THE INFLUENCE OF DIGITAL TWINS ON THE PUBLIC MANAGEMENT

Case study - the Tygron Platform

Hanna Halontka

TYGRON PLATFORM

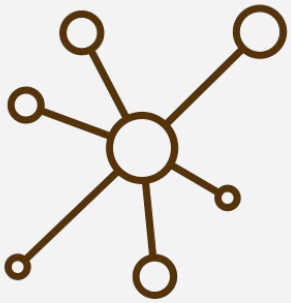
Utrecht University

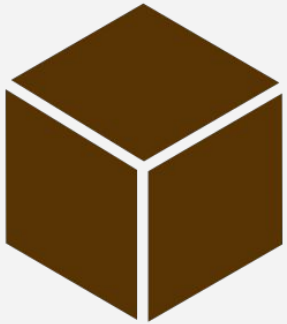
TECHNOLOGICAL INNOVATION FOR URBAN PLANNING

“Even though data informed governance is increasingly popular, there has been little focus on how the data is being produced, analysed and used for governance and businesses. Moreover, there is little attention to real-time data analytics.”

Kitchin, Rob. "The real-time city? Big data and smart urbanism." *GeoJournal* 79, no. 1 (2014): 4.

TYGRON PLATFORM





DATA

ALGORITHM

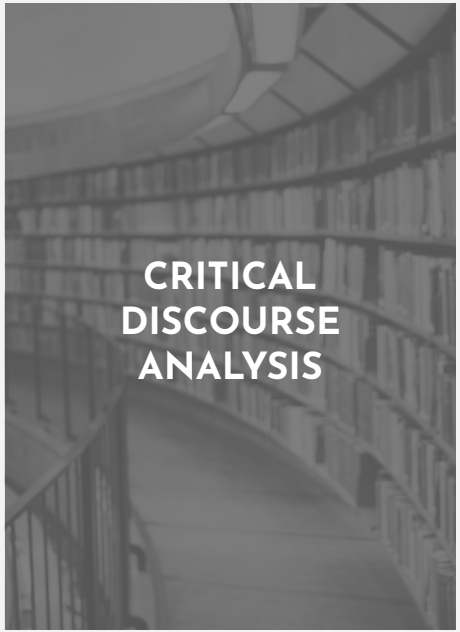
CITY SIMULATION

RESEARCH QUESTIONS

- How do different user groups engage with the digital twin? What does the tool communicate to users with various levels of expertise?

- What consequences (challenges and advantages) does simulation software have for the broader social practice: the public management and urban planning?

RESEARCH METHODS



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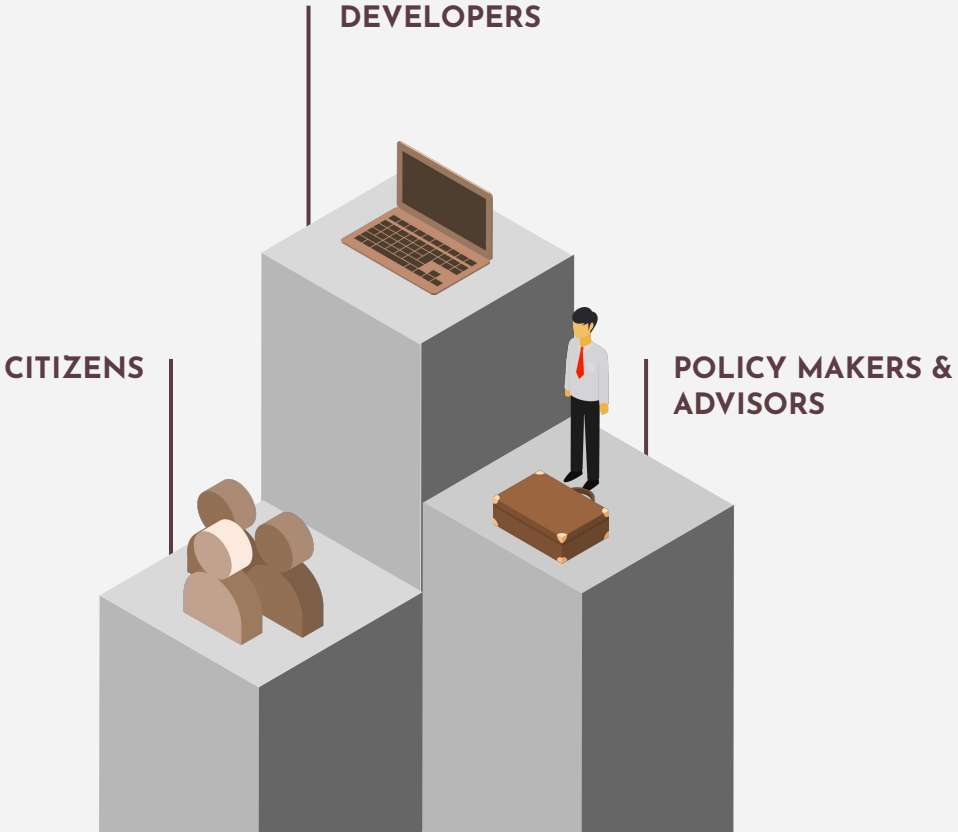
USER GROUPS



DEVELOPERS

Not trained in hydrology, energy transition, environmental studies etc.

They have access to the **data in its fundamental form**.

