HAMBURG UNITAC

UNITAC – United Nations Innovation Technology Accelerator for Cities

Digital tools and data for sustainable urban development

October 2025 – Eurocities Training Academy: Urban Digital Twins

United Nations
Office of Information and Communications Technology

UN-HABITAT

hcu HafenCity Universität Hamburg

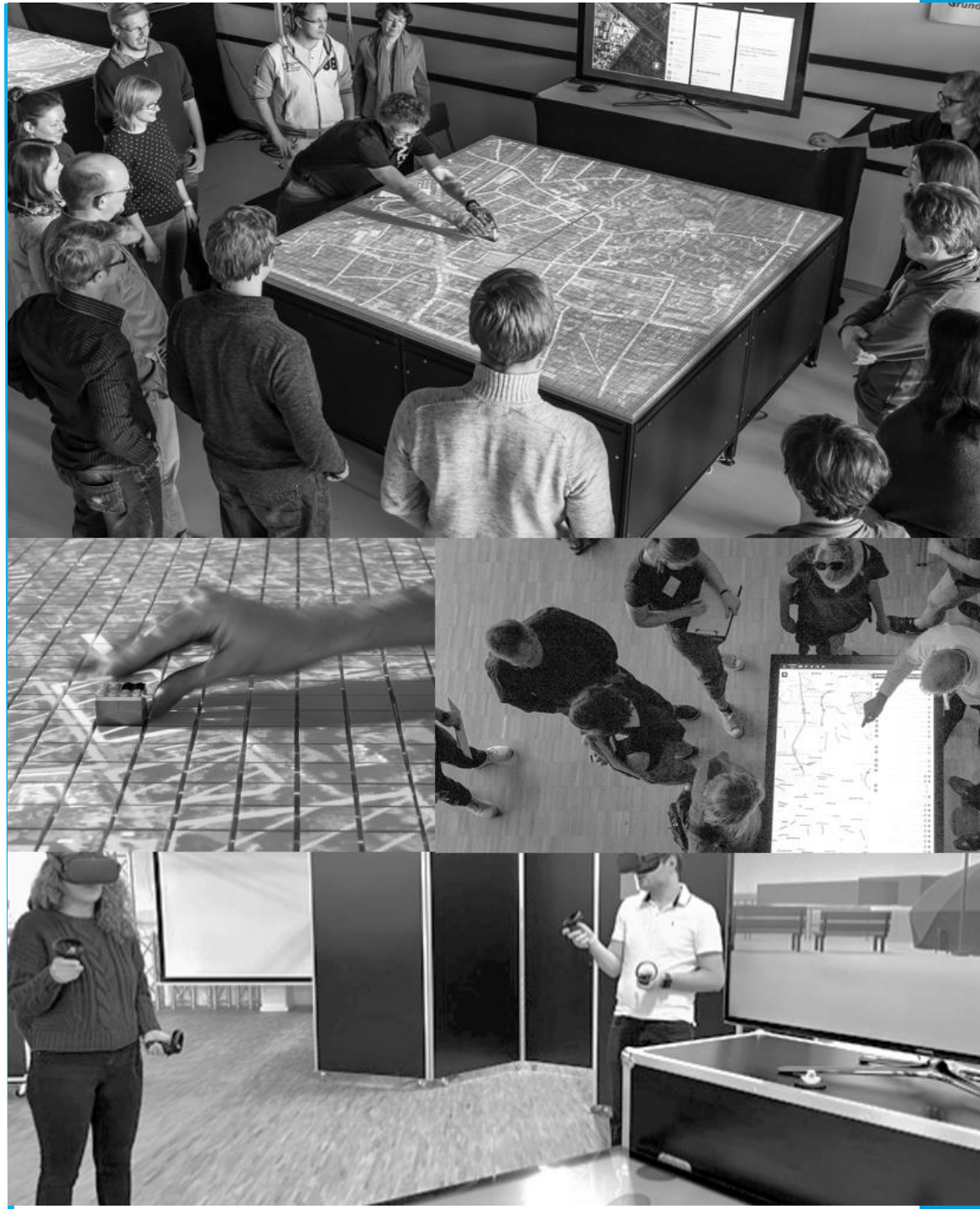
UNITAC – United Nations Innovation Technology Accelerator for Cities

A partnership between:

- United Nations Human Settlements Programme **(UN-Habitat)**
- United Nations Office for Information and Communications Technology **(OICT)**
- HafenCity University Hamburg **(HCU)**

