
Call for Presentations

Transformations of Infrastructure Systems



Second International Conference
Technical University of Darmstadt
4th - 5th November 2021 (online)

Deadline CfP: 16th May 2021

The interdisciplinary Research Training Group KRITIS invites researchers and practitioners to participate in its second international conference. You will find information on how to apply at the end of the document.

Concept of the Conference

At first glance, infrastructures appear to be solid, stable, and immovable. But is that really the case? Research in recent years has shown the opposite: Infrastructures are dynamic and malleable, characterised by continuous development, interruptions, breakdowns, as well as reconstruction, and repair. So, if infrastructures are characterised as changeable to a greater extent, then we might ask: **At what point do changes to or within an infrastructural system go beyond “normal” adaptation?** At what point can we call such processes “transformation”? Is transformation more than a descriptive category or normative demand on infrastructures? In short, **what do we mean when we talk about transformation, and how can it be defined as something distinct from incremental change?**

Current debates surrounding **digitalisation** the **decarbonisation** of energy systems, and the rapid rate of global **urbanisation**, as well as the **challenges** each of these issues pose to technologies, actors, and societies, illustrate the degree to which **transformation** is at stake in the near future. These processes represent a **main challenge** both to technological innovation and to (urban) societies that both support and are supported by infrastructures. Transformation is not, however, specific to our time; rather, complex infrastructure systems have undergone processes of change since their inceptions.

The dynamic and changing nature of infrastructure systems is one of the central themes of the Research Training Group KRITIS. Our aim is to **describe, understand, and explain** transformation processes of infrastructures. What **triggers** these transformations, under what conditions do they take place, and what consequences do they have? We understand infrastructures as socio-technical systems that include physical-technical elements, actors, practices, institutions, and organizations. We also take into account the **spatial** and **temporal dimensions** in which infrastructures are embedded. The scope of our research on

transformations, their causes, conditions, and consequences, includes technical **components** and **modes of operation**, **socio-political aspects**, as well as **spatio-temporal embeddings**.

This two-day, **interdisciplinary online conference** calls for contributions from various academic disciplines and practitioners alike. It focuses on the following questions:

- What **constitutes** transformation? How long does it take, how comprehensive is it, what framework conditions does it require, and when is it considered complete?
- What is the **relationship** between **transformation**, **incremental change**, and **persistence**?
- Which **elements** of infrastructure systems are **dynamically changing**, and which **resist** change?
- What **effects** do transformations have on **infrastructures**? Does a transformation result in a new infrastructure or an “old” infrastructure transformed, or even both at the same time?

As an **interdisciplinary research group**, we address this CfP to **academic scholars from the engineering and computer sciences** as well as the **social sciences and humanities**. We would be pleased to receive submissions by **practitioners** in the field of infrastructure operations or regulatory bodies.

The aim of the conference is to elucidate **different perspectives** on transformation of infrastructure systems. These perspectives are represented by the four subtopics “Cultures of Transformation”, “Governance”, “Temporality and Spatiality”, and “Safe Transformation”.

The panels will consist of invited speakers from the Research Training Group as well as from abroad.

Additionally, there will be three **keynote lectures** by internationally renowned scholars and practitioners, namely

1. [Timothy Moss \(Humboldt University of Berlin\)](#)
2. [Anique Hommels \(Maastricht University\)](#)
3. [Niklas Vespermann](#) (German Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway)

Conference Panels

Cultures of Transformation Panel Chair: [Martina Heßler](#)

In academia, the **socio-technical character** of infrastructures has long been recognized: Social life is embedded into technical systems, and vice versa. For example, infrastructure that supports the water system in an area can be a reflection of the cultural relation of a society to water. Hence, this infrastructure can vary greatly between a dry landscape, where people value water highly, and a water-rich territory, where people have a different relationship to water.

Consequently, transformation processes must be conceived as **multidirectional phenomena** that influence and are influenced by societies and cultures: Changes to infrastructures can be a reaction to modified social needs and practices, for example. Conversely, changes to infrastructures can also influence society. In this section we seek to understand the **relationship between society and infrastructure** via the concept of 'culture'. By culture we understand the dynamic system of signs and meanings inherent in societies, which manifests itself in their different practices, for example the reaction to technological innovation. The question of "culture" is thus vital to the explanation and understanding of transformation of technical systems.

We are looking for theoretical or empirical contributions addressing the following questions:

- What cultural drivers can lead to transformations of critical infrastructures? Are there **cultural factors** that favour transformation?
- What **narratives** are linked to the transformation (of infrastructures), what impact do they have?
- How does transformation of infrastructures affect cultures?
- What notions of transformation exist in different epochs or cultures and how do they differ?
- What is the relationship between social or cultural transformation and the transformation of infrastructures? What interactions exist?

