratic governance and civil society in the network or platform society, producing imaginaries that have become performative in social organisation, political debates and policy.

Research into the hackable city has started to combine these formerly separate domains. As Kitchin has argued, the risk of normative debates is that academics maintain their ivory tower positions, referring to the perils of dominant smart city imaginaries while these work their ways into society at high speed (Kitchin 2016). 'Critical scholars', he argues, 'have to become more applied in orientation: to give constructive feedback and guidance and to set out alternatives and to help develop strategies, not just provide critique'. That does not mean that critique is not valuable.

On the contrary, as Morozov and Bria state (Morozov and Bria 2018), constant ideological and intellectual work is needed to think through the application of new technologies in society in relation to power and their implications for democratic governance. Yet, being critical is not enough. The rapid application of technologies in society requires that researchers put their principles into action and contribute to their translation ‘into practical and political outcomes’ (Kitchin 2016). In this line of thinking, Foth and Brynskov have suggested ‘participatory action research’ as an ‘indispensable component in the journey to develop new governance infrastructures and practices for civic engagement’ (Foth and Brynskov 2016). The lens of the hackable city can serve as a critical reminder for these methods. It underpins both ethos and praxis: normative discussions about principles and value systems of urban governance, as well as practices to discuss and shape these principles in collaborative ways and take on a learning-by-doing and iterative approach in their implementation, including cycles of critical appraisal to see whether indeed these interventions live up to the goals and expectations.

7 Overview of the Book

It is such an approach that informs the contributions to this volume. Taken together, they explore normative points of view with regard to citizen empowerment and inclusive democratic governance in an emerging network or platform society. They also share their attempts to put this model into practice, by designing new modes of iterative and inclusive urban design and dramaturgies for collaboration. This includes the search for new roles for and relationships between citizens, professionals and institutions. They also divulge the struggles these initiatives have run into, trying to make the leap from subversive yet isolated acts of bottom-up city-making to systemic change and institutional reform.

The first part is titled *Design practices in the hackable city* and explores a core principle of hackable city-making: the notions of iterative design and beta-testing. A hackable city is not made by top-down applied master plans but comes into being through the orchestration of stakeholders with sometimes conflicting interests who iteratively design, test and try out urban improvements. In the first chapter, **Luke Hespanhol and Martin Tomitsch** explore the appropriation of public spaces as a means to test out new ideas for city-making. Their notion of plug-in interfaces draws the attention to the use of portable interactive technologies that can temporarily be deployed in public space, creating choreographies that are based on pre-existing architectural and social affordances and situated social dynamics. Their chapter describes a first exploration of design parameters for such plug-in interfaces.

Viktor Bedö analyses the strengths of street games as tools for prototyping in urban design. As he argues, ‘for the duration of the game, things that are not present at an urban site outside the game become present in the fiction of the game and thus in players’ experiences’. This allows for the temporarily modification of the affordances of a particular urban site and encourage players to test out these affordances. As they

are played in the real city, this leads to a deep immersive experience that also leaves space for emergent phenomena and real-life interactions by players that were not foreseen by the developers. As these games usually have rather simple rule sets, feedback from the playing sessions allows for rapid redesign of the prototypes and thus contributes to an iterative process of knowledge generation.

In a similar vein **Joel Fredericks, Glenda Amayo Caldwell, Marcus Foth and Martin Tomitsch** explore the use of ‘pop-up interventions’ in public space as a new methodology to engage communities in the city-making process. The authors argue that the combination of digital and physical media used in their temporary urban interventions has the potential to provide more inclusive forms of community engagement. A middle-out perspective in which designers or researchers working from a participatory action-research perspective could connect local communities with local government agencies (LGAs), by designing situated, contextualised interventions that address local issues in an accessible way in public space. Working in a broader context of media architecture, urban informatics, civic media and digital placemaking, the authors describe two of their own pop-up interventions and have reworked their outcomes into an ‘urban acupuncture framework’ that could serve as a guide for the design of future interventions that could make the process of city-making more interactive, building a bridge between policy makers actively looking for more inclusive ways to gather input from the citizenry and local communities actively identifying topics for discussion.