Based in Hamburg at HafenCity University, City Science Lab Hamburg

UNITAC HAMBURG United Nations Innovation Technology Accelerator for Cities

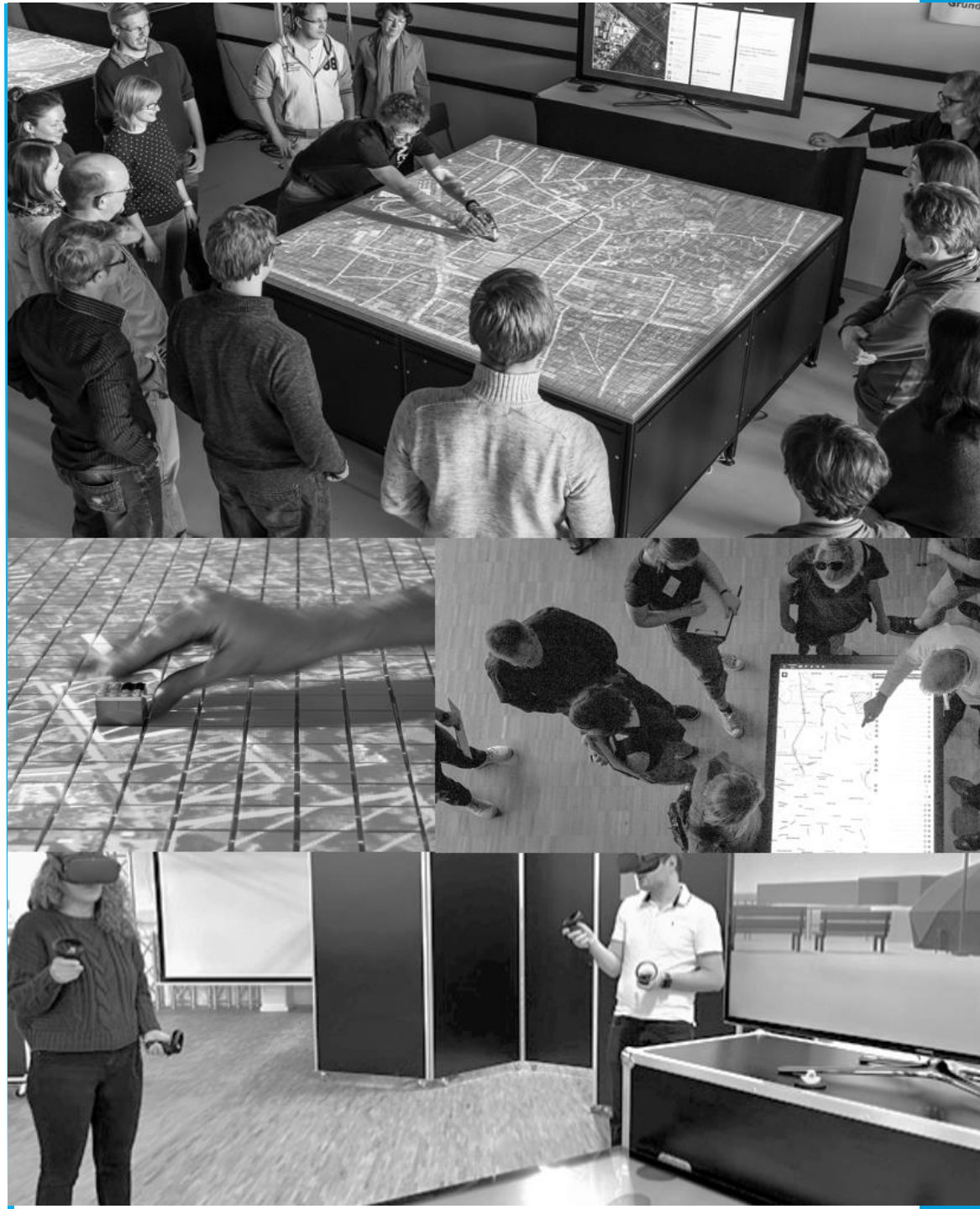


Agenda

- Introduction to UN-Habitat and UNITAC
- People-centred approach of UNITAC
- Centering people in urban digital twins

