Medien der Kooperation

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Infrastructuring Publics

MEDIEN DER
KOOPERATION

Medien der Kooperation

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Digital vernetzte Medien werden als kooperative Werkzeuge, Plattformen und Infrastrukturen gestaltet, die bestehende Öffentlichkeiten transformieren und neue Öffentlichkeiten ermöglichen. Sie sind nicht mehr als Einzelmedien zu verstehen, sondern verlangen eine praxistheoretische Auffassung der Medien und ihrer Geschichte. Alle Medien sind kooperativ verfertigte Kooperationsbedingungen. Ihre Praktiken und Techniken entstehen aus der wechselseitigen Verfertigung und Bereitstellung gemeinsamer Mittel und Abläufe. Darum verläuft die Erforschung digitaler Medien quer zur gängigen wissenschaftlichen Arbeitsteilung und verlangt eine gezielte Engführung von Medientheorie und Sozialtheorie.

Digital network media are designed as cooperative tools, platforms and infrastructures which transform existing publics and give rise to new ones. Digital media can no longer be understood as individual media, but demand a practice-theoretical perspective on media and their history. All media are cooperatively accomplished devices of cooperation. Media practices and techniques evolve from the mutual making of shared resources and joint processes. That's why the study of digital media disturbs our scientific division of labour and remains a challenge for the intersections between media theory and social theory.

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Contents

Public Transport

Science and Academia

Introduction

Matthias Korn, Wolfgang Reißmann, Tobias Röhl & David Sittler

This volume presents selected papers from the First Annual Conference of the Collaborative Research Center 1187 "Media of Cooperation", funded by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG). The conference, entitled "Infrastructures of Publics – Publics of Infrastructures", was held from December 8–10 2016 at the University of Siegen, Germany. In four sections with three chapters each, contributors from diverse disciplines and fields of interest explore the concepts of infrastructures and publics, often centring around one concept and establishing relationships to the other. Many chapters are based on empirical and/or historical cases to enable situated and praxeological insights and, taken together, point towards a new research perspective of infrastructuring publics.

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Our volume's first section, Perspectives, consists of three chapters, intended to open up overarching debates on the relationship of infrastructures and publics and on different ways of researching their interconnections.

In "Infrastructuring Publics: A Research Perspective", *Matthias Korn*, *Wolfgang Reißmann*, *Tobias Röhl* and *David Sittler* trace the separate developments of the concepts of infrastructures and publics in order to merge them into one research perspective. In doing so, they seek to build an understanding of *infrastructuring publics* as a new research perspective that (1) is practice-oriented (instead of starting with strong assumptions on the shape of things); (2) is aware of the common scaling of infrastructures and publics as a media-historic constant (instead of beginning and stopping at digitisation); (3) acknowledges the inevitable interrelation of social and material agencies (instead of a techno-sceptic "people only/people first ontology"); (4) addresses the shape

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and practical usage of infrastructural media and the omnipresent, but often hidden and invisible infrastructural and bureaucratic work (instead of primarily focusing on the contents and the aesthetics of public media); (5) highlights testing, experimenting and projecting publics as important modes of infrastructuring publics (instead of following a teleological approach); and (6) takes a cautious approach to placing normative demands, but has its own normative bias in the efforts of making infrastructures and practices of infrastructuring public (instead of leaving the black box unopened).

In "Historical Infrastructure Research: A (Sub-)Discipline in the Making?", *Christian Henrich-Franke* argues that, since the turn of the millennium, cultural, media and social historiography have experienced a shift towards research on infrastructures. This shift involved the application of new theories of infrastructure and perspectives from other disciplines, resulting in new historical materials being analysed. Reviewing historiographic studies on transnational infrastructures, Henrich-Franke discusses the driving forces of this research. He shows that historical infrastructure research has a clearly defined object, a theoretical alignment (for example with STS and standardisation theories) and a clear focus on practices of negotiating, building, maintaining and using infrastructures. He concludes that it is still not a (sub)discipline in the traditional sense as for example economic history or the history of technology, but rather an interdisciplinary topic that enables research to combine perspectives and methods.

The chapter "How are Infrastructures and Publics Related and Why Should We Care? An Email Conversation" documents an interdisciplinary email debate between *Sigrid Baringhorst*, *Noortje Marres*, *Elizabeth Shove* and *Volker Wulf* – prominent scholars from disciplines ranging from political science to sociology and socio-informatics – on the timeliness and importance of viewing infrastructures and publics together. The debate distinguishes different theoretical, methodological and empirical positionings on the two concepts and examines their interrelation with regard to scholarly debates as well as current political issues.

The second section, Civic Culture, includes three chapters focussing on the infrastructural conditions and/or the practices of "making public" in the area of civic engagement and popular media.

