



# Infrastructure 4.0 Platform Workshop

Munich, 25 March 2021, 2pm-6pm

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## Cooperation Partners



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Technik, Wirtschaft und Gestaltung

Max. 300 registration

A Zoom link will be sent after registration

# Background

Value creation evolves through trusted networks of collaboration. The underlying multistakeholder and multidisciplinary ecosystems increasingly become the backbone of our digitalised world, mobilizing specialized actors for shared goals. Value chain networks are interactive, integrative and agile, and focus on people's needs.

In infrastructure development and delivery, however, such value chain integration is lacking. Resource-efficiency, sequential planning, discipline silos still determine infrastructure practices. As a consequence, the infrastructure sector remains one of the least innovative and digitalized, plagued by delays, cost overruns, and benefit shortfalls. This conventional approach also prevents from the realization of broader and urgent objectives.

In contrast, a novel methodology is needed that breaks down boundaries and increases flow-efficiency and agility across the value chain. To overcome the shortcomings and lack of progress within the infrastructure domain, integration of the value chain and a higher degree of collaboration is needed. This can be achieved through the creation of open and federated digital platforms that are applied to (trans) national infrastructure programs and combine the physical layer with exponential technologies. Such platforms can enable full-lifecycle participation and responsible infrastructure governance thereby reducing risks and increasing return and investment security. The application of technologies and federated data spaces support data sharing within and across organisational and national boundaries, improve the participation of smaller firms, and foster innovation.

# Workshop Themes

This workshop brings together leading global infrastructure and governance experts and aims at advancing the discussions concerning the future of infrastructure and the possibility of establishing such digital collaboration platforms. The workshop will address five themes:

1. **GOVERNANCE.** Writing the platform constitution: platform and ecosystem governance
2. **DESIGN.** The basis for a robust platform design: requirements, business models, and value chains
3. **PROTOCOLS.** Translating infrastructure into code: from infrastructure policies to platform protocols
4. **IMPLEMENTATION.** Programming the right platform mechanics: developing a platform pull system
5. **USE CASES.** Building robust use cases for society: the infrastructure 4.0 user experience

## Project Background

This workshop is part of a larger research and global infrastructure community engagement to

- contribute to the G20/T20 Italian Presidency “Task Force 7: Infrastructure Investment and Financing” in the areas “digital infrastructure”, “infrastructure governance”, and “technological advances”;
- prepare and promote the G20/T20 Policy Brief (more accurately, policy and action proposal) for G20 consideration, on developing federated digital platforms for infrastructure development in line with the UN's SDGs. The policy brief builds upon the “G20 Principles for Quality Infrastructure Investment” and the “G20 Infratech Agenda”.

# Workshop Agenda

The workshop will be structured into four main parts. The first part will provide background and a sense of urgency based on a keynote lecture as well as introductory interventions addressing the five workshop themes. During the second part, participants will break out into five sub-sessions working in detail on the five workshop themes. During the third part of the workshop, the session leaders will report back the results from the breakout groups to the plenary followed by a plenary discussion with questions from the audience. During the fourth and final part, a networking session will allow dynamic interaction of all participants to mingle and discuss remaining open issues and prepare for the next steps required to support the T20/G20 process. The discussion results will be documented and made available to the participants after the workshop.

- 14:00 **Introductions** by Thomas Schmid (confirmed), Managing Director, Bavarian Construction Association and Prof. Dr.-Ing. André Borrmann (confirmed), Chair of Computational Modelling and Simulation, TU Munich
- 14:10 **Welcome Remark** by Peter Altmaier (invited), Federal Ministry for Economic Affairs and Energy, Germany
- 14:15 **Keynote “The Future of Infrastructure and Digitalization** - value chain integration through federated data ecosystems” by Jan-Hendrik Goldbeck (confirmed), Managing Director, Goldbeck Group

# Workshop Agenda

- 14:30 **Setting the Scene** - seven Firestarters introducing the breakout themes (3min each)
  - a. **Norman Anderson** (confirmed), CEO, CG/LA Infrastructure
  - b. **Thomas Maier** (confirmed), Senior Advisor, G20 Global Infrastructure Hub
  - c. **Isidora Kosta** (invited), Infrastructure Community Lead, World Economic Forum
  - d. **Prof. Dr. Glenn Ballard** (confirmed), Co-Founder, Lean Construction Institute (LCI), UC Berkeley
  - e. **Prof. Dr.-Ing. habil. Gerd Buziek** (confirmed), company spokesperson, Esri Germany GmbH
  - f. **Prof. Dr. Rafael Sacks** (confirmed), Director BIM Laboratory, Technion Israel Institute of Technology
- 15:00 **Breakout Sessions** moderated by five Session Topic Leads interactively using Miro boards
  - g. **Dr. Isabel Cane** (confirmed), Director, OECD
  - h. **Dr. Mark Bew** (confirmed), Founder PCSG Limited, former Chairman UK Government BIM Task Group
  - i. **Prof. Dr. Harry Dimitriou** (confirmed), Director, OMEGA Centre, University College London
  - j. **Prof. Ibrahim Odeh** (confirmed), Founding Director, Global Leaders in Construction Management, Columbia University
  - k. **David Bowcott** (confirmed), Global Director, Growth, Innovation & Insight, Global Construction & Infrastructure Group, Aon Risk Solutions