They have **full control over how the visualization and the calculations models are designed**. They know what happens when data is translated into a visualization.

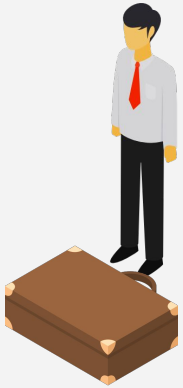
Excellent **analytical skills** and **expertise in data science**, as well as **computer science**.

They are **fully informed about the inner-workings of the tool** as they are the ones who design the algorithms.

ADVISORS AND DOMAIN EXPERTS

They use the platform to **test various scenarios** and propose suitable solutions. They perceive the results as an **estimation** and not the ultimate truth.

Experts in the field. Additionally they often are skilled with data.



They are able to create **custom calculation models**.

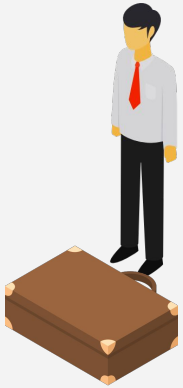
They know **which data is relevant** for answering different questions.

Critical about the result provided by the tool. They understand where the data comes from, how it was prepared, which data is potentially incomplete and how the calculation models work.

POLICYMAKERS

The objective of a considerable number of policy makers is **accelerating the decision making process**.

They often lack sufficient technical skills and data literacy and therefore, they are often **dependent on external advisors**.



The visualisations produced by the software are perceived as **the truth and representation of reality**.

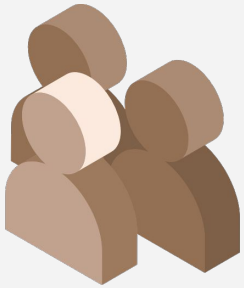
The **data management department** within the municipalities/provinces is not always sufficiently developed.

The digital twin is often perceived as a **black-box**.

CITIZENS

The tool can be used as a visualization tool to **present urban plans to citizens**.

They mostly **lack data literacy**.



Citizens can be involved in the city planning processes through **serious gaming sessions** where they will work on a project together with urban planners.

They do not have the access to the data or the inner-workings of the software, they are **only confronted with a visualization**.

They need to be more involved in the policymaking processes. They can give valuable **insights** to the policymakers.

CHALLENGES

BLACK-BOX

- Persuasive objectivity of the tool results in the lack of critical reflection towards the visualization.
- The complexity of the tool conceals its' innerworkings.
- A black-box for both policymakers and citizens.

DATA CULTURE WITHIN ORGANIZATIONS

- Lack of data readiness.
- Low analytical capability within the organization.
- Implementing the tool requires help from external organizations which results in higher costs and complicates the decision-making process.

TECHNOCRATIC GOVERNANCE

- Reinforcing the technocratic mode of governance.
- Lack of human agency in making decisions.
- Risk that all aspect of the city will be measured and treated like technical problems.

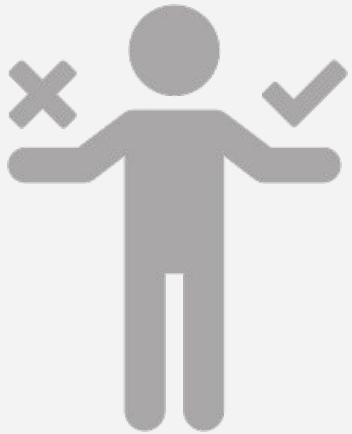
ADVANTAGES

HOLISTIC PLANNING

- The tool reinforces integral way of working and as a result specialists from different domains work together to find a solutions.
- Because of the visualization, the policymakers are better spatially informed and can situate a problem within a context.
- The problems are seen in relation to other parts of the ecosystem.

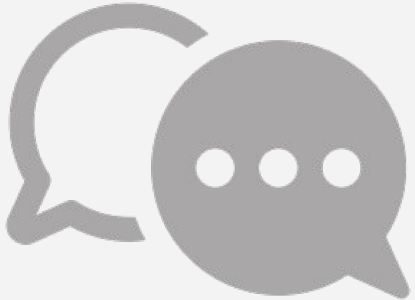
DECISION-MAKING

- Acceleration of decision-making processes.
- Lack of delay caused by calculating the impact of the proposed changes and producing new maps.
- Access to multiple information layers simultaneously (overlays).



COMMUNICATION

- A potential to improve communication not only within governmental organizations but also between the local governments and citizens.
- Serious gaming as offering a chance for citizen-government collaboration.




DIGITAL TWINS
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PRINCIPLES OF GOOD LOCAL GOVERNANCE IN A DIGITAL SOCIETY

PRINCIPLES OF GOOD LOCAL GOVERNANCE IN A DIGITAL SOCIETY

- Participation in the design of algorithms/ co-creation sessions,
- Rapid correction of ineffective policies,
- Continuous adaptation of systems,
- Continuous adjustment of competencies of employees,
- No discrimination or bias in algotithms,
- Ethical standards for system designs,
- Accessible public accountability,
- Human review of objection and appeal [...]

Meijer, A. J., Schaefer, M. T., & Branderhorst, M. (2019). Principes voor goed lokaal bestuur in de digitale samenleving: Een aanzet tot een normatief kader. *Bestuurswetenschappen*, *73*(4), 8-23.

THANK YOU

Does anyone have any questions?

hanna.halontka@gmail.com
+31 638481201

/hannahalontka