1. Needs-driven approach
2. Co-creation and collaboration
3. Capacities for people-centred approaches

- From data to policy
- Final considerations



HAMBURG UNITAC

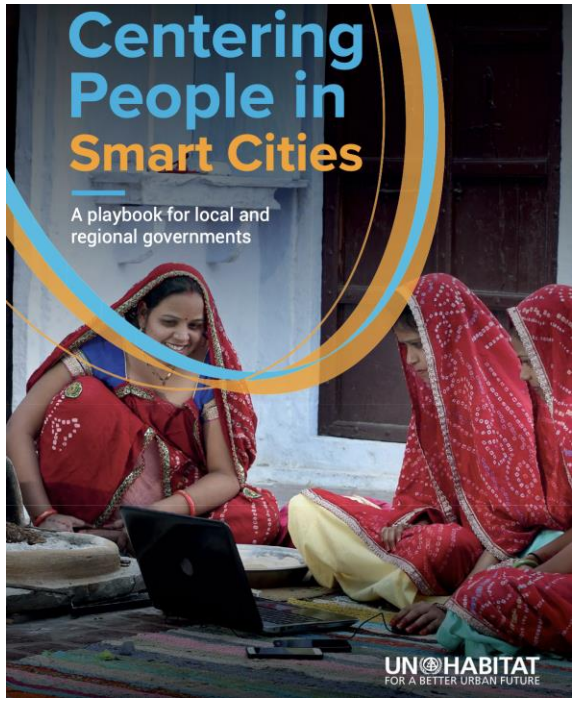
UNITAC is part of UN-Habitat's work on digital technologies, data and innovation

United Nations
Office of Information and Communications Technology

UN-HABITAT

hcu HafenCity Universität Hamburg

The people-centred approach



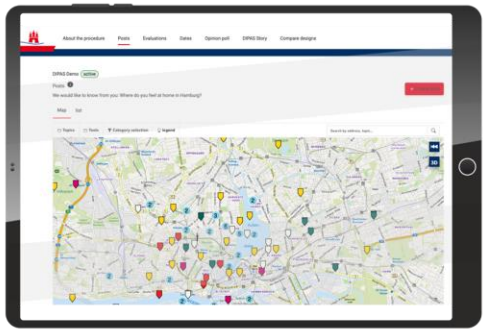
UNITAC HAMBURG
United Nations Innovation Technology Accelerator for Cities

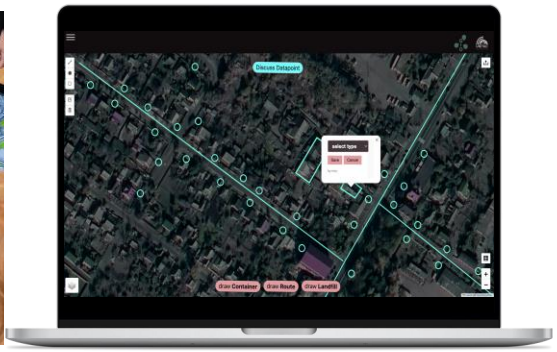
UN-HABITAT

United Nations
Office of Information and Communications Technology

hcu HafenCity Universität Hamburg

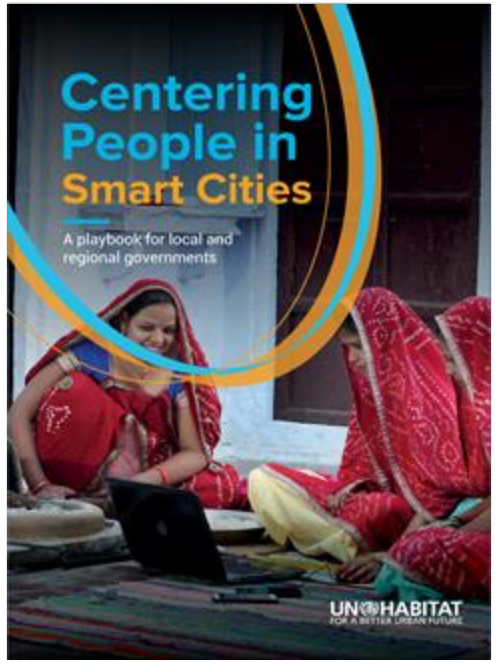
IMPLEMENTING THE NEW URBAN AGENDA



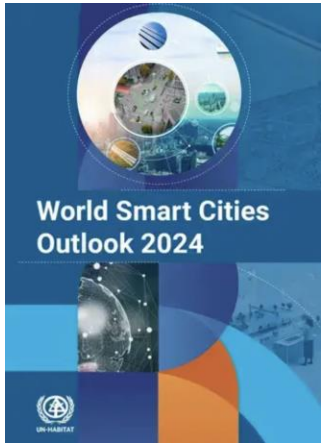


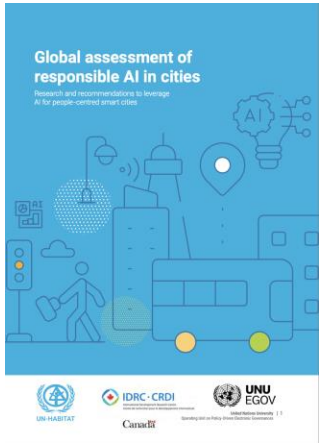
UN-Habitat's work on digitalization, innovation and data

