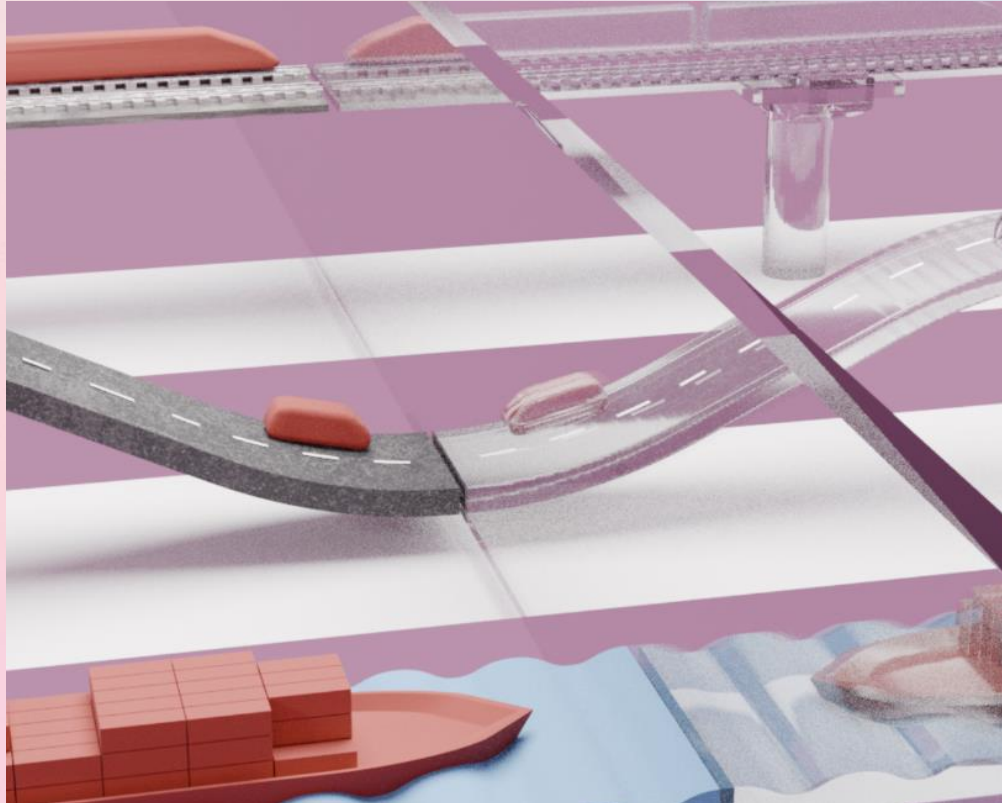


PROJECT INTRODUCTION *OpenTwin*



This project aims to analyse cross-border applications of Digital Twins in the mobility sector, focusing on their use cases, database, and potential benefits.

Project Overview

PROJECT INTRODUCTION *OpenTwin*

Objectives

- To map and compare existing cross-border use cases and best practices of Digital Twins
- To examine their application domains, objectives and databases
- To identify critical challenges and enablers for successful implementation, with a focus on the contribution of open data



PROJECT INTRODUCTION *OpenTwin*

Definition

Transnational Digital Twins are digital twins that either use, contain, or integrate data **from at least two countries**, or represent physical objects, systems, or processes that **extend across national borders** — for example, cross-border railway lines or energy infrastructures.

Relevance

Understanding these cases provides a foundation for future cross-border Digital Twin scenarios and (open)-data-driven innovation in mobility.

