The governance of digital technology: Implications for the city-scale digital twin

Benefits to local authority users (city planning and management), urban planners, urban modellers, smart city delivery companies, activist community groups

“We don’t have access to the model...At the end of the day, most things come down to judgement and you can’t challenge people’s judgement, you can criticize it, but you can’t formally challenge it...I think what we have to do is just enlighten people, particularly councilors, in some cases council officers, to help them make better decisions”

- Citizen Activist, Cambridge

Summary
The study investigates how existing governance systems – both in terms of their structural and cultural characteristics – influence the design and implementation of city digital twins (i.e. a realistic digital representation of urban assets, processes and systems).

Moving towards city digital twins as evidence for decision-making in urban planning and management will have implications for urban governance and modelling. First, it contributes to more a more effective use of evidence through enabling a better understanding of cross-cutting problems and the communication of data-driven decisions. Second, by supporting the development in-house modelling capabilities, commissioning will be become more time and resource efficient. Third, broader accessibility improves the democratic quality of evidence-informed decision-making through enhancing transparency and accountability.

Thus, to harness the benefits offered, the design and implementation of CDTs needs to consider how currently existing local governance systems function and use modelling outputs as evidence for decision-making, as well as grounded citizen participation and feedback.

Key Findings

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<tr>
<th>STAKEHOLDERS (USERS)</th>
<th>CITIZENS (RESIDENTS)</th>
<th>CO-FACTORS (ENABLES AND CONSTRAINTS)</th>
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<tbody>
<tr>
<td>• Context-specific planning to tactical/superficial management (provenance, responsiveness)</td>
<td>• Provide opportunities for more frequent innovative and detailed city planning, government, networks and citizens</td>
<td>• Governmental mandates &amp; requirements (policies and activities)</td>
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<td>• Data-sharing culture-friendly (in focus on specific urban, traffic, housing, etc.)</td>
<td>• Support formalization of decision-making processes</td>
<td>• Critical mass谝nal support (finance, government and citizens)</td>
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<td>• Role of city-owned modeling tools (participation, evaluation)</td>
<td>• Support community-led initiatives (resources, alternative options, hydro, etc.)</td>
<td>• Lack of government support (finance, government and citizens)</td>
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Conclusions:
1. There is an apparent need for participation and better collaboration mechanisms and across the governance landscape based on systemic interdependencies and pressing problems situated at the nexus of governance structures and processes.
2. ‘Black box modelling’ and siloed evidence base limits comprehensive responses and negotiations of accountability relationships and responsibilities, and increases difficulties for engaged citizens to be heard.
3. Cambridge citizens will continue to be engaged, and developing inclusion strategies throughout the modelling process will decrease re-planning costs and negotiation time, and increase trust in the value of modelling evidence.
4. Public scrutiny in Cambridge has increased in the past years with the manifestation of economic growth on citizens’ everyday lives and will continue to demand evidence-based policy-making using traditional and new methods.

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Next Steps

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<tr>
<th>Future Steps</th>
<th>2019 Q4</th>
<th>2020 Q1</th>
<th>2020 Q2</th>
<th>2020 Q3</th>
<th>2020 Q4</th>
<th>2021 Q1</th>
<th>2021 Q2</th>
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<tbody>
<tr>
<td>Content: in-depth analysis of CDTs from different cities to understand generalisability</td>
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<td>Competence: identifying skills and capability gaps for successful CDI implementation</td>
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<td>Experimentation: new research project including real-world case studies and implementation (Cambridge Biomedical Campus, Northern Reach)</td>
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Long-term Vision

- Embedding the significance of research on socio-technical processes to assess impact of digital tools in local contexts.
- Connecting, expanding and re-defining experiences of city digital twins across countries to form a global knowledge network of new generation urban modelling for ‘smarter’ city planning and management.