Sebastian Gießmann's contribution, entitled "Net Neutrality: Anatomy of a Controversy", provides insights into the contested nature of the infrastructural conditions of digital publics. Gießmann investigates recent debates on net neutrality, highlighting the interpretative flexibility of the term. Because of its contested and ambiguous status, it is an "ideal type" (Star and Griesemer) that different stakeholders around the globe can adapt to their needs. In the USA, the discrimination of certain services was an issue, while the debate centred on zero-rating (no charge for specific domains) in India and on throttling data volumes in Germany. Yet, all of these debates rest on the assumption that infrastructures such as the internet can and should be neutral means of communication and interaction, thus denying their intrinsic normative character.

In "Food Sharing as the Public Manufacturing of Food Reuse", *Mundo Yang*, *Lisa Villioth* and *Jörg Radtke* present an extensive case study on food sharing as one example of civic engagement. Going beyond conventional understandings of counter-publics as public blaming or symbolic critique, the authors focus on the processual interplay between civic engagement, material participation and media resonance. Activists attempt both to engender food waste as a public issue and to co-produce an alternative infrastructure or an alternative food system respectively. Yang et al. identify three main material practices as integral parts of the material participation specific to food sharing: engaged citizens re-infrastructure the food system, they re-code the cultural meaning of the distinction between waste and food, and they "publicise" the issue of food waste. This chapter locates food sharing as material participation within the network of food system, online platform, social media, localities, activists, consumers, issue publics, but also the mass media that helped promote the project through positive coverage.

Inspired by Bowker and Star's investigations on large-scale bureaucratic classification systems, in "'Sorting Stories Out': Classifications and Classifying in Fan Fiction", *Wolfgang Reißmann* and *Svenja Kaiser* examine classifying practices and classification devices in the area of popular media culture, in

particular fan fiction. After comparing the classification systems of four major German and North American platforms, the authors turn to auto-ethnographic experiences with an emphasis on everyday obstacles in acts of classifying. Using the examples of age ratings and platform-specific ways of indicating so-called pairings, they show how category design influences the processing and publishing of a single story on different platforms. While other ways of issue formation and communication-driven publics around fan fiction exist as a matter of concern, classification devices in combination with situated acts of classifying are essential conditions for fan fiction publics to emerge. Their focus on infrastructural media and infrastructural work allows Reißmann and Kaiser to shift from the concept of networked publics to fan fiction publics as a "net of works", bringing the media (practices) of cooperation to the fore.

The chapters included in the third section, Public Transport, explore different modes of mobility and the ways in which they become visible issues contributing to the formation of publics.

In his chapter "Infrastructures of Digital Civics: Transportation, Advocacy, and Mobile Computing", *Christopher A. Le Dantec* discusses a set of design interventions in a case of transport advocacy that enables a community of local bicycle activists to participate in civic processes via data. By designing means to create, collect and curate data about their everyday bike rides, Le Dantec argues, designers and researchers working within digital civics "are not simply creating end products that make use of data, but are designing publics […] which arise in response to issues, form through a range of attachments, and ultimately act through the creation of new socio-technical infrastructures". Le Dantec understands these types of design engagements as *infrastructuring*, in which designers "create and link social and technical resources to establish stable but mutable capacities to act", where these "capacities to act become durable with and among a public addressing present and future issues".

In "Staged Wrecks: The Railroad Crash between Infrastructural Lesson and Amusement", *Gabriele Schabacher* discusses the entangled development of transport infrastructures in the 19th century on the one hand and the rise of (morbid) amusement cultures of attraction on the other. Although real railroad accidents were frequent and disastrous, staged railroad crashes became

popular at North American State Fairs at the end of the century. Schabacher compares staged wrecks with real railroad crashes and the development of safety measures in the US and Germany. She argues that transportation infrastructures contributed to the formation of modern (mass) publics by providing access for everyone, including the less well-educated groups of society. Moreover, accidents are crucial for systemic learning and require a mediated representation and reconstruction, which is why they are a fruitful object of study for questions of infrastructural and media history.

In his chapter, "Making Failure Public: Communicating Breakdowns of Public Infrastructures", *Tobias Röhl* uses breakdowns and disruptions in public transport as vantage points to gain insight into the different normative expectations that are associated with infrastructures. Drawing on Boltanski and Thévenot, Röhl defines breakdowns and disruptions as "critical moments" in which actors have to justify their beliefs and claims to others. With this in mind, Röhl employs focus groups as "sites of justification" in which different normative orders are evoked. In his data, public transport infrastructures were most commonly associated with notions of efficiency and entitlement to a service. In contrast to this, he shows that adequately communicating breakdowns to passengers is rather a matter of displaying accountability than a matter of efficiency.

The fourth section, Science and Academia, investigates the infrastructures of research and the ways in which they are involved in the formation of publics.

In "Public Concerns in Sustainability Research: Observations on a Naturalist Expedition in Papua New Guinea", *Tanja Bogusz* explores how sociological research can contribute to the formation of public issues. As an ethnographer, Bogusz took part in a taxonomic scientific expedition to study biodiversity in Papua New Guinea. The process of making biodiversity a public concern is best described as a "heterogeneous cooperation" between researchers and local governments, including scientific and local infrastructures. Consequently, Bogusz' chapter challenges the common dichotomy of nature and culture and the division of labour between natural and social sciences.