# Workshop Agenda

- 16:00 **Reporting Back** by the five Session Topic Leads to plenary and questions by the moderator & *Sli.do* upvoting of questions by the audience.
- 16:30 **Networking** Session with *wonder.me* to mingle, collect open questions and identify required next steps to advance the G20/T20 agenda.
- 17:30 **Final Q&A** *Sli.do* upvoting and concluding moderation
- 17:45 **Wrap up and Closing of Workshop**

# Workshop Moderation & Workgroups

## Workshop Moderation and Project Lead

- **Prof. Dr.-Ing. Konrad Nübel**, Technical University Munich
- **Prof. Dr.-Ing. Michael Bühler**, Konstanz University of Applied Sciences
- **Dr. Thorsten Jelinek**, Director and Senior Fellow, Taihe Institute

## Infrastructure 4.0 Workgroup

- **Norman Anderson**, CEO, CG/LA Infrastructure
- **Prof. Dr. Glenn Ballard**, Co-Founder Lean Construction Institute (LCI), UC Berkeley
- **Dr. Mark Bew**, Founder PCSG Limited, former Chairman UK Government BIM Task Group
- **Prof. Dr.-Ing. André Borrmann**, Chair of Computational Modelling and Simulation, TU Munich
- **David Bowcott**, Global Director, Growth, Innovation & Insight, Global Construction & Infrastructure Group, Aon Risk Solutions
- **Prof. Dr.-Ing. Michael Bühler**, Konstanz University of Applied Sciences
- **Prof. Dr.-Ing. habil. Gerd Buziek**, company spokesman, Esri Germany GmbH
- **Dr. Isabel Cane**, Director, OECD
- **Jordan Cram**, Founder and CEO, Enstoa, Inc.
- **Prof. Dr. Harry Dimitriou**, Director, OMEGA Centre, University College London
- **Jan-Hendrik Goldbeck**, Managing Director, Goldbeck Group
- **Jeff Herriman**, Managing Director, Ascentage Group
- **Dr. Thorsten Jelinek**, Director and Senior Fellow, Taihe Institute

- **Dr.-Ing. Volker Kefer**, President of the German Association of Engineers (VDI)
- **Isidora Kosta**, Infrastructure Community Lead, World Economic Forum
- **Marie Lam-Frendo**, G20 Global Infrastructure Hub
- **Thomas Maier**, Senior Advisor to the G20 Global Infrastructure Hub
- **Prof. Dr.-Ing. Konrad Nübel**, Professor, Construction Management, Technical University Munich
- **Professor Ibrahim Odeh**, Founding Director, Global Leaders in Construction Management, Columbia University
- **Prof. Dr. Rafael Sacks**, Director BIM Laboratory, Technion Israel Institute of Technology
- **Thomas Schmid**, Managing Director, Bavarian Construction Association
- **Associate Prof. Dr. Hajnalka Vaagen**, Department of Ocean Operations and Civil Engineering Faculty of Engineering, Norwegian University of Technology

## **Writing the platform constitution: platform and ecosystem governance**

This session will identify what kind of governance framework and what governance principles need to be developed including a common purpose to provide a strong value proposition for the entire infrastructure ecosystem. In particular, the government needs to understand the value a strong infrastructure platform and ecosystem can create to build a credible business case for the government and the taxpayer by disrupting and enhancing the conventional infrastructure planning and development process.

- How to establish and govern the infrastructure 4.0 platform ecosystem?
  - How to increase trust, provide transparency, reduce complexity, and support secure data sharing?
  - Who is in charge and who decides what?
  - Designing an open infrastructure 4.0 platform: how to build trust and re-establish the commons?
  - For the people from the people: how to enable community participation in infrastructure?
  - What is the experience from related multi-stakeholder platform initiatives?
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- **Norman Anderson** (Firestarter), CG/LA Infrastructure
  - **Dr. Isabel Cane** (Session Topic Lead), OECD
  - **Dr. Thorsten Jelinek** (Group Coordinator), Taihe Institute

## Theme 2: Design

### **The basis for a robust platform design: requirements, business models and value chains**

This session will investigate the basis for the platform design and identify the user requirements and the necessary platform principles and protocols that are needed to develop sustainable business models along the infrastructure value chain.

