



Federal Ministry
of Transport



AEC FORUM

GEOSPATIAL + BIM + DIGITAL TWIN

#AECForum2025

21/22 September 2025, Dwarka, New Delhi

Plenary IV - Transforming Road & Highway Infrastructure through Digitalization

A snapshot on recent projects and innovations in Germany

Christian Schlosser, Ph.D.

Head of Unit – Digital Transformation of the Infrastructure Sector,
German Federal Ministry of Transport

www.bmv.bund.de



Overview

- ❖ Policy Goals and envisaged Impacts
- ❖ Innovation, Research and Development
- ❖ BIM Strategies and Deployment
- ❖ Communication and Outreach
- ❖ Unlocking the Potentials of Digital Twins for the entire Infrastructure Life Cycle
- ❖ The wider Data and Digital Policy Context





Policy Goals for the Digital Transformation of Infrastructure Provision

Key:

**Supporting the digital transformation of the infrastructure,
planning and construction sector through advancing
deployment of BIM, Digital Twins and Data Management**

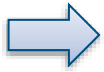


Digital Transformation in Infrastructure – envisaged Impacts

Contributing to:



Enhanced efficiency and reducing emissions across the entire life cycle of infrastructure, public, commercial and residential buildings



Extending the overall data space for infrastructure and buildings



Improved public consultation processes in planning and transport



Supporting market participation of SMEs and international competitiveness of Construction Companies and Developers

