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How can the Transformative Research Methodology be Applied to Regional Governance?

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1 ABSTRACT

The transformative research methodology has become a widely recognised approach to increasing the impact of research on sustainability transitions. Methods such as real-world laboratories, experiments and interventions enable scientists, stakeholders and citizens to collaborate. However, this methodology has mostly been applied at a local level or to specific spatial issues in neighbourhoods or selected sites. This raises the question of how far the transformative research methodology could also be useful at more abstract scales, such as regions or metropolitan areas, and what adaptations or modifications would be required to contribute to regional or metropolitan governance.

In the case of the Metropolitan Region of Nuremberg, this question was addressed in the 'Climate Pact 2030 Plus' research project on the energy transition (BMFTR, 2023–2027). The Climate Pact provides an ambitious vision for regional climate policy and has set up Real World Labs in the fields of energy provision and building renovation to explore different approaches to stakeholder collaboration. Experiments and pilot projects were chosen for implementation, aiming at typological solutions that can be transferred to the metropolitan region. In addition, a monitoring and reporting tool enables reflection and evaluation.

Against the backdrop of its theoretical framework, the paper outlines the methodological approach adopted for the case study and details the experiences of its implementation during the initial phase of the project. Building on this, it considers to what extent sustainable transitions in metropolitan regions can benefit from transformative research, and which restrictions and methodological adaptations need to be taken into account to integrate it into transformative regional governance.

Keywords: metropolitan governance, regional governance, transformative research, real-world laboratory, energy transition

2 STUDY AREA: EUROPEAN METROPOLITAN REGION OF NUREMBERG

With its Climate Pact, the European Metropolitan Region of Nuremberg/Germany (EMN) has set itself the goal of promoting the energy transition and pursuing ambitious climate protection targets. The Klimapakt2030plus research project aims to develop a strategic transformation path and suitable governance and cooperation structures for energy transition and climate protection in the EMN.

The EMN was founded in 2005. In the EMN charter, the founding members laid down the rules and objectives of cooperation. The Council of the Metropolitan Region comprises eight cities and twelve districts (Standecker 2007). The development of the EMN is based on the already close interconnection of central urban axes, in particular the Nuremberg-Fürth-Erlangen chain of cities. These functional relationships, complemented by joint transport and infrastructure networks such as the Greater Nuremberg Transport Association, were important driving forces behind the growth of a polycentric metropolitan region in which Nuremberg is also the dominant centre. Since its foundation, the EMN has gradually expanded as other cities and districts have joined on a voluntary basis.

The governance structure of the EMN consists of several key elements:

- Metropolitan Region Council: This is the political decision-making body of the founding members and sets the strategic goals.
- Charter and Rules of Procedure: These define the institutional rules for cooperation, decision-making and financing.
- Specialist forums: Thematic working committees on the economy and infrastructure, science, transport and planning, culture, sport, heritage and leisure, marketing, climate protection and sustainable development. The forums are supported by initiative groups.

- Funding: The work of the EMN is made possible by contributions from local authorities, corporate donations and project funding.

The EMN is not a hierarchical governing body, but primarily functions as a network and cooperation platform. The governance of the EMN is based on voluntary participation, the principle of subsidiarity and cooperative network structures. This means that decisions are made at the local level wherever possible, while the metropolitan region itself primarily acts in an enabling and supportive capacity. It sees itself as a catalyst, moderator and supporter of regional self-organisation processes, without having any sovereign powers. Its role is to connect stakeholders, exchange experiences and facilitate joint strategies, such as in the 'Climate Pact 2030 Plus' project (Standecker 2007; European Metropolitan Region of Nuremberg 2023).

3 REQUIREMENTS FOR TRANSFORMATIVE RESEARCH AT CLIMATE PACT 2030PLUS

The research project 'Climate Pact 2030plus – Energy Transition in the Nuremberg Metropolitan Region' uses transformative research methods to support the energy transition. The project will run for five years (2023–2027) and is being carried out by a transdisciplinary research network comprising practitioners and scientists. The practitioners involved include the Nuremberg Metropolitan Region and the Nuremberg Energy Region, while the scientists include universities from the region and HafenCity University Hamburg as a partner for accompanying socio-ecological research and governance analysis. The project is funded by the Federal Ministry of Education and Research as part of its research for sustainability programme. From the ministry's perspective, Climate Pact 2030plus is a pilot project for the metropolitan region's level of action.

