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The bureaucratic life of urban climate resilience

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Abstract

With this commentary, we invite urban scholars to join us in exploring the bureaucratic life of urban climate resilience. Under this heading, we call for research into the intricate and often unpredictable processes of urban governance, from the formulation of general mitigation and adaptation goals to the implementation of concrete measures on the ground. While previous research on urban governance has focused primarily on political negotiations and alliance-building beforehand and on published plans after they are passed, we propose to put emphasis on the non-linear dynamics inherent in decision-making and implementation processes within city administrations. In this context, this commentary has two objectives: (1) we provide arguments for the need to (re-)focus attention on administrative processes in urban climate resilience and (2) we present a perspective that can be used to effectively study said processes. In contrast to widely used actor-oriented perspectives, our approach draws on insights from actor–network theory and integrates human and non-human actors to be studied. We illustrate our approach through an ethnographic study in the municipality of Augsburg, Germany, which serves to uncover the multiple processes of translation inherent in building urban climate resilience and to provide insights into the ways how bureaucrats shape and mediate the future of contemporary cities.

Keywords

bureaucrats, public administration, science in action, urban climate adaptation, urban climate mitigation, urban resilience

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摘要

本文邀请城市研究学者与我们一起探索与城市气候复原力相关的官僚体系运行。在本文中，我们呼吁对城市治理复杂且往往难以预测的进程加以研究，包括总体缓解和适应目标的制定以及具体措施的实地实施。先前的城市治理研究主要集中于事先的政治谈判和联盟建设，以及通过之后公布的计划，但我们建议重点关注城市行政管理部门内部决策和实施过程中固有的非线性动态。在此背景下，本文有两个目标：（1）提供需要（重新）关注城市气候复原力相关的行政进程的论据；（2）提出可用于有效研究上述进程的观点。与广泛使用的以行为者为导向的视角不同，我们的方法借鉴了行为者网络理论的见解，并整合了要研究的人类和非人类行为者。我们在德国奥格斯堡市开展一项民族志研究，以此阐释我们的方法。该方法旨在揭示建设城市气候复原力所固有的多种转变进程，并深入阐释官僚如何影响和干预当代城市的未来。

关键词

官僚、公共行政、科学在行动、城市气候适应、城市气候减缓、城市复原力

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Introduction

In the face of climate change, many especially large cities and metropolitan areas worldwide are currently drafting climate resilience strategies. In this context, scholars have pointed out that most empirical research so far has focused on municipalities' published plans that are easy to access and examine (Castán Broto, 2020; Otto et al., 2021). For instance, Reckien et al. (2019) and Grafakos et al. (2020) analysed the Climate Action Plans of 885 cities of the EU-28 countries, using Eurostat's Urban Audit database and reported that only a minority of 147 cities consider both mitigation and adaptation policies. In a similar vein, Lee et al. (2020: 351) as well as Reckien et al. (2023) used the Urban Audit database and found that adaptation is positively influenced in cities with mitigation action policies, and that the quality of climate action plans in European cities has improved over time, while many plans still lack consistency as well as participation, monitoring and evaluation systems. Against this background, Otto et al. (2021) have developed an internationally applicable approach to rank cities based on their commitments to mitigation and adaptation. Apart from these quantitative studies based on large databases, further studies look into specific cases to understand the quality of climate actions plans (Tu and Yu, 2023) and climate policy pathways in detail (Haupt et al., 2023; Haupt and Kern, 2022; Kern et al., 2023).