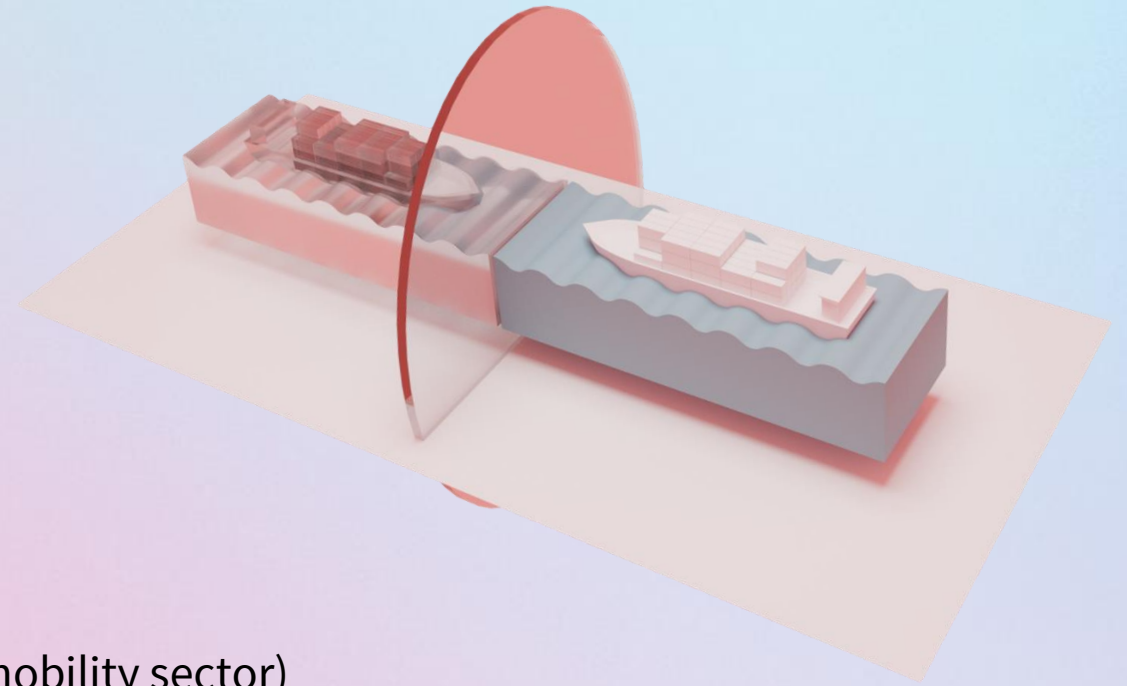
PROJECT INTRODUCTION *OpenTwin*

Project Overview

- Duration: 12 months
- Funding: Federal Ministry of Transport
- Funding initiative: mFUND – Research initiative for data-driven innovations

Expected Outputs

- Collection and mapping of best practices for cross-border Digital Twin applications (especially mobility sector)
- Exploration of concepts and potential future scenarios for transnational Digital Twin use through international exchange and shared learning
- Documentation and recommendations to support knowledge transfer and collaboration