In the second part *Changing roles* we shift attention to new roles and relations between actors that are emerging in a hackable city. Hackable city-making often revolves around the organisation of collectives around issues of communal concern, and this leads to new practices of social mobilisation and community organisation that in turn need to be matched with (professional) design efforts that depart from the interests of the community involved. In the context of hackable city-making, these roles have been described as the ‘urban curator’ or ‘community orchestrator’. **Rosie Webb, Gabriela Avram, Javier Burón García and Aisling Joyce** explore collaborative city-making practices from such a perspective and bring out the role of the ‘network weaver’. This person or organisation plays a pivotal role in opening up traditional of civic participation. These are usually limited to passive forms of public consultation on projects, often after most detailed design decisions have already been made. Instead, network weavers engage their professional skills to help local communities organise in long-term placemaking processes. Through a broad variety of activities, they contribute to building up mutual trust, develop ideas and prototypes in co-creation sessions, manage expectations and interface with local institutions. The ‘Designing with Communities’ framework introduced in this chapter based on their experiences with the Adaptive Governance Lab (AGL) at the School of Architecture at University of Limerick (SAUL) describes this new emerging role for designers/professionals in more detail.

In the following chapter, **Matthijs Bouw and Despo Thoma** describe their experiences as urban curators, more specifically as developing architects, who as ‘leaders from behind’ have organised collective building groups in Amsterdam Neighbourhood Buiksloterham. When traditional masterplanned and institutionally driven

development failed due to the financial crisis, in this brownfield redevelopment site in Amsterdam various collectives emerged that started to build their own homes, organising themselves under the flag of the circular economy. A new model for area development emerged here, and looking at this through the lens of the commons, Bouw and Thoma argue that such an approach is both more resilient and delivers a better quality of life for its future residents.

Next, **Gabriele Avram** provides a series of action-research-based insights in the emergence of a ‘hackable city’ initiative in the Irish city of Limerick in 2011. In an era of economic downturn, various actors adopted the central idea of the television show *Local Heroes* to organise a local community to address and overcome local issues and needs. In a detailed description of the process, she shows how a ‘hybrid community’ emerged, organised a series of events and later dissolved again. As online and offline practices were combined, ‘digital objects’ played an important role as focal points around which the community organised and represented itself to larger audiences. In her analysis, she shows how the success of initiatives as the Limerick Local Heroes can be understood through the notion of ‘scaffolding’: the adaptation and localisation of existing (social) formats and templates. In this case, a television show provided a recognisable dramaturgy that was easily understood by all participants. Similarly, a broad range of freely available and widely used digital tools could easily be used to set up a range of communal practices. These practices allow for the weaving of local community threads that in themselves make it possible for new publics to emerge around issues of concern even after the initial initiative has dissolved.

As a final contribution to the second part **Annika Wolf, Daniel Gooch, Jose Cavero, Umar Mir and Gerd Kortuem** shift attention to open data and digital platforms as one of the ways that local communities can identify topics for discussion, explore opportunities to address them and formulate solutions. However, as these authors show, it may be overly optimistic to expect that opening-up datasets will by itself invite civic organisation around collective issues. First of all, data literacy in society is still low, and initiatives are needed to address that issue. Further, based on three data-driven projects carried out in Milton Keynes, they argue that the empowerment of citizen collectives could also benefit from professionals and institutions such as researchers and community organisations taking up a role as organisers or curators. They can use their professional skills and networks to get the project of the ground and connect citizens with local institutions needed in the implementation. Yet, while this may be a productive approach, it also raises its own questions. Such a model depends on the availability of financing at the collective level. It also places these collective organisers in a position of power deciding which projects they will support. A hackable city, they conclude, is in need of new types of policies and governance models that allow citizens a greater degree of freedom in their hacking activities.

The third section, *Hackers and institutions*, further explores that last point. How do local institutions relate to practices of hackable city-making? How can they initiate, stimulate or regulate them in line with their principles of democratic governance and accountability? And how can hackable city initiatives themselves be governed? **Fiona McDermott** brings in such an institutional perspective. She describes how between

2012 and 2016 the city of Dublin ran the DCC Beta-programme to bring an approach of small-scale experimentation and iterative design to urban planning. In addition, ideation for and evaluation of these projects was organised in close collaboration with both individual citizens and civic society organisations. As such, the project was a serious attempt to create an ‘urban innovation system’ that would tap into the collective intelligence of the city at large. While the collaborative design process worked well, McDermott argues that the connection between the experiments and institutional structures of democratic decision-making needs to be developed further. One of the issues that emerged over the course of DCC Beta was the need for a coherent mechanism for prioritising projects.

