



City Digital Twins & Governance: Unpacking a Complex Nexus



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**No longer hype, not yet mainstream?
Recalibrating city digital twins'
expectations and reality: a case study
perspective**



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Jean Monnet DETWIN-GOV
Digital-Environmental Twins for Sustainable EU Governance
16th October, Université Catholique de Lyon

CDTs and governance revisited

- from CDTs as **tech models**
→ to CDTs as **sociotechnical processes**

The nexus is complex (***cum-plex***) because it folds upon itself

- from governance as decision-making to **address problems**
→ to governance as the **framing of problems** (and the implications for decision-making that ensue)

Modelling:
From CDTs to
Urban Digital Twinning



Recalibrating the hype ([Calzati 2023](#))



- Most CDT projects around the world:
 - 1) Tech-first, case-led approach (**modelling as a technical affair**)
 - 2) Top-down and/or corporate-led approach (**tokenized civic participation**, at best)
 - 3) Mostly BIMs with some IoT (**limited** real-time physical-digital integration)
- ☐ **Overlooked sociotechnical dimension**
- ☐ **Overlooked governance**

Calzati & van Loenen 2023

From CDT to **Urban Digital Twinning**:

→ from the city as a “thing” to the urban environment as an **evolving dimension**
→ **stress on the process**, rather than on the (technical) output

Urban Digital Twinning can be designed as a **data commoning** process (cf. EC’s Digital Commons 2025):

- a) **participatory** since the outset (quadruple helix as baseline)
- b) **contextual & iterative**, i.e., the technical and the social feedback on each other
- c) **open**, i.e., assessing its own sustainability through adaptive governance



Governance:
From “Problem-Solving” to
“Problem-Opening”

Ethics for the data-driven city

([Calzati & Ploger 2024](#))

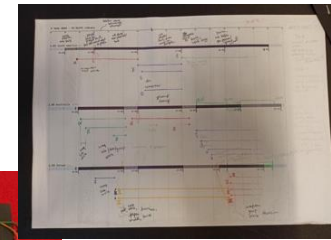
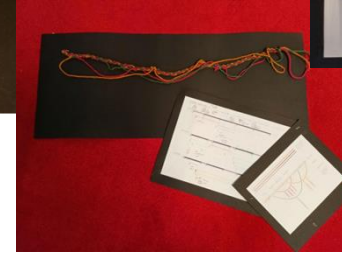
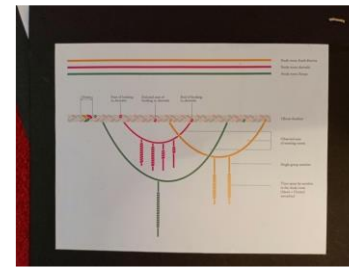


- “Technology is neither good nor bad; **nor is it neutral.**” (Kranzberg 1985)
 - Technology as “**pharmakon**” (at once, poison & antidote)
 - Digital modelling of complex physical environments produce **value-laden entanglements** (good & bad) and **uncertain consequences** (intended & unintended)
- Governance as **framing** and **systemic assessment**

Research & design

Research

- 1) **Identification** of a case study (e.g., TU Delft campus)
- 2) **Framing** of the case study (e.g., how it is presented; how it works; etc.)
- 3) **Data-value entanglements** (e.g., values in/excluded; data in/excluded)
- 4) **Open-ended scenarios** (e.g., possible un/intended consequences)



Design

a) Project journal

b) Artefact (e.g., physical/digital object exposing/redressing the tensions identified)

c) Author's statement describing the artefact

The Green Village

- **Living lab** for sustainable tech innovation (e.g., buildings energy efficiency, mobility, etc.)
- 10-12 **residents** on site
- Legal frame is **flexible**, e.g., low rent (subject to data collection and access to houses)
- TGV developing its own CDT through **participatory sociotechnical approach**
- TGV as a whole is not energetically sustainable: “**unsustainable sustainability paradox**” and scaling up & wide issues





Thank you

<https://stefanocalzati.com>

(Mi Lin, book cover's artist, [Milandia 瀾瀾之域](#))

Quantum Ecology

Why and How
New Information Technologies
Will Reshape Societies

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