PROJECT INTRODUCTION *OpenTwin*

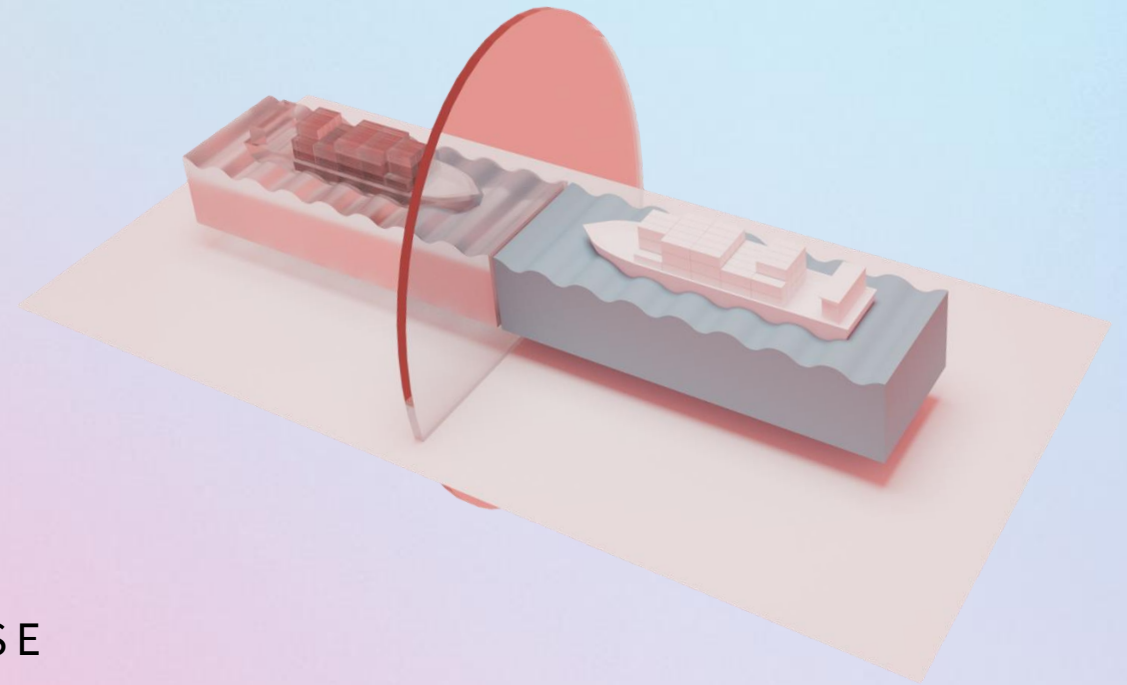
Research Approach & Methodology

ANALYTICAL RESEARCH PHASE

- Literature review and mapping of cross-border Digital Twin use cases
- Categorisation by domain, purpose, and (open) data use
- consultation for deeper, practice-oriented insights

EXPLORATORY & PRACTICE-TRANSFER PHASE

- International Ideathon to develop new scenarios and ideas
- Platform for knowledge exchange and networking
- Promotes cross-border collaboration and reuse of best practices



First Insights

No shared concept yet

- Transnational Digital Twins are not yet conceptually defined.
- Most projects remain national or sector-specific — still seen as tools, not systems.
- Emerging lighthouse projects point toward cross-border collaboration.

EU frameworks as enablers

- European Data Spaces and programmes like Horizon Europe drive harmonisation and data exchange.
- They can become the technical and regulatory backbone for future TDZ ecosystems.

Early pilots emerging

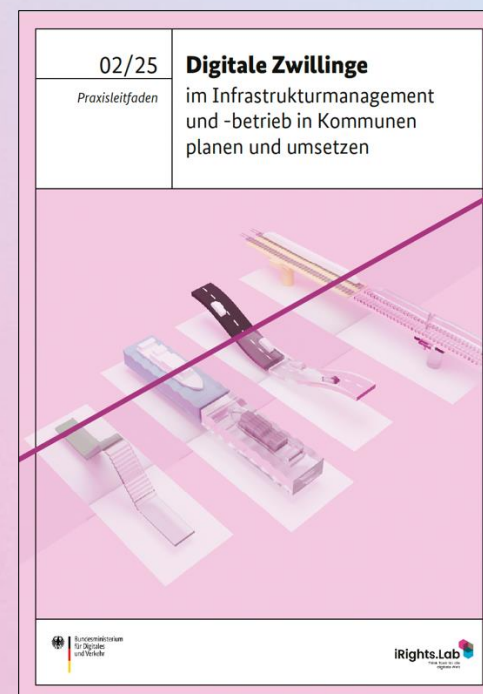
- Current projects are EU-funded, exploratory, and sector-focused (mobility, energy, climate).
- Mobility stands out as a key test field for cross-border applications.

PROJECT INSIGHTS:

Digital Twins for Infrastructure and Construction in Germany



[Study: Digital twins
for construction,
infrastructure management,
and operation](#)
(in German)



[Practical guide: Planning and
implementing digital twins in
infrastructure management and
operation in municipalities](#)
(in German)



PROJECT INSIGHTS:

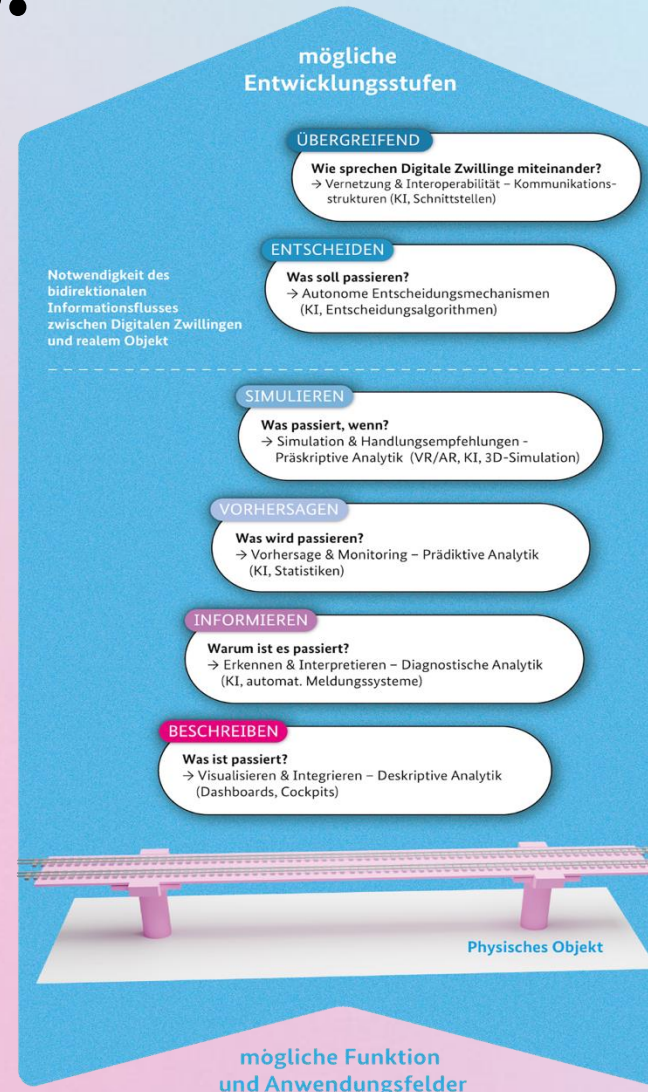
Scope & Outputs

Starting point:

Necessity of extending the lifecycle of infrastructures, broaden data basis and improve administrative efficiency

Objectives:

Assessing the nationwide status quo of digital twins in infrastructure, construction and municipalities and developing recommendations for action for users



Realisation:

- Definition — conceptualisation of Digital Twins
- Analysis of 135 use cases, 49 expert interviews, literature review, desk research
- Knowledge transfer & exchange