In view of the special spatial constellation of a metropolitan region, a number of specific conditions and requirements arise for transformative research:

- Multi-level governance: The energy transition in a metropolitan region is embedded in multi-level structures, from the municipal and district level to the metropolitan region level to state and federal policy, European guidelines and global contexts. Transformative research must therefore be designed to capture interactions and contexts at the various levels of governance. A multi-level-oriented understanding helps to uncover coordination problems between the levels and identify potential for improvement in the management of the energy transition.
- Urban-rural interdependencies: The Nuremberg metropolitan region encompasses urban centres and rural areas. Solutions in densely populated areas may differ from those in rural areas. For example, rural areas play an important role in the generation of renewable energy (wind farms, solar fields) due to their large open spaces, while urban areas are centres of consumption and innovation. Transformative research should therefore aim to highlight interactions (e.g. with regard to energy, resources, knowledge transfer) between cities and their surrounding areas.
- Implementation barriers and obstacles to transformation: Climate Pact 2030plus examines the governance of the energy transition at regional level. Barriers to implementation can be institutional (lack of responsibilities, silo thinking between sectors), socio-cultural (acceptance problems, conflicting values), economic (financing issues, distribution disputes) or technical/infrastructural. In addition, the research maps the roles of important key players (local administrations, political decision-makers, networks, industry/energy suppliers, etc.) and their power resources and interests.
- Transformative methods: As part of Climate Pact 2030plus, tests are being conducted to determine how transformative research methodology can be applied at the metropolitan regional level. This involves the use of transformation arenas, real-world laboratories and real-world experiments, among other things. The climate pact process culminates in a collective narrative for a shared future of regional development aimed at climate neutrality.

4 THEORETICAL FRAMEWORK: TRANSFORMATIVE GOVERNANCE

4.1 Fundamentals of transformation research

Transformation research deals with social change processes and the conditions under which they arise, stabilise or accelerate. In the Climate Pact 2030plus project, it serves to scientifically analyse the energy transition in the EMN and to make governance structures visible. The aim is to support decision-makers and

actors in advancing the energy transition by examining ongoing processes and testing transformative control elements (WBGU 2016; Schneidewind and Singer-Brodowski 2014; Radtke and Canzler 2019). A distinction is made between two complementary approaches. While transformation research aims to derive general system knowledge from the observation of real transformation processes, transformative research actively accompanies these processes in order to provide targeted support and gain a better understanding of them. In this understanding, transformations are enabled by social, economic and technical innovations. (WBGU 2016, pp. 20–33, also Hofmeister et al. 2021)

4.2 Role of transformation research in the Climate Pact 2030plus project

In the Climate Pact 2030plus project, overarching transformation research analyses the governance structures of the EMN in order to understand how political, economic and civil society actors interact with each other and which institutional paths promote or hinder the energy transition. At the same time, it pursues an explicitly transformative approach in the real-world laboratories: it plays a formative, cooperative and process-supporting role, without directly intervening in the governance structure of the EMN (Parodi et al. 2016). This results in a dual approach: analysis of the existing system on the one hand and experimental testing of new forms of control and transformation on the other.

The energy transition can be understood as a socio-technical transformation process that encompasses both technological and societal changes. Socio-technical systems consist of closely interwoven social and technical components that can only be changed together (Geels and Schot 2011). The transformation of a socio-technical system requires technical innovations as well as their embedding in social structures, market mechanisms and institutional frameworks.

4.3 Fundamentals of governance research

Governance research has its roots in various social science disciplines (van Kersbergen and van Waarden 2004), which makes it difficult to arrive at a uniform definition (Benz and Dose 2010). While ‘government’ refers to the system of government of a political entity, governance encompasses all processes that take place between state, private sector and civil society actors and aim to organise collective affairs (Benz and Dose 2010; WBGU 2016). Governance is thus understood as an umbrella term for the forms and mechanisms used to coordinate the interdependent actions of various actors. This includes both formal institutions, such as legal regulations and state administrative structures, and informal arrangements, such as cooperative networks (Benz and Kilper 2018, WBGU 2016, 544, 102). Governance is not understood as opposed to state action, but as an analytical framework that systematically encompasses different modes of governance, including state hierarchy, market mechanisms and civil society self-organisation. The focus is particularly on coordination and cooperation, as political control in complex fields such as the energy transition is hardly possible through hierarchical control alone (Benz and Kilper 2018).

4.4 Role of governance research in the Climate Pact 2030plus project

The accompanying research in the Climate Pact 2030plus project is based on an understanding of governance that encompasses both hierarchical governance and the participation of social and economic actors in decision-making processes. The analysis focuses on the applicable regulatory systems, institutional configurations and forms of interaction that shape the field of climate protection in the European Metropolitan Region of Nuremberg (Benz and Kilper 2018). The project distinguishes between five types of governance instruments: (1) regulatory instruments, (2) financial assistance, (3) market participation, (4) organisational instruments and (5) informal instruments.