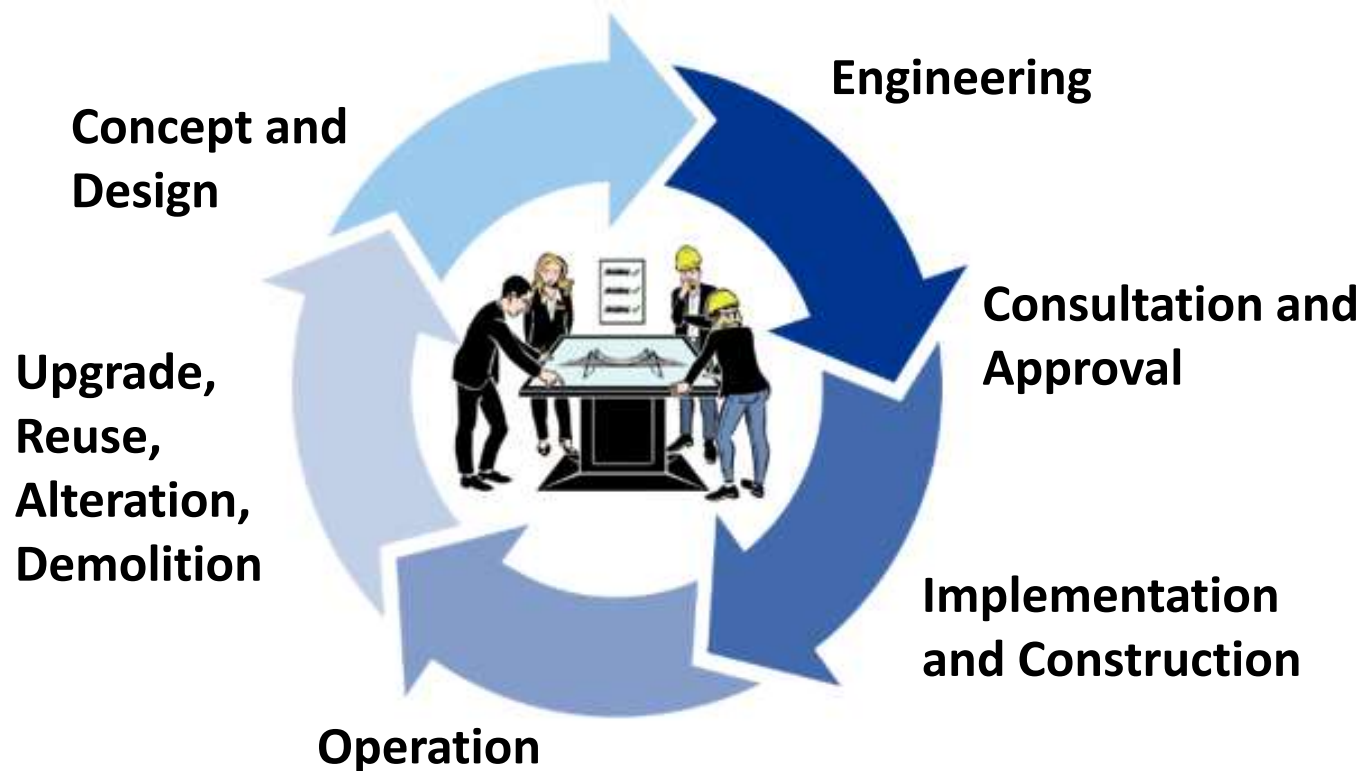


Meta-study of research Publications in the Economic Impacts of BIM

- Out of 489 peer-reviewed research publications globally, 48 identified as relevant; of 170 other publications, 41 relevant
- In total, 32 publications available and selected for the analysis
- Overall, the studies examined show that BIM can significantly reduce cost risks, enhance the quality of plans and contribute towards finishing projects within time and financial budget across all projects phases and subsectors



Digitalization across the entire Infrastructure Life Cycle





From BIM to Digital Twins – Initiatives to support the Digital Transformation of Planning, Construction, Maintenance and Management of Infrastructure

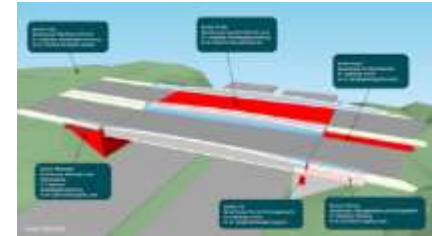
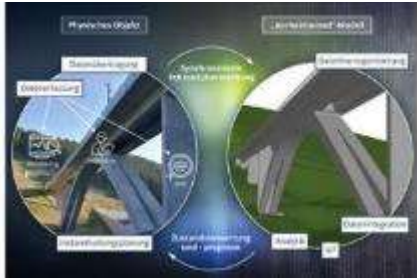




Federal Ministry
of Transport

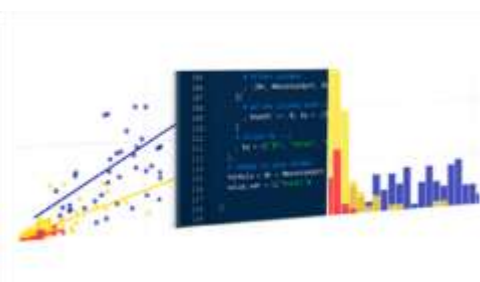
Research and Innovation - preparing the ground for BIM, Digital Twins and data-based Infrastructure Management

- Since 2017, BMV funded a wide range of projects (est. total grant volume > 50 Mill. Euros)
- addressing innovations for BIM deployment and digital Twins, integration with GIS, AI and new surveying methods and sensor technologies



Profiles of all 600 Projects:

<https://www.bmv.de/DE/Themen/Digitales/mFund/Projekte/mfund-projekte.html>





BIM-Implementation Strategies at Federal Level in Germany





Federal Ministry
of Transport

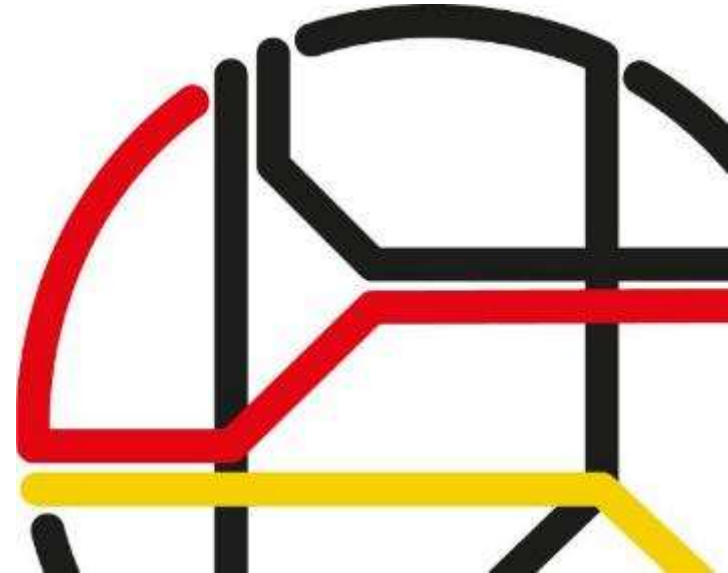
BIM Deutschland – National Center for Information, Networking and Capacity Building