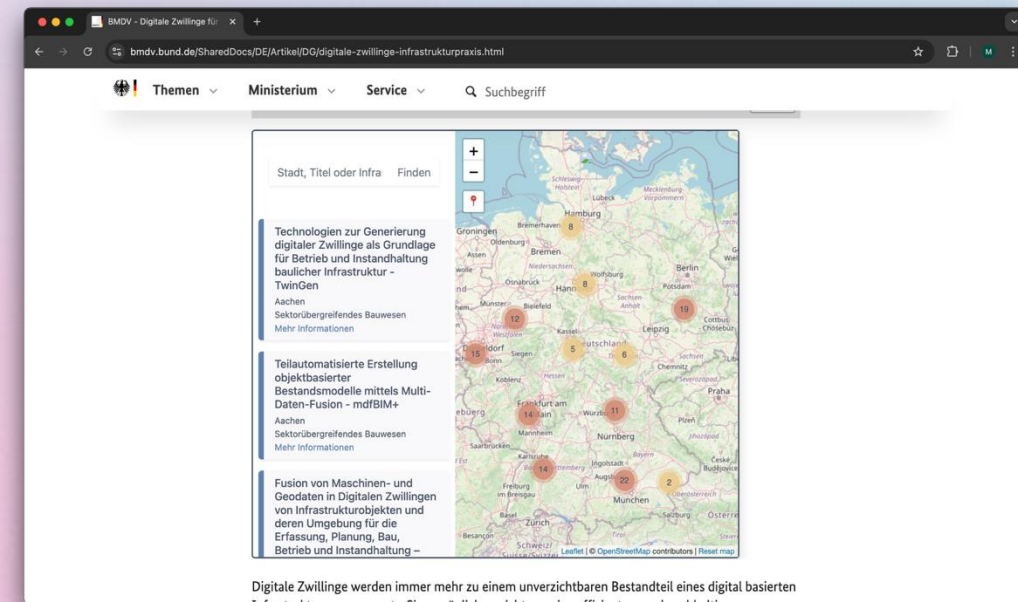
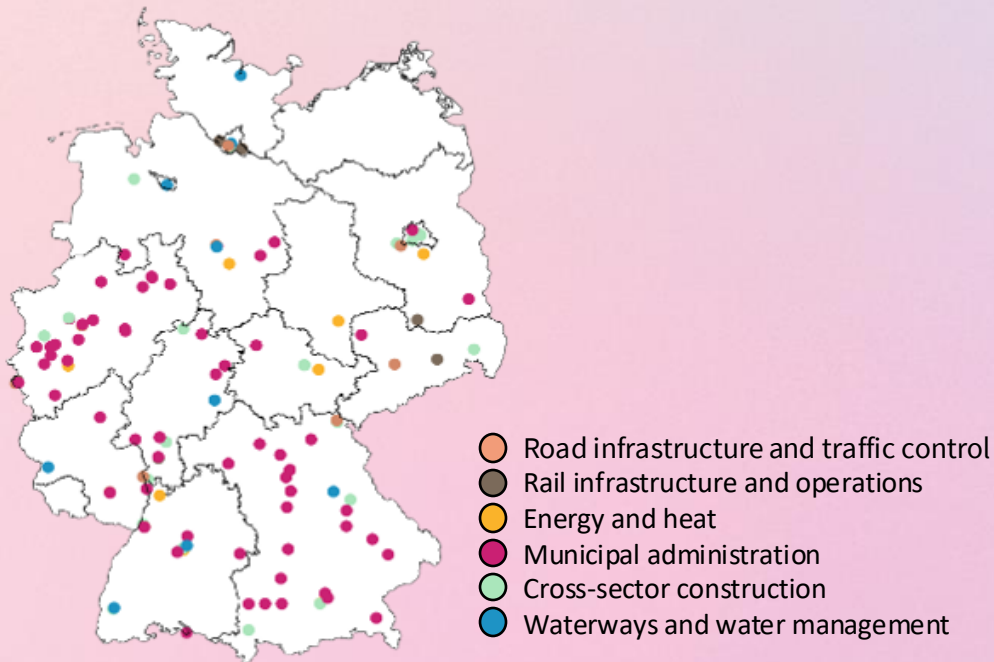
Outputs:

- 2 major publications
- briefing series
- interactive good practices map, expert / 4 workshops / forums



PROJECT INSIGHTS:

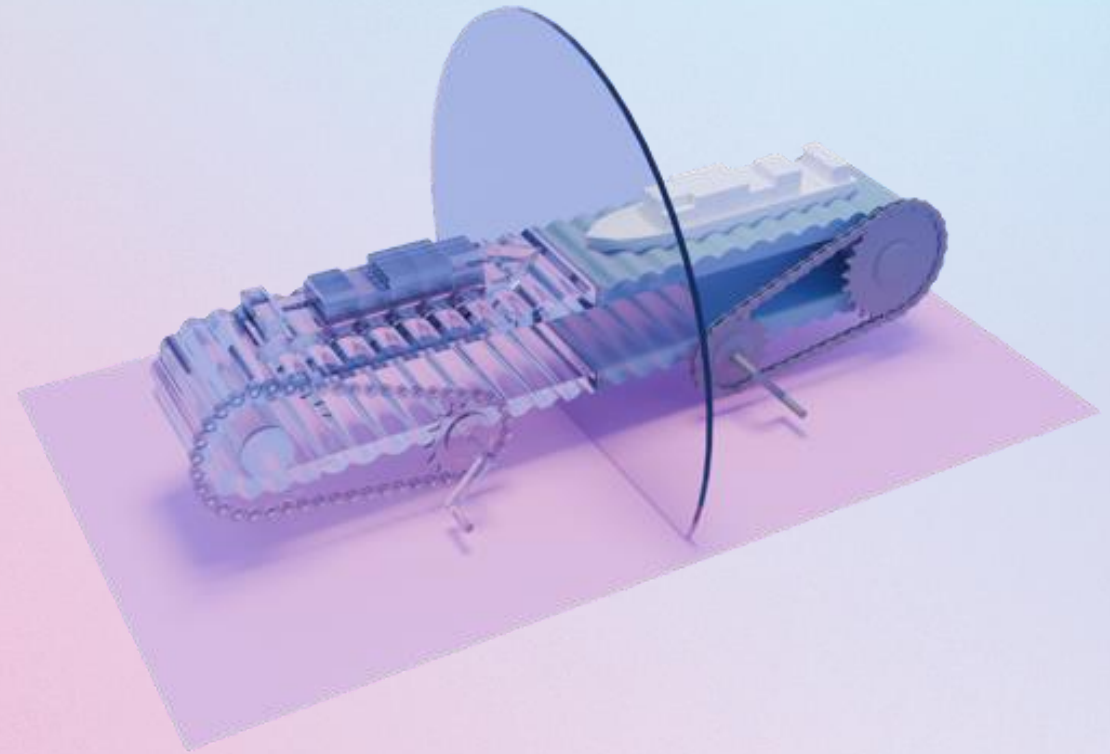
Digital Twin Use Cases in Germany: Systematic Analyses of Areas of Application, Digital Twin use cases and Good Practices