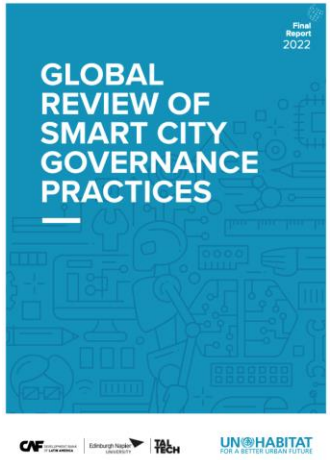
UN-HABITAT



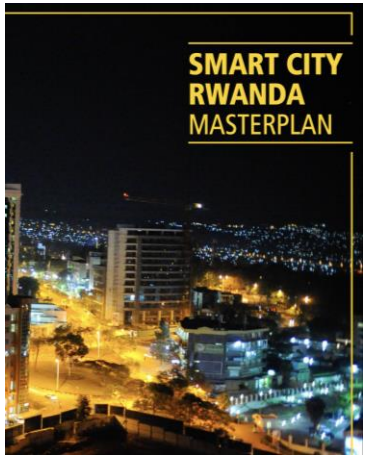
Research and data collection



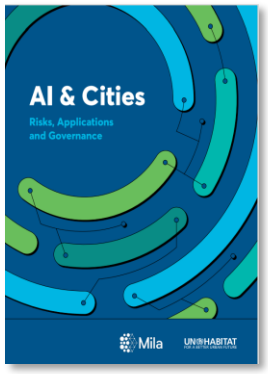


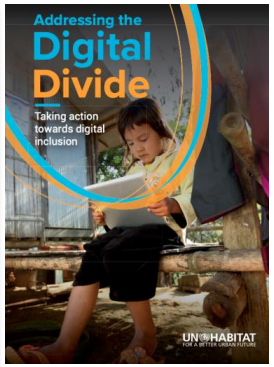


Technical support



Capacity development





Events & advocacy

Climate Smart Cities Challenge

UNITAC HAMBURG
United Nations Innovation Technology Accelerator for Cities

HAMBURG UNITAC

How do we work?

UNITAC approach

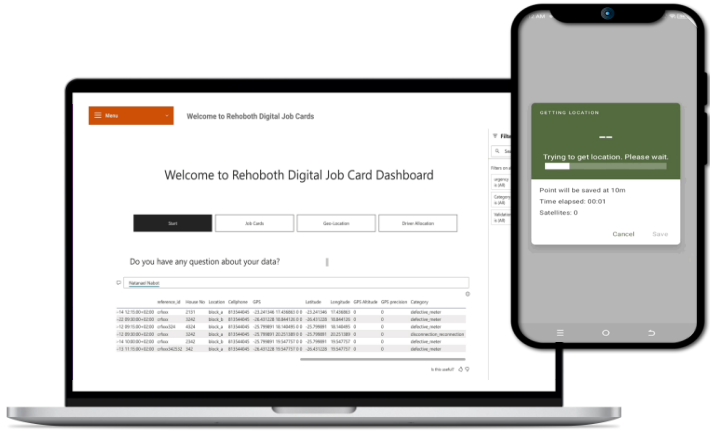
United Nations
Office of Information and
Communications Technology