BIM Zentrum für die
Digitalisierung
des Bauwesens
Deutschland

www.bimdeutschland.de

- Jointly established and financed by the Federal Ministry for Digital and Transport, the Federal Ministry of Housing, Urban Development and Building and the Federal Ministry of Defense
- so support harmonized and coordinated BIM-deployment across Sectors and preparing the basis for digital Twins





Networking and Knowledge Exchange

- Online Workshop Series featuring the BIM-Portal, targeting different user groups
- Online consultation and training events for BIM practitioners on technical BIM topics
- Online Workshops featuring Digital Twins (potential applications and pilot projects)



Wissing and Geywitz kick-start platform to support digital planning, construction and operation





Federal Ministry
of Transport

BIM-Portal of the Federal Government as technical Plattform and collaborative Process

BIM Deutschland Centrale Informationsplattform für Bauwesen

Leichte Sprache | Hilfe | Registrieren | Anmelden

Startseite

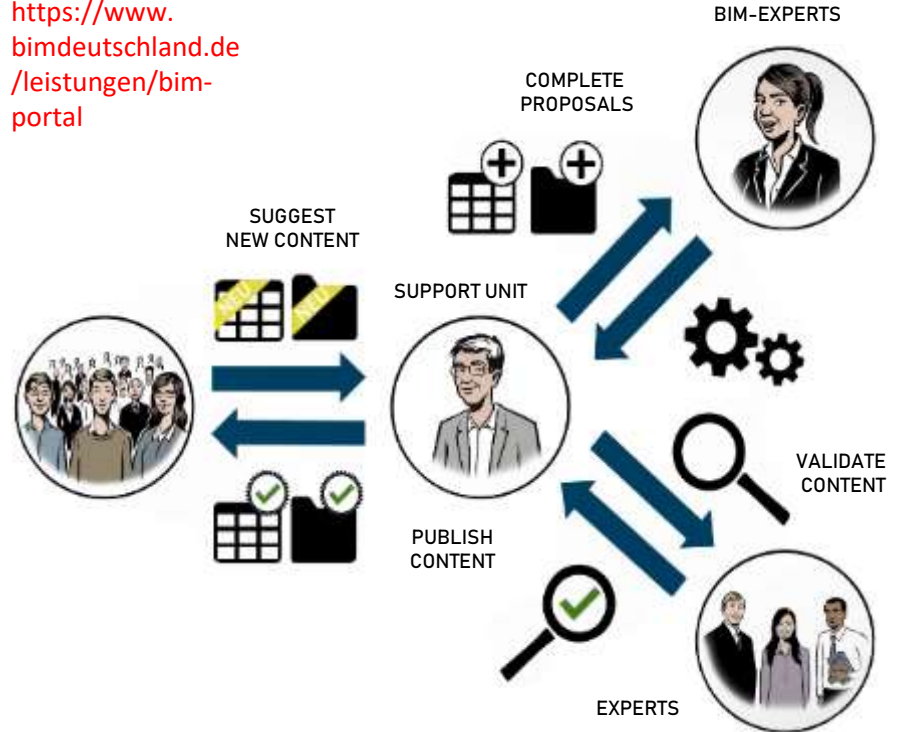
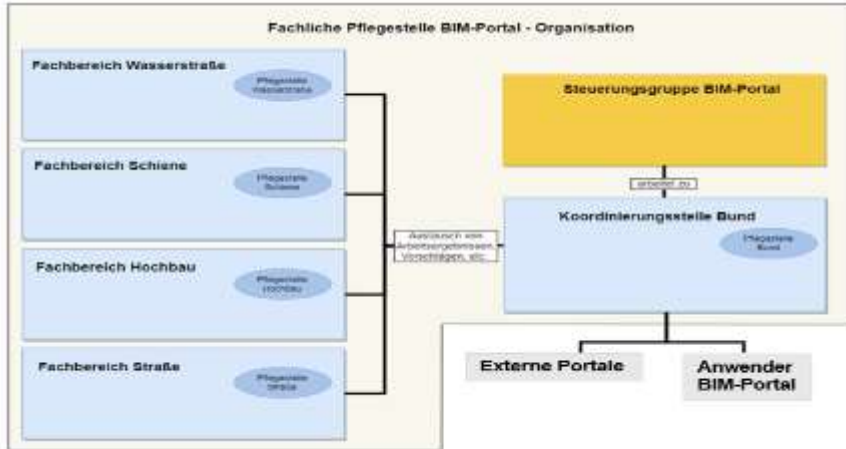
Das BIM-Portal des Bundes