Given these studies and their vital accomplishments, it needs to be said that local climate action plans are neither the mere consequence of scientific insights, nor the result of superordinate policies at the national or state level, but the outcome of complex and extensive negotiation processes among various actors, departments, and institutions (e.g. Cremonini et al., 2023). Furthermore, when climate action plans are implemented, they travel through the hands of many people within the administration and are mediated and transformed by them. Against this background, Biesbroek et al. (2018) have highlighted the need for understanding how climate change mitigation and adaptation plans are negotiated and actively shaped by public administrations, a research question we aim to address with this paper. Fitting well with this call for inquiry, Kelley (2018) has come up with a dissertation on local bureaucrats and their role in urban

climate change adaptation. Interestingly, she can show that bureaucrats do not only hold vital institutional knowledge but are often capable of successfully implementing measures by adopting a position that separates local adaptation efforts from the public debate polarised between denial of climate change on the one hand and apocalyptic exaggerations on the other. With a focus on joint mitigation and adaption action in cities, Göpfert et al. (2020) demonstrate that the joint organisational institutionalisation of mitigation and adaptation (i.e. joint departments) can be considered as a both necessary and significant prerequisite for joint implementation. Finally, Bhardwaj and Khosla (2021) show how bureaucracies that have the intention of responding to climate change but have limited control over their planning practices and mandates often align climate objectives with existing bureaucratic practices and objectives that include identifying and acting upon co-benefits between climate and existing environmental and social objectives – a practice the authors call 'superimposition'.

In the context of these latter studies, we seek to contribute to this emerging field of investigation by providing a perspective for studying the bureaucratic life of urban climate resilience. This paper combines a theoretical exploration of Bruno Latour's actor–network theory (ANT) with an empirical case study of the city of Augsburg, Germany, to analyse the bureaucratic processes shaping urban climate adaptation governance and answer the question: how do bureaucratic actors and non-human elements mediate, shape, and influence the development and implementation of urban climate adaptation measures? Focusing on a single case, we delve deeply into the nuances of local governance and decision-making, providing insights that inform urban adaptation practices in other contexts. With this heading, we seek to address the intricate and often unpredictable processes that climate resilience strategies go through on their way from the formulation of general mitigation and adaptation goals to the implementation of concrete measures on the ground. We argue that opening the black-box of urban administrative processes can help us in two respects. First, it can help us understand how general goals, such as 'climate neutrality' or the conversion of municipalities into 'sponge cities', are transformed on their way to being materialised by political majorities in city councils, reflecting social, ecological and economic interests, through temporal bottlenecks created by tenders in competition for scarce public resources, and by the skills, capacities, will, and networks of the bureaucrats in city administrations. Second, it can provide us with a foundation to critically reflect upon the differences between the formulated objectives and the implemented realities that make us see what remains of the ideas of climate resilience after they have gone through the bureaucratic machinery of the green capitalistic city. In contrast to widely used actor-oriented perspectives, our approach draws on insights from actor–network theory and integrates human (political representatives, urban planners, bureaucrats, etc.) and non-human actors (laws, guidelines, computer programs, infrastructure, etc.) to be studied. We illustrate our approach through an ethnographic study in the municipality of Augsburg, Germany. Augsburg was selected as a critical case due to its huge federal funding for the innovative Smart Urban Green project, which combines digital technologies, such as smart irrigation systems, with traditional climate resilience measures like tree planting, and the creation of climate oases. This funding and project scope make Augsburg uniquely suited to explore the processes of translation inherent in urban climate resilience governance. By examining this case, we uncover the intricate ways in which bureaucrats, alongside non-

human actors, shape and mediate the socio-material networks that influence the future of contemporary cities. Furthermore, by focusing on a single case study, we can delve deeply into the nuances of local governance and stakeholder interactions, thereby enhancing our understanding of how innovative solutions like those in Augsburg can inform practices in other urban contexts.

Over the course of 1 year, we conducted ethnographic fieldwork, closely accompanying the Smart Urban Green project and the two bureaucrats responsible for it. This included periodic meetings, participation in implementation-focused discussions, and four informal interviews with key project stakeholders and staff from other departments. These interactions offered valuable insights into formal decision-making processes and the interdepartmental dynamics shaping the project. To complement these engagements, we analysed extensive project documentation, such as proposals, memos, and implementation plans, providing a comprehensive contextual foundation for our study. Building trust with key actors further allowed us to access unofficial information and informal perspectives, enriching our understanding of the project's bureaucratic processes. This approach enabled us to capture the nuanced interplay between formal structures and informal practices within the administration.