In "The Politics of Communication Controlling: On a Conceptual Infrastructure for the Management of Publics", *Hagen Schölzel* addresses the

managerial turn in public relations. Referencing Bruno Latour's "Dingpolitik", Noortje Marres' "material participation" and Fred Turner's "democratic surround", Schölzel attempts to shift the focus away from technical infrastructures to what he designates "conceptual infrastructures". Opposing the distinction of linguistic and material forms of engagement, Schölzel presents the well-established PR concept of Communication Control as a procedure for applying diverse media devices to manage public controversies. At its heart, communication controlling is about the (invisible) "steering of a communication corridor". Schölzel concentrates on the infrastructuring work undertaken by social scientists in the field of public relations research, establishing guidelines and tools that can be implemented in corporate communication practices. He argues for a perspective that includes the entire infrastructure organisations deploy in order to influence processes of the formation of publics.

Christian Erbacher, in "Ways of Making Wittgenstein Available: Towards Studying Infrastructures and Publics in the History of Editing Wittgenstein's Writings", attempts to open the "black box" of Wittgenstein's philosophical inheritance and offers the reader to witness parts of the dynamic history of editing Wittgenstein. To do so, he examines the work practices and the ways in which diverse infrastructures were established to stabilise/document, transport and make available traces of Wittgenstein's thought processes. Erbacher shows how three of Wittgenstein's former students and close friends, Rush Rhees, Elizabeth Anscombe and Georg Henrik von Wright, handled the inherited works and discusses the corresponding logistic practices of making philosophic works public(ly accessible) as an epistemic practice.

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Beyond their allocation to four sections, the contributions share further aspects identified within the orientations outlined in Korn et al. Not all six orientations take centre stage in the individual contributions of this volume, and none of the contributors addresses all these orientations at once. However, they arise as a guiding principle in the diverse ways our authors' reason and approach their heterogeneous research topics.

1. *Relationality of infrastructures and publics*: The authors whose contributions are gathered in this volume understand infrastructures and publics as dynamic and performative entities. What infrastructures and publics are depends on the actors involved and the situation at hand. In that vein, Shove argues for a relational concept of infrastructures in the email conversation. Unlike resources or appliances, infrastructures are material entities that have a background role supporting certain practices. Similarly, Wulf characterises infrastructuring as a socio-technical activity in the email conversation, and Le Dantec, in his chapter, describes the work involved in infrastructuring to establish stable but mutable capacities to act. Within the email conversation, Baringhorst sees infrastructures and publics as intertwined rather than as separate entities – particularly in the field of politics. For Henrich-Franke, the new focus on infrastructure studies in historical research likewise means studying practices rather than fixed entities. Building on these relational notions, Korn et al. view the relationship between infrastructures and publics not as fixed, but as enacted in practice.
2. *Socio-materiality of publics*: Several chapters in this volume help bridge the gap between social-constructivist perspectives on publics in the political sciences and communication studies as well as material-driven and technology-driven perspectives in media studies, science and technology studies, and informatics. These chapters invite readers to reconsider ordinary understandings of people merely participating in publics or going public using media and their infrastructures. Instead, the materialities themselves are significant in order to form(at) publics. Le Dantec demonstrates that the formation of publics around issues of bicycle infrastructure is enabled by data-based civic participation where bicycle activists create, collect, and curate data about their infrastructure usages. Yang et al. provide a fresh glance on news value theory by focusing on material values. In their case study, it was the material practices in particular – such as saving and sharing food, programming and engaging on a platform – that made the food-sharing project newsworthy and attracted the attention of larger audiences. Reißmann and Kaiser, in the area of fan fiction, present an understanding of publics as participation of literary works in a network of texts.

Classification devices and practices of classifying establish relationships between the otherwise dispersed stories. Schölzel explores the relation of material infrastructures and social publics by looking at (rather immaterial) conceptual infrastructures involved in PR practices. By looking at breakdowns and disruptions, Röhl shows that the public dimension of infrastructures is the result of socio-material practices linked to notions of common goods and services. Similarly, Erbacher looks closely at philosophical writing and thinking, highlighting the socio-material dimension of cognitive practices often equated solely with the ideas of individual minds.

3. *Experimenting and testing*: Infrastructural innovations can be seen as public experiments and testing grounds. In her commentary to the email conversation, Marres points to the fact that the whole area of public transport under the umbrella of "autonomous driving" is a gigantic field test. Schabacher shows how the "test mode" in 19th century staged railroad crashes was a public way to form imaginations around the power of these big machines and technology as such and to cope with the shocking, negative or lethal unintended consequences of industrialisation. Gießmann's reconstruction of the net neutrality controversy can be taken as a harbinger of far-reaching consequences of technological innovation when considering the present amalgamation of digital media infrastructures and the "internet of things". This debate is a test run for (dis)privileging transportation of data and goods of all sorts. Bogusz, on the other hand, runs her very own experiment: How can researchers intervene in the complex interplay of publics and infrastructures? And how does this undermine common distinctions between disciplines?