PROJECT INSIGHTS:

Challenges and Opportunities for Implementing Digital Twins: **8 Areas of Action**

1. common understanding
& clear definition of objectives
2. organizational requirements
3. operational implementation
4. data infrastructure
5. technical infrastructure
6. legal framework
7. digital ethics
8. funding & networking structures



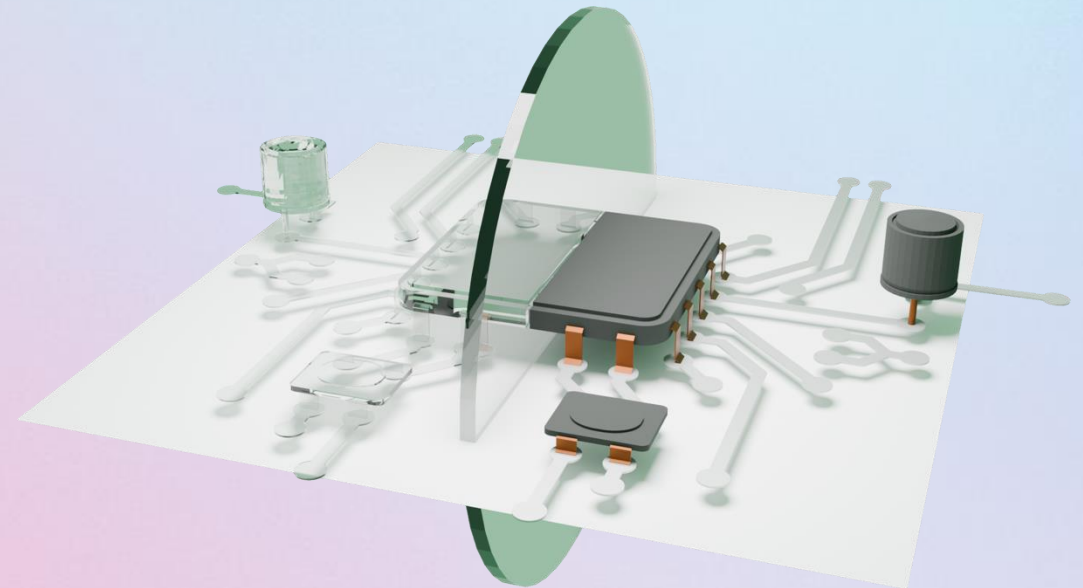
PROJECT INSIGHTS:

Key Findings & Outlook

Digital twins are not an end in themselves:

They are always application and context specific. They must support specific decision-making and optimisation processes.

Digital twins do not deliver added value through technology alone, but through institutional, legal, and organizational integration.



PROJECT INSIGHTS:

Key Findings & Outlook

High potential for efficiency, sustainability & decision-making support

Most projects still in pilot phase → need for scaling

Core challenges:

- Fragmented understanding · Data quality issues · Legal uncertainty
- Limited funding continuity · Lack of interoperable infrastructure

Key recommendations:

- Build shared understanding · Improve data governance
- Strengthen open standards & legal clarity
- Foster collaboration & capacity building

Next steps: Practice guide · Standardisation · Knowledge exchange