Bureaucracy matters

Max Weber is widely regarded as one of the most influential scholars in the study of bureaucracy. In his book *Economy and Society* (2013) Weber distinguished three types of authority: charismatic, traditional, and rational-legal authority. He furthermore pointed out that states progress from charismatic to rational-legal authority. Weber's model of bureaucracy reflects his understanding of modernity, in which bureaucracy is seen as a response to the demands and challenges of the modern, industrialised world. In Weber's view, the rationality and formalisation of bureaucracy serves to reduce uncertainty and to create efficient administrative structures for complex social organisations – aspects that are often associated with modernisation at large. For Weber, bureaucratisation is key to rational-legal authority and an efficient and rational way of organising human activity. Weber delineated the core elements of bureaucracy, including a well-defined hierarchy of authority, division of labour, formal rules and procedures, impersonal relationships, merit-based employment, and meticulous record-keeping. The hierarchical arrangement ensures clear lines of command, while task specialisation enhances operational efficiency. Formal regulations, coupled with impersonal interactions, facilitate consistent decision-making and behaviour, underpinning the system's predictability. In this system, the bureaucrat has the role of a recipient of orders and is conceived widely as a passive executor of prescriptions who conforms to the hierarchy.

With Latour, in contrast, bureaucrats – as all other existing actors – need to be understood as having agency. Unlike Weber's understanding of agency as a mere human capacity, for Latour, all objects possess this particular power of making a difference in a specific situation. A Latourian perspective thus allows us to conceive bureaucrats differently, and in addition to that to also consider non-human elements, such as laws, guidelines, protocols, evaluation measures, etc., in our analysis. With Latour we can understand bureaucracies as complex networks of different actors that seek to stabilise themselves as functional units, while being a central tool of the state to govern public affairs in general, and climate resilience in particular. While other frameworks and approaches (e.g. Paul Kingdon's agenda-setting theory)

focus on the political dynamics of agenda-setting, Latour highlights the complexity and fluidity of actor interactions within networks, suggesting that policy outcomes emerge from ongoing negotiations rather than predetermined structures.

In *Laboratory Life*, Latour and Woolgar (1979) revealed how scientific facts are established through a series of steps involving the mobilisation of resources, the negotiation of interpretations, and the building of consensus among researchers. They emphasised that scientific work is not solely based on objective observations or experiments, but deeply influenced by social interactions, negotiations, and the use of various scientific instruments. In their book, the authors employed an ethnographic research method to study the inner workings of a scientific laboratory. The authors focus on the 'observations of actual laboratory practice' (Latour and Woolgar, 1979: 153) and draw attention to the 'process by which scientists make sense of their observation' (Latour and Woolgar, 1979: 29). In doing so, Latour and Woolgar aimed to understand science as a practice without any presumptions.

In Latour's later book *Science in Action – How to Follow Scientists and Engineers through Society* from 1987, he argued that scientific objects come into being through the process of interdefiniton and translation. Actors never behave in an isolated manner; instead, they are constantly seen in relation to the network of which they form part. In this regard, interdefinition refers to the idea that the meaning of a term or entity is determined by its relations to other actors and entities in the network. Latour's concept of networks refers to the dynamic and complex interactions between various actors, which can include humans, objects, technologies, institutions, and more. Latour argued that these networks shape and influence the development of knowledge, social structures, and the way societies work. Translation in this context refers to the process by which different actors establish connections, communicate, and work together. When actors (both human and non-human) encounter each other within the network, they often have different and sometimes competing interests, goals, and perspectives. Translation involves a process of negotiating and aligning these interests so that the actors can work together. This negotiation can involve compromises, adjustments, and sometimes even conflicts. As translation occurs, connections are established between actors, and the network begins to take shape. These connections stabilise the network, allowing it to function and evolve. The success of translation determines the strength and durability of these connections.