Finally, it is not possible to ignore the central question of *normativity* when discussing or scrutinising infrastructures and publics, which is addressed as a praxeological dimension in this volume. Norms are a field of practice in themselves. They therefore have a history and should not be presupposed as an anthropological constant. This volume highlights the need to start from implicit and explicit controversies, ruptures, incommensurabilities, inconsistencies or seemingly paradox constellations. Science is never neutral or innocent:

The urge to know means having to deal with (un)expected consequences. A reflexive researcher is looking for practical processes of establishing norms as conceptual tools, media or infrastructures, and scrutinises possible normative implications connected with cooperatively produced infrastructures and publics. The norms can be as heterogeneous as the people and materials involved, but that does not mean they are boundlessly variable. There are always contextual resonances and practical interrelations that have to be taken seriously. Or, in other words: The struggle for adequate infrastructures and the infrastructuring of public issues has to be put on the agenda time and again to support the informed consent and formation of will of communities and societies. This is also a question of public science. Science as a collective epistemic practice is a sensitive and precious tool that helps democratic societies not to fall back into authoritarian binary norm systems and situations where heterogeneity is easily lost to the dominance of a dogma and its executors.

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Infrastructuring Publics: A Research Perspective

Matthias Korn, Wolfgang Reißmann, Tobias Röhl & David Sittler

"Infrastructure – If anything exciting happens, we've done it wrong."
Last Week Tonight with John Oliver (HBO), "Infrastructure", 2nd March 2015

1 Introduction

This volume focuses on the ongoing accomplishments entailed in the mutual making of infrastructures and publics. In doing so, it reframes the relation of publics and infrastructures as praxeological, exploring them from two different angles: (1) When, under which conditions and by what means are publics cooperatively produced, practically embedded and socio-technically infrastructured? (2) When, under which circumstances and how are infrastructures perceived as such, being debated in various publics, critically and explicitly examined for how they are used, shaped and which effects they have? These questions imply a reconception of the traditional understanding of both the public realm and infrastructures. Rather than as different fields or systems, we have to treat them as intertwined aspects of socio-technical organisation and study them through a practice theory lens. We understand and explore both publics and infrastructures as relational categories. This allows us to better characterise the current situation of a heavily mediatised society and its making, and the ways to reflect on and cope with the challenges coming with both phenomena – *infrastructuring* and *making public*.

The classical theory of the public sphere and notions of infrastructure derived from an engineering perspective both imply a rather static ontology. In contrast, socio-informatics and computer-supported cooperative work (CSCW) have developed the concept of infrastructuring, a process and design-oriented ontology based on cooperative practices that let infrastructures emerge and develop. Media and communication studies, the political sciences,

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and cross-disciplinary social movement research have also shifted from rather static imaginaries of the public sphere to acknowledging the existence of multiple publics and practices of making public. The stability of infrastructures and publics is not taken for granted anymore, but their dependence on dynamic sets of practices and actions that involve media technology has been recognised.

What has sparked the current interest in the interrelation of publics and infrastructures? Why is it that the combined perspective on both matters to the disciplines of political, social, media and communication studies and informatics? Recent challenges in connection with the intensified digitisation and its impact on politics and societies require us to rethink traditional basic concepts and critical theories, addressing questions such as: What is the public realm today? What was it like previously? What can be and what needs to be made public, and why? What enables democracy, continued public discourse or collective endeavours of knowledge production such as academia?

With this volume, we suggest a new interdisciplinary common ground from which to explore the two concepts of publics and infrastructures in their past and present co-evolution. In this introduction, we first trace how the two concepts have evolved and been revised in interdisciplinary research over the past thirty years – from static to dynamic, singular to plural, and from entities and characteristics to practices. By reconstructing conceptual understandings, we introduce the new research perspective of "infrastructuring publics" and offer a heuristic to guide new research. Our aim is to build a common ground to stimulate future interdisciplinary research.

2 Towards a praxeological understanding of infrastructures

Infrastructure as an empirical, theoretical and methodological research interest has gained greater attention in the last few decades. As a conceptual lens, the term has shifted focus from single artefacts and sites to the connectedness and entanglement between them. It has added complexity to research on sociotechnical arrangements – previously thought of as distinct and unrelated – in a fruitful way. In the following sections, we briefly trace these developments

and outline different conceptualisations of the term. We describe two major shifts within this development: one from an interest in large technical systems (LTS) to mundane infrastructures and another from infrastructures to the activities of infrastructur*ing*.