Cristina Ampatzidou explores the role that games can play as a setting and focal point for communal action as well as a communicative interface between collectives and institutions. Using the concept of emergent gameplay, she describes how games can trigger social interactions between players that lead to ‘civic learning’. The latter refers to the process through which citizens become familiar with a city’s institutions and legal procedures, acquire the skills needed to navigate them and develop a sense of ownership towards issues of communal concern. Likewise, these game sessions could also trigger form of what analogously could be called ‘institutional learning’. The debates and the exchange of knowledge and insights triggered by the game could inform institutional officials about attitudes and concerns of citizens and civic organisations.

Concluding this section, **Richard Beckwith, John Sherry and David Prendergast** approach the issue of governance from a perspective of data stewardship. Openly accessible data, they write, is often argued to provide the best ways for citizens to organise themselves around relevant issues and hold accountable those in power. However, making all data available as open data can also lead to community impacts that are undesirable. They argue that urban data should be understood as a rivalrous good that requires stewardship by the community. In a case study, they analyse the discussions around stewardship in a community that collected data about floodings. To whom exactly should that data be made available? While the data collected by the community allow residents to organise around an urgent local issue, publishing that data in wider circles could also lead to higher insurance or lower real estate prices, even after the issue itself has been resolved. Controlling the flows of information, the authors conclude, is one way that communities express and steward their culture. Considering how communities choose to steward their culture (and their shared information) allows us to see that it is not just the information but also shared beliefs about that information that should define the practices of data governance.

In the last section of this book, *Theorizing the hackable city*, we move towards a number of theoretical perspectives through which collaborative city-making could be understood, further contributing to the normative debate about the hackable city. First, **Irina Anastasiu** proposes to revive Lefebvre’s ‘right to the city’ as an approach to participatory city-making. From this perspective, digital technologies can aid citizens in their willingness, ability and right to act upon their cities and gain a sense of ownership to their direct surroundings. While such a stance could be incorporated into existing liberal-democratic models of urban governance, it could ultimately pave

the way for a radically new model for a grassroots democracy, based on a notion of citizenship that is closely related to the hacker's ethic. In her chapter, she develops a taxonomy that could aid in the analysis and design of tools and practices to bring about such an 'urgent utopia'.

Next, using Murray's six-step model for social innovation, **Ingrid Mulder and Peter Kun** explore practices of hackable city-making and conclude that so far, successes have mainly been achieved in the first three phases of the model. They describe hacking, making and prototyping as practices that are well fitted to (1) explore social issues and stretch the boundaries of existing imaginations as well as current legal confines, (2) explore solutions in collaborative processes and (3) communicate the ideas generated through prototypes. However, the leap from this 'fuzzy front-end of city-making' to (4) sustaining and (5) scaling these ideas towards (6) systemic change through co-creative partnerships so far has been less developed. Hacking, in other words, opens up the process of city-making, but in itself that is not enough. A broader approach, including political, organisational and cultural aspects, is needed to ensure that bottom-up and middle-out practices such as hackathons can grow into more than just generators for ideas and truly contribute to change for the common good.

Doug Schuler provides a framework for what he calls 'holistic hacking'. Hacking, he argues, could all too easily be understood as revolving around a single intervention, an improvised appropriation of this or that infrastructure to meet some goal or another. However, practices of democratic and inclusive city-making in the network era need a more holistic approach. His overview of seven spaces or spheres of action can be helpful to understand how various independent hacks working in various domains can be sufficiently coordinated so that they help bring about a common goal, working towards systemic change. Each of these spaces—from the spaces of governance and institutional organisations to physical spaces and infrastructure space—has its own actors organising that space, and—importantly—its own particular affordances to be 'hacked', shifting the perspective from hacking as a practice to 'hackability' as an index of openness and opportunities for social innovation and change.

This volume concludes with a final reflection on hackable city-making by co-editor **Michiel de Lange**, who—like Bouw and Thoma—bases his analysis on his fieldwork with a community of 'self-builders' active in the Amsterdam brownfield redevelopment site of Buiksloterham. The key argument he makes is that hacking provides a productive frame to look at emergent city-making practices from a cultural and situated perspective. Despite the obvious differences between 'original' hackers and self-builders, the notion of 'hackable city-making' provides an analytical frame to look at city-making in terms of ethos, praxis, and structural affordances. De Lange refers to a heuristic model for 'hackable city-making' developed as part of a research project on The Hackable City, which describes the relations between individuals, collectives and institutions in practices of collaborative city-making. This model, he argues, is not simply descriptive or prescriptive but provides an entry point for critical yet affirmative discussions about hackable city-making.

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