4.5 Metropolitan regions as governance areas

Metropolitan regions develop from socio-economic interdependencies that increasingly overlap existing municipal and administrative boundaries. Due to urbanisation, changing commuter flows and economic networks, the political and administrative boundaries of many cities and counties no longer correspond to the actual functional areas. Metropolitan regions are responding to this change by forming broader territorial boundaries that better represent and organise current social, economic and infrastructural interdependencies (Yan and Growe 2022). This presents the challenge that governance cannot be focused exclusively on urban centres, but must actively integrate the surrounding peripheral areas in order to avoid regional imbalances.

Concepts such as 'communities of responsibility' are intended to promote a new 'spatial awareness' that strengthens cooperation and solidarity within the region (Miosga 2007).

The governance of metropolitan regions is generally voluntary and characterised by the principle of subsidiarity. Decisions should be made as locally as possible, while the metropolitan region itself primarily assumes a coordinating role: it acts as a catalyst and moderator for regional self-organisation processes. By networking actors and exchanging experiences, it strengthens regional capacity for action, but generally without having any sovereign powers of its own (Standecker 2007; European Metropolitan Region of Nuremberg 2023). Overall, metropolitan regions are emerging as governance spaces that are characterised less by formal hierarchies than by cooperative networks. Their special quality lies in their ability to connect regional actors, enable collective problem-solving and coordinate long-term transformation processes (such as the energy transition) across institutional boundaries.

4.6 Metropolitan regional transformative climate governance

Metropolitan regional transformative climate governance can be understood as a form of governance that aims to achieve the sustainable transformation of socio-technical systems (in the Climate Pact, this refers in particular to the energy system and building stock) within polycentrically organised metropolitan areas or regions. It combines knowledge of profound social transformation processes (WBGU 2011; Schneidewind and Singer-Brodowski 2014; Radtke and Canzler 2019) with an understanding of governance that encompasses intentional forms of coordination between governmental, economic and civil society actors (Benz and Dose 2010; WBGU 2016; Benz and Kilper 2018). This form of climate governance is transformative because it aims to integrate technical, economic, social and political-administrative knowledge in order to shape knowledge-intensive processes such as the energy transition (Dewald et al. 2019). At the same time, it offers an analytical approach that takes into account institutional frameworks, stakeholder landscapes, forms of cooperation and path dependencies typical of long-term transformation processes (Czada and Radtke 2018). It is metropolitan-regional because it takes place in a space characterised by close socio-economic interdependencies, functional urban-rural relationships and the overlapping of municipal boundaries (Yan and Growe 2022; Miosga 2007).

In the Climate Pact 2030plus project, metropolitan regional transformative climate governance forms the theoretical framework for analysing and shaping the energy and climate transformation.

5 TRANSFORMATIVE METHODS

The methods of transformative research focus on various levels of action within the complex multi-level structure of the EMN.

- Steering committee. A select group of decision-makers from the metropolitan region ensures that the work of Climate Pact 2030plus is linked to real-world processes. The steering committee also acts as an interface between the Metropolitan Region Council and the expert forums, enabling the transfer of results and the adoption of the necessary resolutions.
- Transformation arenas. At the metropolitan region level, annual transformation and climate pact conferences have established transformation arenas that facilitate exchange, networking and information sharing among the stakeholders involved. They create spaces for knowledge exchange and enable discussion of implementation approaches. Participatory and co-creative working methods aim to promote interaction and activate participants.
- Transformation agenda. At the start of the project, the EMN already had a target document, the Climate Pact. This was revised in the first few years of cooperation in a collaborative working process. The Climate Pact is a joint strategy paper in which the members of the metropolitan region voluntarily commit themselves to actively promoting climate protection and the energy transition. The Climate Pact creates a common framework, formulates strategic goals and bundles the political commitments of the participating municipalities and districts. However, these are kept open enough to allow sufficient room for creativity and adaptation to changing conditions during the implementation process.
- Real-world laboratories. Two real-world laboratories, 'Energy Supply Transformation' and 'Building Stock Transformation,' were also set up at the metropolitan region level. They deal with

the topics of energy and heat supply as well as building renovation. Real-world laboratories are research infrastructures in which experiments are carried out under real-world conditions (Beecroft et al. 2018; Parodi et al. 2016). As cooperation platforms, they bring together a wide variety of actors from the respective subject areas, who jointly develop and test strategies and measures for implementing the Climate Pact. The collaboration aims to generate various forms of knowledge that contribute to transformation processes (Beecroft et al. 2018, Benz and Dose 2010): system knowledge, target knowledge and transformation knowledge. The design of the real-world laboratories provides for a variety of working methods, such as workshops, excursions and individual consultations, in order to achieve the highest possible level of transformation activity in the region.