Translation also involves what Latour refers to as black boxing. This occurs when certain actors or processes become taken for granted or invisible within the network. They are no longer questioned or debated, but rather accepted as part of the background. In the process of translation, certain complexities or incommensurabilities may be bypassed or simplified to allow actors to work together effectively. This can lead to the stabilisation of the network but also potentially hide certain nuances or conflicts. Regarding the laboratory, Latour and Woolgar (1979: 65) argues that it is a 'configuration of machines', a multiple, overlapping set of tracking devices that transcribe and translate material substances into grids, graphs, logbooks, codings, diagrams, equations, and language. The black boxing begins when findings, theories and concepts become established in the scientific landscape and are recognised as a given. Latour and Woolgar (1986: 246) point out: 'Scientific reality is a pocket of order, created out of disorder by seizing on any signal which fits what has already been enclosed and by enclosing it, albeit at a cost.' In the same way that the scientist can be observed

producing facts and going through various stages before these facts are published in a journal, the black box of bureaucracy can also be unpacked.

Opening the black box of bureaucracy

In *Laboratory Life*, Latour and Woolgar entered the lab without any presumptions as to what constitutes and explains scientific activity. The anthropological approach they chose demanded they follow the practices of scientists as closely to everyday life as possible. As Latour argued, black boxes can only be examined with ethnographic means, which he understands as a variety of grounded theory (Glaser and Strauss, 2017). It requires that the researcher delve into a specific social setting, like the laboratory, to understand the intricacies of human practices and the cultural production of significance.

By following the lead of Latour in his study of *Science in Action*, we propose to study *bureaucracy in action*. With this heading, we seek to undercover the translation processes (definitions, selection criteria, decision making schemes, framework conditions, etc.) that climate resilience strategies go through on their way to becoming concretely implemented materialities. Yet, we do not seek to exactly copy the ethnographic method proposed and pursued by Latour and Woolgar. We rather see a strength in methodological diversity that allows us to capture different examples of bureaucratic processes in different ways. Thus, in this paper, we propose a two-tiered methodology. The first step is to focus on open-ended interviews and observations *en passant* in a mode close to everyday conversations, which are complemented by more formal interviews as well as focused and systematic observations. The second step is to contextualise our findings with historical accounts, the analysis of written sources, and available sets of standardised data. We now illustrate our approach by means of an empirical study in the municipality of Augsburg, Germany.

In 2023 the municipality of Augsburg (Germany) received a grant for a project financed by the Federal Government of Germany to enable smart climate tree planting. With 8 million Euro, the project was the highest individual fund a municipality received from the federal funding program (Bundesprogramm 'Anpassung urbaner Räume an den Klimawandel') in 2023. The project, called Smart Urban Green (SmS) for Augsburg, consists of four sub-projects that include (1) a smart irrigation system based on digital moisture meters on trees and in soil, (2) the creation of green spaces and tree planting, (3) the establishment of public sitting facilities called 'climate oases', and (4) the planting of trees in the city centre. Given the idea of understanding the bureaucratic life of urban climate resilience, our interest is to examine how exactly the initial ideas came to be translated into concrete sub-projects and which actors were involved. Since the project outline states that the aim is to convert Augsburg into a sponge city, the realisation of this concept is of special interest for us.

The process of translation began when different actors came into contact with each other forming a new network. The idea to apply for this federal funding came from the staff at the Office for Green Space Management (Amt für Grünordnung) after there was an internal reference to this funding opportunity. An application was considered promising because many of the necessary requirements had already been met beforehand. Papers and concepts were 'in the drawer' so that a draft proposal could be prepared in the short time available. The tender for funding as well as existing concepts of the administration, which were

necessary for the application, are important non-human actors that perform as mediators between human actors, thus contributing to the stabilisation of the network by providing consistent and predictable elements. In addition, non-human actors can shape the way concepts are understood, interpreted, and communicated among actors. As such, special emphasis was placed on smart irrigation and around this topic, the network was stabilised by administrative staff, the existing concepts in the drawer, and the tender offer.