- Infrastructure 4.0 platform principles and protocols: how to learn from the UK's National Digital Twin and 20 years of BIM?
  - How to identify and prioritize Infrastructure 4.0 business cases through value generation across the value chain?
  - How to build the platform architecture and implement core services for society?
  - How to financially sustain the platform?
  - What are effective business models and how to track value generation and monetize within the value chain?
- **Jeff Herriman** (Firestarter), Managing Director, Ascentage Group
  - **Dr. Mark Bew** (Session Topic Lead), PCSG Limited
  - **Thomas Schmid**, Bavarian Construction Industry Association
  - **Prof. Dr.-Ing. Michael Bühler** (Group Coordinator), Konstanz University of Applied Sciences

## Theme 3: Protocols

### **Translating infrastructure into code: from infrastructure policies to platform protocols**

This session will discuss how conventional infrastructure policies can be translated into platform protocols so that lengthy and burdensome infrastructure planning and development processes can be optimized and streamlined across the infrastructure value chain. Similarly, sustainable development goals, decarbonization targets, circular economy principles, and environmental protection requirements need to be translated into platform incentive mechanisms to achieve the desired infrastructure development outcome.

- Infrastructure 4.0 platform: how to translate policies into a platform protocol?
  - How to de-code the strategic planning, appraisal, and capacity building for infrastructure and urban and regional development?
  - How to introduce impact metrics towards a sustainability total cost of ownership model that accelerates and dictates decarbonization, circular material flows, and environmental/commons protection?
  - How to leverage the existing G20 hubs and alliances to promote policies, standards, and technologies needed to blueprint and implement open and federated digital platforms?
- **Thomas Maier** (Firestarter), G20 Global Infrastructure Hub
  - **Isidora Kosta** (invited), World Economic Forum
  - **Raffaele DellaCroce** (confirmed), OECD
  - **Prof. Dr. Harry Dimitriou** (Session Topic Lead), University College London
  - **Dr. Thorsten Jelinek** (Group Coordinator), Taihe Institute

## Theme 4: Implementation

### **Programming the right platform mechanism: designing a platform pull system**

This session builds on lean management principles and experience on how to transform conventional resource-efficient systems into more agile and resilient flow-efficient systems. The focus of this session will be on how to design a platform pull system that creates on-demand value for the taxpayer as well as internal project customers considering the full-lifecycle participation of all stakeholders including the general public.

- Human-centred Infrastructure 4.0 for reinventing infrastructure delivery: platform architecture as a pull system
  - How to allow full-lifecycle participation of private and public stakeholders in the planning and innovation process?
  - How to transform the conventional waterfall model of infrastructure planning and delivery into an agile and resilient platform system?
  - How to put the infrastructure user/citizen and internal customers in the center of the value generation process and deliver demand-driven infrastructure services (pull versus push)?
- **Prof. Dr. Glenn Ballard** (Firestarter), UC Berkeley
  - **Prof. Ibrahim Odeh** (Session Topic Lead), Columbia University
  - **Prof. Dr. Hajnalka Vaagen** (confirmed), Norwegian University of Technology
  - **Prof. Dr.-Ing. Konrad Nübel** (Group Coordinator), Technical University Munich

## Theme 5: Use cases

### **Building robust use cases for society: the Infrastructure 4.0 user experience**

This session will collect and investigate the most promising use cases that will generate the most value by leveraging the open platform concept as well as crowd innovation. The focus will be on the visualization of data and the overall user experience. Use cases from other industries will lead this session in the right direction.

- How to design strong platform attractors and effective incentive mechanisms to enable robust use cases?
  - How to de-risk infrastructure development through big data and 4IR technology?
  - Smart Infrastructure Management @ Gaia-X: how to identify, prioritize and build robust (sub)use cases related to infrastructure delivery and management?
  - How to accelerate the digitalization of the infrastructure sector by following policies, standards, protocols and utilizing technologies like cyber-physical systems, cloud/edge computing, IoT, and AI?
  - How to enable collaborative and smart contracting?
  - How to monitor, tracking and control the value creation process using distributed ledger technology?
  - How to foster international data flows; SME inclusion to avoid further concentration; better understand value chain risks/opportunities and leverage innovation?
- **Prof. Dr.-Ing. habil. Gerd Buziek** (Firestarter), Esri Deutschland GmbH
  - **Prof. Dr. Rafael Sacks** (Firestarter), Technion Israel Institute of Technology
  - **David Bowcott** (Session Topic Lead), Aon Risk Solutions
  - **Prof. Dr.-Ing. Michael Bühler** (Group Coordinator), Konstanz University of Applied Sciences