Merkmale

- ASIA
- Dokumentation
- Prüfwerkzeuge

Building Information Modeling (BIM) ermöglicht die Erfassung moderner, IT-gestützter Prozesse und Technologien bei Planung, Bau und Betrieb von Bauwerken. GdR bestreift ein einheitliches Datenformat zwischen dem Akteuren. Das BIM-Portal unterstützt öffentliche Auftraggeber bei der BIM-gestützten Definition ihres Informationsbedarfes sowie andere Auftraggeber bei der qualitätsgerechten Steuerung ihrer Bauwerke. Informationen sind zu den notwendigen Informationen gleichberechtigt. Angaben darüber, was, wann, in welcher Darstellung und in welchem Format die angeforderten Daten liefern soll, damit der Auftraggeber seine Prozesse steuern und ggf. automatisieren kann.

<https://www.bimdeutschland.de/leistungen/bim-portal>





Federal Ministry
of Transport

BIM Standardization and Harmonization

- BIM-Standardization Roadmap (DIN 2022)
- Contributing to national and international Standards Committees



- Technical Documents for BIM Deployment





Federal Ministry
of Transport

Digitalization of the Approval Process: BIM-CDE for Federal Transport Authorities

A collage of documents and drawings on a blue background. At the top center is a red PDF icon with the text "PDF". Below it are several overlapping documents and drawings:

- A document titled "Sonderentwurf" (Special Design).
- A document titled "1. Überbau Entwurfsstatik" (1. Superstructure Design Statics).
- A document titled "Richtlinien zum Planungsprozess und für die einheitliche Gestaltung von Entwurfsunterlagen im Strassenbau" (Guidelines for the planning process and for the uniform design of design documents in road construction), dated August 2017.
- Technical drawings of a bridge structure, including a cross-section and a plan view.
- A site plan or map showing a road network with a highlighted area.

A collage of documents and a 3D model on a grey background. At the top center is a logo consisting of four interlocking rings in blue, red, and purple. Below it are several overlapping documents and a 3D model:

- A document titled "DEGES BIM-Auftraggeber-Information-Anforderungen (BIA)" (DEGES BIM Auftraggeber-Information-Anforderungen (BIA)).
- A document titled "DEGES BIM-Abwicklungsplan (BAP)" (DEGES BIM-Abwicklungsplan (BAP)).
- A document titled "LOIN - Leitfaden Arbeitshilfe LOIN-Konzept" (LOIN - Leitfaden Arbeitshilfe LOIN-Konzept).
- A 3D BIM model of a complex highway interchange with multiple levels and ramps.
- A technical drawing of a bridge pier or support structure with various dimensions and labels.



From BIM Deployment to Digital Twins

...From the design and construction stage of new projects to the entire life cycle of (existing) facilities

...from static inputs and sources to comprehensive (real-time) operational data and analysis

...extending the focus from buildings and objects to users and other data sources and inputs



Federal Ministry
of Transport

Stocktaking: Map of Digital Twin Projects in Germany (137)

<https://www.bmv.de/SharedDocs/DE/Artikel/DG/digitale-zwillinge-infrastrukturpraxis.html>

Examples:

Digital Twin for **Predictive Maintenance** of the Köhlbrand Bridge in Hamburg

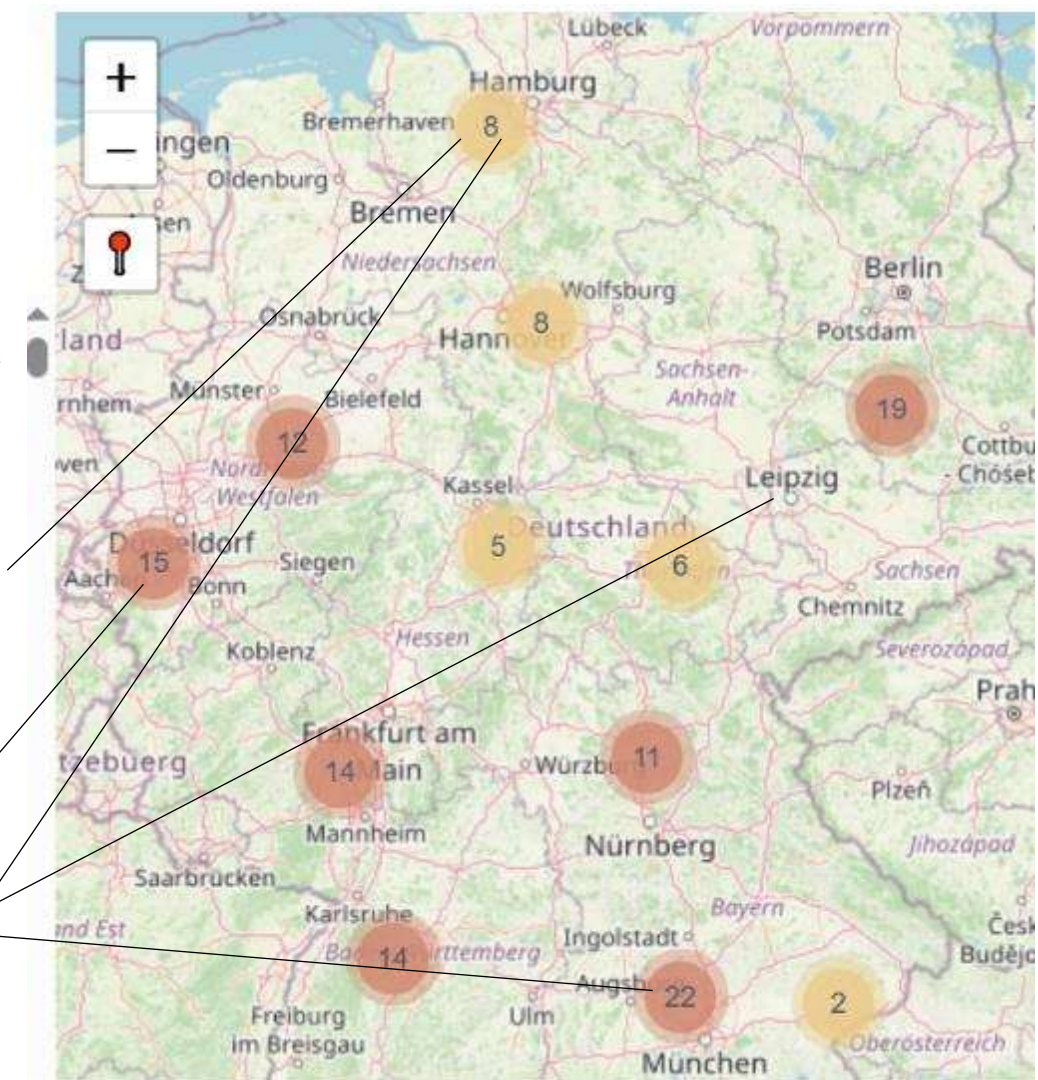


TwinGen

Digital Twins Technologies for Infrastructure Maintenance



Urban Digital Twin of the city of Munich, embedded in the larger Connected Urban Twins project with Hamburg and Leipzig