After the topic was chosen, a proposal was drafted that specified the steps to be taken and the ways in which these steps would be implemented. Yet, the network that had produced the selection of the topic did not remain static, but was continuously reshaped and redefined by the ongoing interactions and negotiations among its constituent actors. Since digital and smart networking was meant to play an important role in the application, contact and coordination with the Smart City Initiative, a unit in the city administration, was necessary. So, as soon as these actors entered the network, translation processes followed. For the Smart City Initiative, the sensors that were to be deployed in the soil were not sufficient. Their idea was thus to use additional sensors that were to be placed in the trees' bark to provide significantly more data. While for the Green Space Management the sensors in the soil would be seen as a welcome innovation improving the irrigation system and helping to predict 'the water absorption capacity of soil before heavy rainfall events', for the Smart City Initiative the sensors in the trees' bark were seen more important, because similar sensors had already been tested elsewhere and these types of sensors would allow for 'further possible applications'. As can be seen from the fact that, in the end, both types of sensors were applied for, sensors can also lead to a reshaping of the network and its outcome. At the same time, it shows how actors such as *sensors* are perceived differently by varying actors based on their individual interests and priorities.

After the mentioned negotiation process, a decision was made as to equip a total number of 600 trees with both types of sensors within the frame of the project to contribute to the goal of making Augsburg a sponge city. Subsequently, two areas were selected that were deemed to serve as test sites of the smart irrigation system before it would be extended all over the city: the historic city centre and the newly established *Augsburg Innovation Park*. While the city centre was chosen due to its high proportion of sealed natural ground, the selection of the Augsburg Innovation Park followed different selection criteria. This new development area became legally binding in 2012 as part of a development plan (BP No. 900) and the greening of this area through tree planting was stipulated in an open space planning realisation and ideas competition. The competition was over a planning concept for approximately 16 hectares of public space, called Central Centre. In our interviews it became obvious once again that the area was chosen for the realisation of the sponge city concept as there were already existing concepts, approvals and thus institutional overlaps with other plans and projects. Also, important legal matters had already been clarified, such as ownership questions. These preconditions enabled the involved bureaucrats to formulate the project proposal in the short time available. The office that won the ideas competition provided the necessary information on measures, tree species and design concepts for the open space (Stadt Augsburg, 2022b).

Apart from the smart irrigation system, the creation of green spaces and tree planting, and the planting of trees in the city centre, the establishment of public sitting facilities called 'climate oases' was only

included at a very late stage of the project application phase. Initially, it was planned to purchase new trucks that would help the staff of the Green Space Management to irrigate the urban green infrastructure. This initial idea was particularly pushed by the mentioned institution, as it would have meant a reduction of workload on an everyday basis. Apart from that, the trees themselves were also important players here, since the young trees especially that were to be planted needed permanent access to sufficient amounts of water in order to grow the deep roots necessary for their long-term survival in the urban environment. However, since the funding could not be spent on new vehicles due to regulatory limitations in the tender offer, the employees of the Green Space Management had only 1 week to think about an alternative. The new idea of climate oases then was developed, based on precursory projects as part of the already existing climate adaptation plan of Augsburg. In this plan climate oases are understood as small-scale green spaces, primarily close to residential neighbourhoods. These spaces should be created or upgraded to such an extent that they can have a local climatic effect (Stadt Augsburg, 2022a). Thus, in this case, the existing urban climate adaptation plan acted as a mediator in the application process, that is, as a bridge helping to overcome barriers in the time of the proposal writing and differences that had existed between actors before. Later on the climate oases became black-boxed, which means that the very idea of this sub-project is no longer actively negotiated or questioned within the network. So today, the climate oases seem like a sub-project just like the others.