2.1 From LTS to mundane infrastructures

For a long time, infrastructures remained "invisible" in social research, as they were largely taken for granted as an aspect of everyday life. They were included in statistics and other fields of research, but not regarded as an object of study or interest in their own right. However, social science research on technology began to change its perspective in the 1980s. With publications such as Thomas P. Hughes' (1983) *Networks of Power*, it shifted from mainly scrutinising specific technologies from their invention, development and effects on society to "extended and functionally integrated socio-technical networks" (Mayntz and Hughes 1988, p. 5). The term large technological system (LTS) implied a common-sense notion of scale which framed the understanding of large railroad (Heinze and Kill 1988), electricity (Hughes 1983), aviation (La Porte 1988) and other networks in an implicit ontological way as "large" and as phenomena that had to be studied as a "distinct type of technological system" (Joerges, in: Mayntz and Hughes 1988, p. 10). For some researchers, these systems were fundamentally flawed. Charles Perrow (1984), for example, understood accidents as an integral part of nuclear power plants, because their components are "tightly coupled" and inscrutably interrelated. This marked a paradigm shift from the technological optimism that characterised industrialisation until the height of cybernetics to a more pessimistic or at least critical approach to (industrial) technology, accompanied by the diagnosis of a "risk society" (Beck 2009). The notion of LTS implied a systemic and relational view on technology as being part of larger networks of other technologies and infrastructures. For example, it was only possible to electrify western societies on the basis of a functioning and extended power infrastructure, organisational changes and other elements. This perspective, however, also

emphasised the role of powerful "system builders" (Hughes 1979) such as Edison, Insull and Mitchell in the electrification of the United States.

In the 1990s, Susan Leigh Star, Karen Ruhleder, Geoffrey Bowker and others (Bowker et al. 1996; Bowker and Star 1999; Star and Ruhleder 1996; Star 1999) began to establish infrastructure as a guiding concept, adding a processual dimension to the (implicit) relationality of the LTS concept. Following from this, the question to ask is not *what,* but *when* and *for whom* something is an infrastructure. An infrastructure is the taken-for-granted material and organisational substrate of human action. In this regard, the term is close to the common-sense notion of infrastructure as "something that other things 'run on'" (Star and Lampland 2006, p. 17). As such, it is usually transparent and invisible as long as it is doing its job seamlessly. In the case of a breakdown, however, its role becomes visible (Star 1999, p. 381f.). For maintenance workers and other personnel involved in the installation and care of an infrastructure, it is not the substrate of their actions, but the focus of their work. Arguing along similar lines, Elizabeth Shove (2017) refers to "infrastructural relations", denoting a non-essential view on infrastructures that emphasises its changing status in different practical contexts.

At the same time, this relational and processual move from LTS to infrastructures implied "shifting away from thinking about infrastructures solely as centrally organized, large-scale technical systems and recognizing them as part of multivalent sociotechnical relations" (Parks and Starosielski 2015, p. 8). The role of other actors, technologies and organisations involved was more fundamentally taken into account. Infrastructures themselves were increasingly seen as "technologically mediated, dynamic forms that continuously produce and transform socio-technical relations" (Harvey et al. 2017, p. 5). In this sense, infrastructures are socio-technical arrangements that synchronise the mobility, exchange and transport of people, goods, and/or data up to a global scale. This broad notion of infrastructures as "extended material assemblages that generate effects and structure social relations" (Harvey et al. 2017, p. 5) enables researchers to understand the emerging internet and other forms of socio-technical arrangements connected to science as "knowledge infrastructures" (Bowker et al. 2013). Moreover, legal and political aspects of

infrastructures come into view (Benkler 1999; Frischmann 2012): standards, conventions and procedures accompanying infrastructures configure our social lives, defining categories of inclusion and exclusion (Bowker and Star 1999). Consequently, infrastructures are seen as not only supporting, but also shaping practice (Niewöhner 2015). Like other material entities, infrastructures are not neutral means, but they are themselves involved in practice. They link and synchronise widely dispersed practices. In the case of household energy consumption, for example, interconnected infrastructures transform single users into a collective doing similar things at similar times (Shove et al. 2015). Infrastructures are therefore "sites where multiple agents meet, engage, and produce new worlds" (Jensen and Morita 2016, p. 85). In this respect, they are involved in the formation of publics.

2.2 From infrastructures to infrastructuring

In adopting a relational perspective, infrastructures are no longer viewed as fixed and stable entities that are simply there once they have been installed. Instead, several researchers emphasise the constant work required to maintain their status as a reliable and transparent basis for other actions (Dant 2005; Denis et al. 2016; Graham and Thrift 2007; Henke 1999; Krebs et al. 2018, van Laak 2018). Without repair and maintenance, infrastructures age, decay and are no longer able to fulfil their role. For instance, a seemingly simple system like the signage of the Metro in Paris has to be constantly cleaned, revised, renewed and maintained by an army of designated workers (Denis and Pontille 2010). Without engineers' daily work on the water pumps beneath Manhattan, the subway lines would fill with water within 36 hours; eventually the streets would collapse and become rivers (Weisman 2007, p. 24ff.). Even when becoming outdated, infrastructures may still require work to gradually phase them out without causing any problems – for example when old computer architectures are no longer supported and need replacing by newer systems (Cohn 2016). The work involved in slow decay and phase-out is never more apparent than when considering decommissioning nuclear power plants. Looking at the work and effort required to maintain infrastructures also

highlights diverging and conflicting views that are usually blackboxed. In other words, social order itself becomes visible as mutually made, but also as multiple and contested (Jarzabkowski and Pinch 2013).