Governance of Transformation

Panel Chair: [Michèle Knodt](#)

The governance of transformation processes focuses on the coordination of collective and individual actors, e.g., policymakers, enterprises, and intermediaries. Regardless of the character of the transformation process – whether it is far-reaching and prevalent throughout several levels of infrastructure systems or it is related only to partial or incremental adaptations, there are some one main questions to be asked: **How are transformation processes guided and how do different (groups of) actors influence transformation processes?**

We assume that transformation involves diverse (groups of) actors and that it affects different levels and elements of infrastructure systems. For example, the liberalisation of the energy sector in conjunction with the surge of renewable energy required the cooperation of electricity producers, suppliers, network operators, and policymakers, and its effects affected local, regional, and national levels and were determined, inter alia, by EU law.

The governance of transformation could be analysed with regard to questions of its legitimacy and/or **effectiveness**. Legitimate and effective governance helps in avoiding destabilisation of the system or causing **functional crises**. In this panel, we therefore welcome empirical and theoretical contributions that deal with different modes of **governance** for the transformation of infrastructures, **explain the conditions** under which different modes could be considered to be legitimate and effective, and **analyse possible consequences** of transformative change.

We will discuss questions such as:

- Which modes of governance of transformation processes can we detect and how can their emergence be explained? What are the key triggers, processes, and patterns of such transformation?
- What **preconditions** and **frameworks** for transformation are created by different governance arrangements?
- How does multi-level governance of infrastructural system transformation work?
- What are the **consequences** of (different) modes of governance on transformation processes?
- What role do **intermediaries** and **non-state** actors play in transformation processes? What **challenges** does this pose for the governance of transformation processes?

Temporality and Spatiality of Transformation

Panel Chair: [Jochen Monstadt](#)

Any transformation of (critical) infrastructure is inherently shaped by its distinct temporality and spatiality. Since transformation is a **process of change**, temporality is one of its main elements. At the same time, infrastructures are always embedded in space and connect places and people across distances. **Transformations thus take place within complex spatio-temporal relationships. Here, we are interested in both spatial and temporal characteristics of transformation, as well as impacts of transformations from a temporal or spatial perspective.**

Transformation does not only imply short-term developments, but rather includes a broader “timescape” in the past and present, as changes to infrastructures are usually embedded in **long-term processes** – even if they might be triggered by a sudden event. As such, temporality is of utmost importance to transformation as it allows for a **holistic investigation** of processes, rather than focusing on selective events.

Equally important is the notion of **spatiality** of infrastructure transformations, since such transformations may **restructure spatial relations** within an infrastructure network. To what extent is spatial reorganisation an indicator for transformation in spite of readjustments? Does, for example, the shift of data storage to a **centralized location** with **decentralized access** (“the cloud”) represent a transformation of information and communication infrastructure?

In this panel, we welcome theoretical or empirical **contributions** that investigate the **implications** and **consequences** of **how the factors space and time can be conceptualized** within the context of infrastructure transformation.

We will discuss questions like:

- How and in which **context** is temporality relevant for transformation?
- Continuity and Change: What is their meaning or function in regards to temporality? What is the relationship between transformation and permanence here?
- Is the transformation of an infrastructure also reflected in a change of space, its use, its appropriation, its experience, its nature?

Safe Transformation

Panel Chair: [Florian Steinke](#)

Given the dynamic nature of infrastructure, transformations can also occur as rapid and comprehensive change in one or multiple, interconnected systems. But compared to incremental changes that represent the “daily business” of adaption and repair, profound transformations seem riskier to an infrastructure system, changing fundamental parameters of operation. Therefore, one could assume, transformation may **increase the risk of instabilities, failures, or breakdowns** and that **safe operation** and function of a given system is fundamentally important to transformation processes.

With regard to the possible threats that transformation proposes, it should be noted that concepts and **strategies for safety and protection** of infrastructures must be as **dynamic** and **adaptable** as the infrastructures themselves. In this context, the question arises if infrastructure systems become more **vulnerable** through transformation, or if, and under what circumstances, transformation can lead to more **resilient infrastructure systems**.

We equally welcome theoretical contributions and empirical studies on this topic. Central **questions that could be discussed are:**

- What is the relationship between crises (functional crises of the infrastructure like breakdowns, systemic crises like political or economic crises, etc.) and transformation?
- Under what **conditions** do transformation processes lead to safety problems or functional crises?
- What is the relationship between **vulnerability** and **transformation**: Is transformation the result of identified vulnerabilities and does it cause new vulnerabilities?
- How can the safety during transformation processes be guaranteed?

Practical Information

How to apply

- Please submit an abstract of your presentation (max. 2,000 characters/ 280 words)
- Please indicate your preferred panel
- Each talk will be no longer than 15 minutes; language: English
- Please add a short academic CV
- Please send a single PDF file (max. 2 MB)
- Accepted applicants will be informed within six weeks after deadline
- The conference will be held online and in English; there are no conference fees
- Send your application by May 16, 2021 to: conference@kritis.tu-darmstadt.de

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