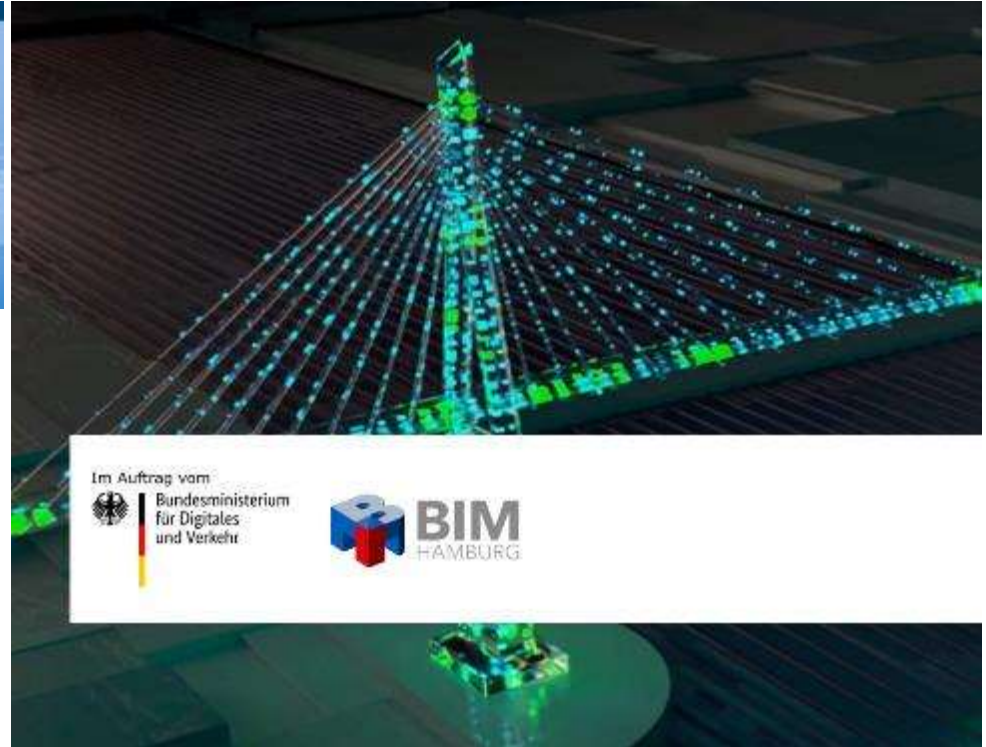
Digital Twins in Practice at Federal Level– the Köhlbrand Bridge in Hamburg



„Real Life
Digital Twin
Laboratory“



<https://bmdv.bund.de/SharedDocs/DE/Pressemitteilungen/2024/003-wissing-bruecken-effizienter-erhalten.html>





Moving Digital Twins to practical implementation – Key Elements and Steps

1. Identifying and defining cross-sector/sector-specific demands
2. Systematic review of current research and case studies
3. Developing strategic approaches and implementation plans
4. Dialogue and stakeholder consultation
5. Establishing technical standards, systems, data governance
6. Defining owners and operators of digital twins
7. Enabling people and implementing organizational arrangements



BIM and Digital Twins in Infrastructure – Data Policy and Digitalization Context

Federal Government National Data Strategy 2023



<https://bmdv.bund.de/>

https://bmdv.bund.de/SharedDocs/DE/Anlage/K/national-e-datenstrategie.pdf?__blob=publicationFile





The Federal Ministry of Transport has adopted a pioneering role for Open Data and Data Innovations in Transport and Mobility

- A Geo-Information Strategy (drawing on INSPIRE implementation)
- A grant program for data-driven innovations with a particular focus on Start-ups and SMEs: mFUND
- An Open Data Portal and a marketplace for real-time data from road traffic and public transport
- Public hackathons with Open Data from Transport Sub-sectors
- A data portal for national dissemination of remote sensing data from the Copernicus program: CODE-DE





Catalyzing Data Innovations in Mobility and Transport - thematic Programme Areas

Data Access

- Enable access to existing data sources
- Open up new data sources
- Improve usability of data sources

Data based Applications

- Develop applications based on existing and new data sources
- Take into account economic potential and societal use

Data Governance

- Explore societal aspects:
- Economic effects
 - Political implications
 - Legal framework

Topics covered:

Topics of the Federal Ministry of Transport (e.g. mobility, infrastructure)
and related themes (e.g. environment, demographics, smart cities)



Target Groups and Partners for establishing a Data Ecosystem in the Transport Field

- Individuals
- Associations

- Startups/
Entrepreneurs
- SMEs and big
companies
- Trade associations

- Universities
- Non-university
research
institutions

- Federal, State, Local
Authorities and
institutions
(potentially with R&D
functions)



Partnerships and networks incorporating a wide range of stakeholders



A+S Consult GmbH



TU Kaiserslautern



RWTH Aachen

Thank you for your attention !

Contact:

Christian Schlosser, Ph.D.
German Federal Ministry of Transport
Invalidenstraße 44
10115 Berlin

Christian.Schlosser@bmv.bund.de
[linkedin.com/in/christian-schlosser-bmdv](https://www.linkedin.com/in/christian-schlosser-bmdv)



EasyDigiTwin2