Looking at urban infrastructures in the Global South, the importance of continuous repair and improvisation required for their maintenance is conspicuous, as these practices are "too overwhelming and visible to be ignored" (Graham and Thrift 2007, p. 12). Residents of cities such as Mumbai, for example, would be constantly aware of the current state of their city's infrastructure, which is plagued by problems (Björkman 2015). Consequently, disruptions and breakdowns are more widely treated as an ordinary part of infrastructures in non-western contexts as in the case of Nigeria's urban radio and television infrastructures (Larkin 2008).

Workarounds (Brohm et al. 2017) make us aware that infrastructures neither work autonomously nor are they a deterministic force. When infrastructures malfunction or frustrate, people are able to improvise and find solutions using infrastructural features not envisaged by the designers when the infrastructure was built. Installed infrastructures are constantly repurposed (Wagenknecht and Korn 2016; Le Dantec and DiSalvo 2013). Even when we simply 'use' infrastructures, it is this taken-for-granted and routine use that lets them do their work. Without us actively becoming immobile collectives of passengers on planes (Schindler 2015), ferries (Stäheli 2012) or in elevators (Hirschauer 2005), for example, a flight, a ferry crossing or an elevator ride would not be possible or would at least become socially problematic. Commuting by ferry, for example, requires passengers to follow unwritten rules like respecting other passengers' claims to seats (Hodson and Vannini 2007).

A relational concept of infrastructure consequently explores the different ways in which infrastructures shape practices, but it also examines how practices shape infrastructures. The use of the verb *infrastructuring* (Pipek and Wulf 2009; Star and Bowker 2002) instead of the noun infrastructure underlines the praxeological and relational perspective on infrastructures as cooperative accomplishments of socio-technical arrangements that operate the way they do because of evolved social practices. It also stresses the reflexivity of the infrastructuring actors and actants making a change of use from the planned one

and/or modifying a device or how they embed it. Using the term *infrastructuring* highlights the shift of perspective from a structuralist or system theory-led approach that attempts to characterise systems as entities to a practice theory-inspired view on phenomena as results of systematically linked and synchronised practices.

To summarise: a move from LTS to infrastructures emphasises the relational and processual dimensions of socio-technical systems and networks. As such, infrastructures are not neutral means, but deeply involved in social practices, creating new relations between technologies, people, institutions and the practices shaping them, and simultaneously being shaped by them. Synchronising and linking dispersed specific practices, infrastructures create (inter)dependencies, standards and routines. Because of these dependencies and standardisations, infrastructurings are inherently political, including some entities and excluding others.

By shifting the focus to *infrastructuring*, infrastructures are viewed as practical achievements of various actors. Infrastructures are not simply in existence, but they are built, installed, maintained, repaired, used, worked around/against, appropriated and so on. Without these practices, it would be impossible to establish an "infrastructural relation" (Shove 2017). Again, normative and political questions arise: Which forms of infrastructuring are accessible, and to whom? Which forms have the most profound impact on infrastructures? Who is infrastructuring for (or against) which purpose or public? Who is accountable to whom? Who is included or excluded from infrastructuring? In asking these questions, we approach the core of the interrelation between infrastructures and publics, which we will explore next.

3 Towards a praxeological understanding of publics

Changing perspectives, forms, structures and processes of *publics* have attracted the attention of scholars from various disciplines over the last hundred years. With regard to the rise of modern/western states and societies in particular, the emergence of the public as an imagined independent (quasi-)institution was seen to play a crucial role both for democratic development (Taylor

1992) and the increasing complexities of technological societies in which it is not possible to manage public affairs on the basis of local interaction (Lippmann 1927; Dewey 1927). Similar to the two-fold development identified in infrastructure studies, in this chapter we describe two major moves in approaching public(s) as a separate field of investigation: one from "the public sphere" to multiple publics and another from publics as an entity to the practices of making something public.

3.1 From the public sphere to multiple publics

Following the master narrative invoked by Jürgen Habermas (1962), the modern public sphere within western societies has its origin and ideal model in the bourgeois public, which he assumed had existed for a hundred years between 1750 and 1850 in countries such as England, France and Germany. The bourgeois public was conceived as an emancipatory achievement, replacing the representative public of aristocracy with a reflectively produced and negotiated public opinion. Driven by independent print media, placed in the protected spaces of coffee houses and salons, private civics were supposed to address issues of public interest, characterised by open access, communicative participation and distance to the state. In the mid-19th century, however, the bourgeois public lost its influence and distance to the state – according to Habermas: with the rise of the mass press and mass media, the economy and the state took over. Processes of market concentration and public relations resulted in a re-feudalisation of the public sphere. Interest-driven policy replaced the logic of the best argument, and homologously with critiques on the cultural industries, active participants in public discourse transformed into passive, consuming and powerless audiences.