- Experiments and experimental spaces. The implementation processes of the real-world laboratories are organised in a variety of ways and are geared towards the needs of the respective measure. This has led to the creation of sub-regional energy supply companies organised as inter-municipal cooperatives. In the field of building renovation, region-wide training events, for example for homeowners or property managers, offer solutions and attempts are being made to identify and overcome obstacles in the renovation sector. This can then be done on a small scale as a pilot project.
- Monitoring and reporting: As part of Climate Pact 2030plus, a monitoring system has been developed to track progress in climate protection and the energy transition. In addition to presenting numerical values, the monitoring system also includes reporting that showcases successful projects and measures. This is intended to encourage others to follow suit and recognise the respective project sponsors. The monitoring system differentiates between districts and independent cities, thereby helping to highlight pioneers and encouraging laggards to become more involved in climate protection and the energy transition. (Ulrich et al. 2026)

6 CONCLUSION

The Climate Pact serve as central platforms for supporting and disseminating the regional transformation processes initiated by Climate Pact 2030plus. They are key building blocks for bringing project results to the region while at the same time incorporating new ideas from practice and involving regional actors in the transformation process.

For sustainable spatial development, transformative research offers a repertoire of methods that supports co-creative processes and provides a space to move from the idea to experimental testing. Until now, these approaches have been used predominantly in small-scale contexts, such as at the neighbourhood level (e.g. Oltmann et al. 2022). The Climate Pact 2030plus research project attempts to scale these experiences to the metropolitan regional level.

The metropolitan region offers both advantages and challenges for transformative research approaches. On the one hand, the abundance of diverse actors available simply due to the size of the area is an advantage. They make it possible to identify sufficient transformation pioneers and forge innovation alliances. On the other hand, the large size of the area makes it difficult to establish the proximity and trust that are prerequisites for successful cooperation. Consequently, it is necessary to respond to the complex multi-level structure of the metropolitan region with a multi-level methodology of transformative research. Large-scale real-world laboratories play with the different levels of action, applying formats for the entire region as well as smaller-scale experiments, with the selection depending on the respective topics.

Furthermore, there are special requirements for the integration of transformation processes into metropolitan regional governance. The EMN's steering committees are also the key decision-making structures for the implementation of transformative experiments and other results of the cooperation process. This requires system knowledge in order to make use of the necessary access points and negotiation forums.

These requirements also give rise to further research questions, such as how transformative research processes can be integrated into existing multi-level structures, how urban-rural specifics affect transformation, both in terms of potential and possible restrictions, or whether the specific spatial structure of a metropolitan region – for example, centralised or polycentric – gives rise to special requirements for transformative research. And, of course, the question arises for a metropolitan region as to what extent the

instruments of transformative research can permanently supplement the repertoire of regional development, i.e. can experimental forms of governance in the context of real-world laboratories increase stakeholder cooperation and innovation dynamics selectively or even permanently?

7 REFERENCES

Beecroft, Richard; Trenks, Helena; Rhodius, Regina; Benighaus, Christina; Parodi, Oliver: Reallabore als Rahmen transformativer und transdisziplinärer Forschung: Ziele und Designprinzipien. In: Antonietta Di Giulio und Rico Defila (eds.): Transdisziplinär und Transformativ Forschen. Eine Methodensammlung. Wiesbaden: Springer, 75–100. 2018.

Benz, Arthur; Dose, Nicolai (eds.): Governance – Regieren in komplexen Regelsystemen. Eine Einführung. Wiesbaden: VS. 2010.

Benz, Arthur; Kilper, Heiderose: Governance. In: ARL (ed.): Handwörterbuch der Stadt- und Raumentwicklung. Hannover: Akademie für Raumforschung und Landesplanung, 857–865. 2018.

Czada, Roland; Radtke, Jörg: Governance langfristiger Transformationsprozesse. Der Sonderfall „Energiewende“. In: Jörg Radtke und Norbert Kersting (eds.): Energiewende. Politikwissenschaftliche Perspektiven.Heidelberg: Springer VS, 45–75. 2018.