Over time, the Smart Urban Green network became larger, and the more dynamic it became the more bureaucrats from other departments were involved. Also, with the publication and reporting of the project, new translations and interrelations with the civic society arose. Thus today, the process of translation is still going on and will do so at least until the project is fully realised. As we hope to have shown with this example, Latour's concept of translation irritates conventional ideas of planning processes. Instead of focusing on formal rules and procedures alone, with Latour we can highlight planning and implementation processes in their complexity and non-linearity instead. By focusing on the bureaucratic life of urban climate resilience projects such as the one described here, we can highlight the role of translation and mediation in the construction of knowledge and facts. Through translation, different points of view are integrated into a network, and the stability of this network depends on the ongoing alignment of interests and meanings among its actors.

Outlook

The Smart Urban Green project has been finally approved by the respective departments. The processes behind the application, the choosing of sub-projects, their contents, and the areas of implementation are now ripe to disappear in a black box and only the materialities established within the project will remain as artefacts in the urban landscape and as starting points for potential new project applications in the future. By opening the black box of such project applications and implementations, urban scholars can explore how actors come together, how they interact with each other, and how networks emerge and evolve over time. We can examine power relations and their dynamics that might influence the network and identify inherent biases and limitations. Examples in our case were the restrictions that made the purchase of vehicles impossible or the strong focus on irrigation and sensors as a clear content-wise bias. Furthermore, when we open the black box, we can also reveal and

uncover mediators that enable interactions. These mediators play a crucial role in translation and negotiation, as can be seen from the city's climate adaptation plan, which already incorporated the idea of climate oases and thus helped the project proposal to be finalised and submitted, or the existing plans of the Augsburg Innovation Park, that helped the bureaucrats to adapt the project proposal within a short time. Understanding the roles of mediators thus enriches the analysis of network processes that need to be understood not as linear but as complex and controversial. Opening the black box enables researchers to examine the diverse perspectives, interests, and conflicts that contribute to network dynamics.

Black boxing and translation processes are central to Latour's actor–network theory (ANT) and therefore differ from similar approaches that analyse power and actors, like political ecology. While both have much in common, ANT focuses on understanding how diverse actors, both human and non-human, come together to form networks. In this context, we want to highlight three implications of our perspective on bureaucracies, as illustrated: (1) 'bureaucracy in action' as a perspective allows the inclusion of human (e.g. bureaucrats) and non-human actors (e.g. regulations) and provides information on how objectives (e.g. sponge city) are realised in concrete terms on the ground; (2) 'bureaucracy in action' as a research program allows for identifying concrete bureaucratic barriers and obstacles that hinder urban climate resilience measures to be rapidly implemented; and (3) 'bureaucracy in action' as an emancipatory and empowering mission allows us to contribute to a new understanding of bureaucrats as active mediators and networkers that help form future-proof, equitable, and just cities – in contrast to Weber's bureaucrats as passive recipients of the prescriptions of the green capitalist city and the rational state.

By referring to Latour we can also analyse bureaucratic networks in their relation with other actors when urban climate resilience measures are implemented. As shown in our case, these networks are not predefined structures but shaped by alternating associations and fluid relationships. With the concept of translation and mitigation, we can study these alternating and fluid processes through the eyes of different actors to understand the resultant networks as the socio-material hybrids they are. When it comes to urban climate resilience, post-structuralist studies often refer to Foucault's governmentality analysis to study respective policies. In this context, a Latourian perspective could add additional insights by putting emphasis on policies in the making. Such a perspective highlights the associations that are needed to keep an institution, a policy, a plan, or a strategy stabilised. This calls for engaging, documenting, and reflecting on the precariousness of what is constructed. After studying scientific networks and legal networks, maybe it is time now for studying bureaucracies in action.

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