Approaching publics as a theoretical concept and their empirical and historical shapes, Habermas' modern history of the rise and fall of the bourgeois public is both an important and contested starting point. Many critics and interventions are based on a (re)reading of Habermas' postdoctoral thesis: against neglecting the influence of critical and subaltern counter-publics and their resilience to dominant cultural industries (Warner 2002; Fraser 1992; – later, Haber-

mas (1992) himself relativised the passive/consuming audience thesis); against consensus-orientation/for agonistic pluralism (Mouffe 1999); against purely rationalist actor images neglecting people's feelings and asymmetrical positions (Young 1997, p. 38ff., 60ff.)[1]; against neglecting gender inequalities in terms of access and performance in the (bourgeois) public (Meehan 1995); against national biases and national reductionism in theories of publics (Fraser 2007; Volkmer 2014); against the historical chronology, the factual composition and the empirical validity of the (hi)story of the bourgeois public (Bosse 2015); and against privileging a model of communication based on face-to-face encounters over "mediated publicness" (Thompson 2011, p. 54ff.), although dealing with journals and literary text production; and conceptions of the public as a bounded space.

Needless to say, "the" public sphere has always been a set of various arenas and cannot be reduced to the media. (Neo-)Institutional approaches that currently rearticulate Habermas determine the public sphere as "a constellation of institutional fields" including "the media, arts and cultural organizations, religious organizations, voluntary organizations and research and higher education organizations" (Engelstad et al. 2017, p. 14). At the same time, speaking of the public was and is often connected to the *social imaginary of an overarching and integrating sphere*, an agora-like "meta-space", open to all, continuously assembling and negotiating all relevant societal problems.

Especially in 20th century's mass media research, the public sphere was more or less equated with audience publics constituted through the press, radio and TV. Mass media were conceived as focal societal institutions or systems to perpetuate and stabilise the self-observation of society (Luhmann 1996). Subsequently, mass media research often described a pyramid-shaped stage logic of different sorts of publics, with encounter publics at the bottom, assembly publics in the middle and the mass media public at the top. It was intended that only the mass media public would be able to permanently

1 These arguments primarily address Habermas' discourse theory and communication ethics, which are, however, related to his understanding of the (bourgeois) public as an ideal type.

represent and discuss the societies' most relevant (political) issues and to simultaneously guarantee wide access and distribution of information to audiences. The assigned roles and functions varied between liberal understandings of merely monitoring political action and more demanding approaches with regard to normative ideals of discourse principles and representation standards (Ferree et al. 2002). The performance of mass media in contributing to implicit or explicit normative ideals in the different models of the public sphere as a democratic infrastructure was (and is) discussed controversially. Empirical mass media research revealed numerous contradictions between aspirations and reality. The rising power of media-related logics of selection and interpretation, a common line of argument, led to a "new"/"second" structural change of the public sphere. It was characterised by a mediatisation of politics and tendencies of personalisation, sensationalism/scandalism and emotionalisation on the level of content production and by shifting power relations between state/politics and mass media institutions (e.g. Mazzoleni 2014). These institutions were supposed to have gained increasing "independency" during the 20th century, while at the same time their orientation towards market logics increased.

The emergence of what some have called *digital publics* re-intensified the debates on what media publics actually are and how they are shaped (Dahlgren 2005). Possibly even earlier, through dysfunctionality, target group programming, audience fragmentation etc., the idea of the public sphere as a huge, rather static container or unified sphere, steered by mass media institutions that (at least ideally) fulfil functions of social integration and are accessible to anyone through media consumption, had lost its persuasiveness. As a matter of fact, the "traditional" mass media are still powerful societal and economic institutions, which have transformed themselves into multi-channel content deliverers and players within social media. However, their predominance has been broken, and the "myth of mediated centre" (Couldry 2003, p. 37-54), if it still has any power, is no longer connected to them alone.

With the emergence of huge digital platforms such as *YouTube*, *Facebook* or *Twitter*, various concepts have been mobilised to grasp key aspects of this "third" structural change of the public (sphere) prompted by digital media

technologies. These "new media publics" were initially defined by basic organising principles, with "network" and "networking" as the most important model of reasoning (Benkler 2006; boyd 2010). They are characterised as fluid, dynamic and mobile (Sheller 2004) and seen to place individuals in hybrid semi-public environments. Besides, they are qualified as "affective" (Papacharissi 2015) and supposed to emerge "ad hoc" (Einspänner-Pflock et al. 2016).