Dewald, Ullrich; Grunwald, Armin; Poganietz, Witold-Roger; Schippl, Jens: Die Energiewende als soziotechnische Transformation – Von der Analyse zur Gestaltung. In: Jörg Radtke und Weert Canzler (eds.): Energiewende. Heidelberg: Springer VS, 319–352. 2019.

EU Commission: Delivering EU’s Rural Vision 2040 through urban-rural cooperation. Online verfügbar unter https://eurocities.eu/wp-content/uploads/2022/01/Eurocities-statement_rural-vision-2040_final.pdf. 2022.

Europäische Metropolregion Nürnberg (2023): Nachhaltigkeitscharta konkret. Agenda 2030 in der Metropolregion Nürnberg.

Geels, Frank W.; Schot, Johan: The Dynamics of Transitions: A Socio-Technical Perspective. In: John Grin, Jan Rotmans, Johan Schot, Frank W. Geels und Derk Loorbach (Hg.): Transitions to sustainable development. New directions in the study of long-term transformative change. First issued in paperback. New York, London: Routledge, 10–221. 2011.

Hofmeister, Sabine; Warner, Barbara; Ott, Zora (eds.): Nachhaltige Raumentwicklung für die Große Transformation. Herausforderungen, Barrieren und Perspektiven für Raumwissenschaften und Raumplanung, Forschungsberichte der ARL, Bd. 15, 125-133, Hannover, 2021.

Knieling, Jörg; Ulrich, Franziska, Monitoring, Kllimapakt 2030plus. Forschung kurz&knapp. Nürnberg: EMN. 2026.

Miosga, Manfred: Einführung: Metropolregionen als Instrument der Raumentwicklung. In: Manfred Miosga und Raymond Saller (eds.): Wie viel "Governance" braucht eine Metropolregion? Überlegungen zur organisatorischen und inhaltlichen Ausgestaltung der Metropolregion München. Hannover: Akademie für Raumforschung und Landesplanung (Arbeitsmaterial, 339), 1–14. 2007.

Oltmanns, Amke; Knieling, Jörg; Kretschmann, Nancy: Die Transformationskraft von Realexperimenten für die Mobilitätswende in der Stadt. Wie temporär autofreie Zonen Innenstädte nachhaltig und klimagerecht verändern, GAIA 31 (2), 103-110. 2022.

Parodi, Oliver; Albinez, Marius; Beecroft, Richard; Meyer-Soylu, Sarah; Quint, Alexandra; Seebacher, Andreas et al.: Das Konzept „Reallabor“ schärfen. Ein Zwischenruf des Reallabor 131: KIT findet Stadt. In: GAIA – Ecological Perspectives for Science and Society 25 (4), 284–285. 2016.

Radtke, Jörg; Canzler, Weert (eds.): Energiewende. Wiesbaden, Heidelberg: Springer VS. 2019.

Schneidewind, Uwe; Singer-Brodowski, Mandy: Transformative Wissenschaft. Klimawandel im deutschen Wissenschafts- und Hochschulsystem. Marburg: Metropolis. 2014.

Standecker, Christa: Die Europäische Metropolregion Nürnberg. In: Manfred Miosga und Raymond Saller (eds.): Wie viel "Governance" braucht eine Metropolregion? Überlegungen zur organisatorischen und inhaltlichen Ausgestaltung der Metropolregion München. Hannover: Akademie für Raumforschung und Landesplanung (Arbeitsmaterial, 339), 41–51. 2007.

Ulrich, Franziska; Knieling, Jörg; Hollerbach, Pia: Monitoringbericht der Metropolregion. Klimapakt2030plus: Forschung Kurz & Knapp. 1/2026, Hamburg. 2026.

van Kersbergen, Kees; van Waarden, Frans: 'Governance' as a bridge between disciplines: Cross-Disciplinary inspiration regarding shifts in governance and problems of accountability and legitimacy. In: European Journal of Political Research (43), 143–171. 2004.

WBGU – Wiss. Beirat der Bundesregierung Globale Umweltveränderungen: Welt im Wandel. Gesellschaftsvertrag für eine Große Transformation; Hauptgutachten. Berlin: WBGU. 2011.

WBGU: Der Umzug der Menschheit. Die transformative Kraft der Städte; Hauptgutachten. Berlin: WBGU. 2016

Yan, Simin; Growe, Anna: Regional Planning, Land-Use Management, and Governance in German Metropolitan Regions – The Case of Rhine–Neckar Metropolitan Region. In: Land 11 (11), 2088. DOI: 10.3390/land11112088. 2022.