If all these different views on publics (to cite just a few) have one thing in common, it is the replacement of the collective singular, the (media) public, by the concept of *multiple publics*. It is no coincidence that it has become customary to address and identify publics by hashtags. And a considerable part of the research on media publics has turned to *Twitter* and network analysis, mapping controversies with the help of digital methods (Rogers 2013).

Implicitly, however, most of the current approaches to media publics still rely on the characteristics formerly attributed to the public constituted by mass media. That is to say, the idea of *the* public is still there, still powerful, still part of the game. In conversations surrounding "filter bubbles", "echo chambers" or polarising communities, we find that *its negative expression* – the absence of an integrating public sphere – is regarded as a problem. Conversely, in phenomena like huge "media events" (Couldry et al. 2010) which traverse all possible media channels, for a minute, a day or a week the "tele campfire" seems to be back sporadically and periodically. Terror attacks or football world cups reassemble the mass in global liveness, while, of course, interpretation and follow-up communication occur in multiple publics and other media events are limited in their scale and restricted to differentiated (popular) cultures.

3.2 From public(s) to making public

Blaming mistakes in the English and French translations of Habermas' *Structural Transformation of the Public Sphere*, Slavko Splichal (2010) emphasises the difference between "a/the public(s)" and the "public sphere". While the first is meant to describe a "social category" (ibid: 28), the public sphere is "only" the infrastructure for interactional and societal discourse "resembling the ancient Greek agora or forum Romanum" (ibid). As an infrastructure, the public

sphere "cannot act" and "cannot communicate" – "a/the public can. The public sphere is not a sufficient condition for a/the public to emerge" (ibid).

Before and during the era of mass media, many people had the experience of not being visible or represented in the public sphere. Reality therefore always lagged behind the ideal. In the 19th and particularly in the 20th century, critical discourses raised the issue of the public visibility of marginalised groups and people time and again. Consequently, contemporary social theories such as French neopragmatism (Boltanski and Thévenot 2006) or civic culture theory (Alexander 2006) emphasise the plurality of conflicting normative orders in society instead of a consensual public ground. This applies even more when taking into account non-western perspectives on the public sphere (Dwivedi and V 2015; Zillinger 2017).

Digitisation and the diffuse entanglement of different interaction and communication modes, of scales and scopes, highlight not only the fragility and complexity of what for a long time was taken for granted as the public sphere. They also underline that publics and public media do not simply exist, but have to be permanently made and remade. Rather than underpinning a fixed (political) concept of the public sphere as a quasi-institution, scholars are increasingly asked to explore the different modes and forms of making public as a practice.

Considered critically, this shift can be seen as a loss of theoretical precision of the public sphere as a political and normative category. In fact, perspectives on "socially mediated publicness" (Baym/boyd 2012) broaden the focus and ask more openly and fundamentally about the boundaries between the public and the private realm and the relation of audiences and publics. Suspending pre-fixed imaginaries of the public sphere opens up new and additional fields of research, e.g. private data and risk management, enskillment in making public, practices of (partial) public self-representation or digital storytelling. Acknowledging the diversity of the practices of making public also helps overcome the one-sided emphasis of studies on political publics, election campaigns, news and journalistic representations. Publics emerging around and mobilising popular media culture in the areas of music, film, literature or games are taken into account (e.g. Jenkins 2016, p. 31ff.). Simultaneously, a

vivid landscape of research on social movements and their attempts to make things public, to be heard and to exert influence on societies and civic cultures' developments emerged (e.g. Milan 2015).

In terms of their assessment, familiar logics of optimism and scepticism apply to making public and professionalised practices of publishing in digital media environments. Where some have (fore)seen a worldwide participatory culture, a revitalisation of civic deliberation and counter-publicity (e.g. Downey/Fenton 2003), others have questioned the "passiveness/in-activity" of "the people formerly known as audience" (van Dijck 2009), the factual possibilities to be heard under the conditions of a highly competitive attention economy, or critique the conditions of acting in privately-owned publics/platforms as a "work of being watched" (Andrejevic 2002). In addition, many ways of participation did and do not fit into (mainstream) public theory. They are characterised as being *too* emotional, *too* uninformed and *too* aggressive. Especially today, with debates on polarising and reductionist political communication via *Twitter* & Co, sceptical voices increase. Many scholars see a "'publicity without publics' (...), suggesting that the expanded communication capacity enjoyed by new media participants does not necessarily result in the kinds of thinking, debating communities envisioned by traditional understandings of the public sphere" (Dean, cited in Jenkins et al. 2013, p. 165). Overall, participation – a demand so deeply incorporated into the ideals of political deliberation and the power of networked publics – has lost its innocence and become a contested term for most of the users' activities (Lovink 2016; Wimmer et al. 2018). Other issues resulting from the dissolution of heterogeneous practices of making public are the (dis)intermediation of/by established institutional actors in journalism and politics and/or concerns of trust and accountability of both traditional mass media and platforms: data-driven economies, algorithmic steering of information processing, doubtful production and dissemination of "facts", resistance against "mainstream" media's news biases, the power of and governance by platforms etc.