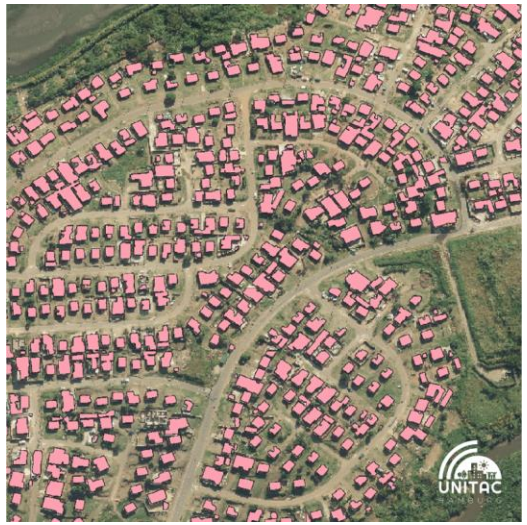
UN-HABITAT

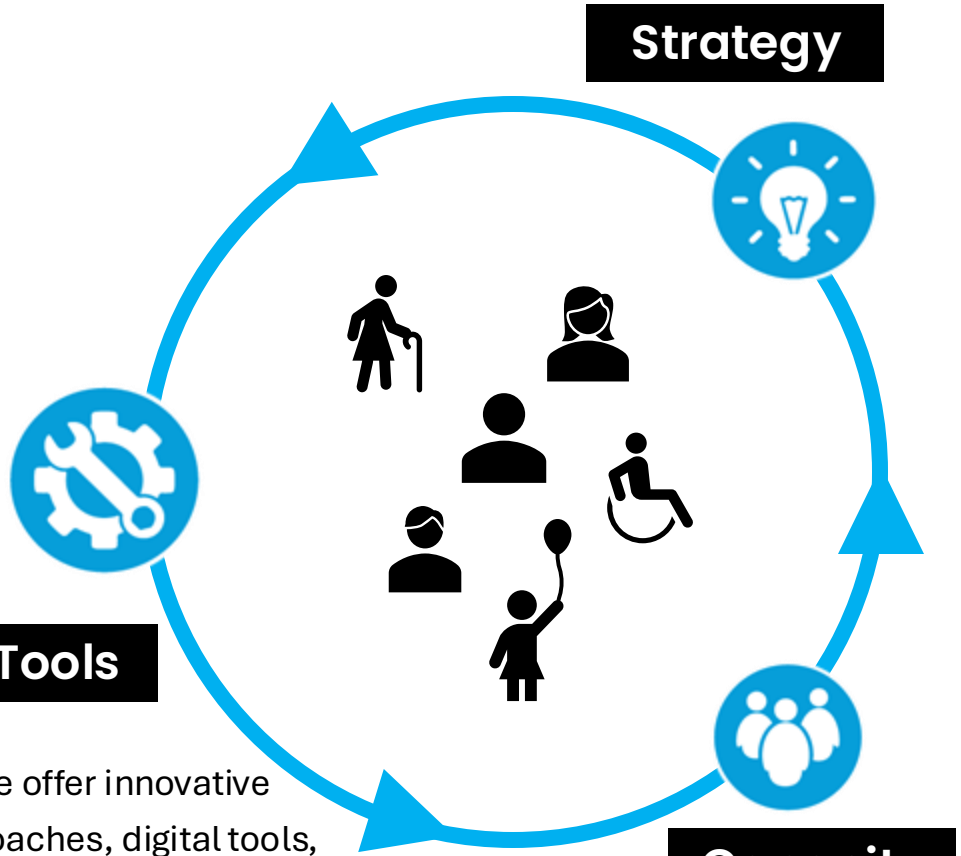
hcu HafenCity Universität Hamburg

UNITAC approach

We analyze and provide technical expertise on urban digital transformation, data strategies and digital governance frameworks.





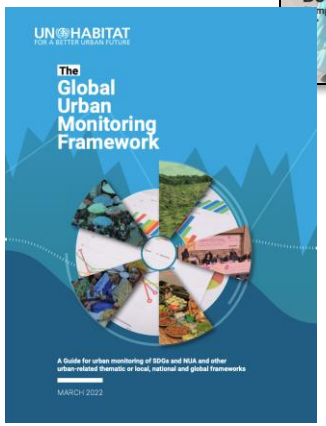


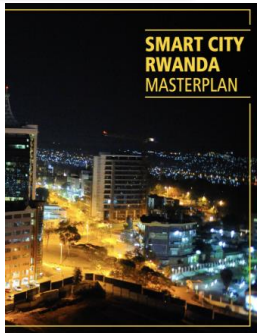
Tools

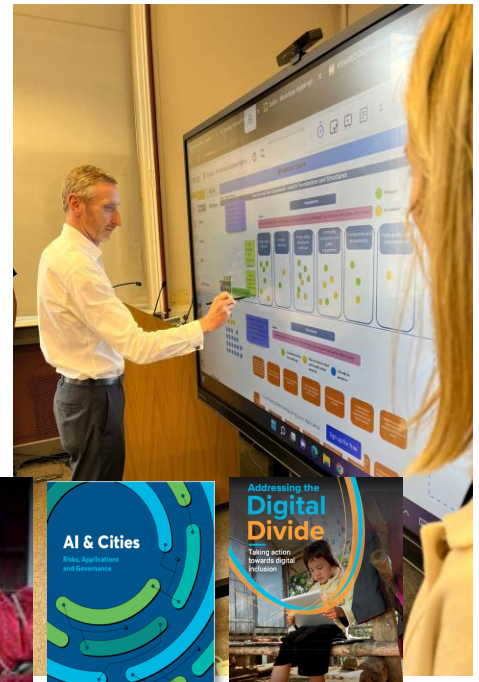
We offer innovative approaches, digital tools, and data platforms.

Capacity

We offer practical training, knowledge exchange and technical support.







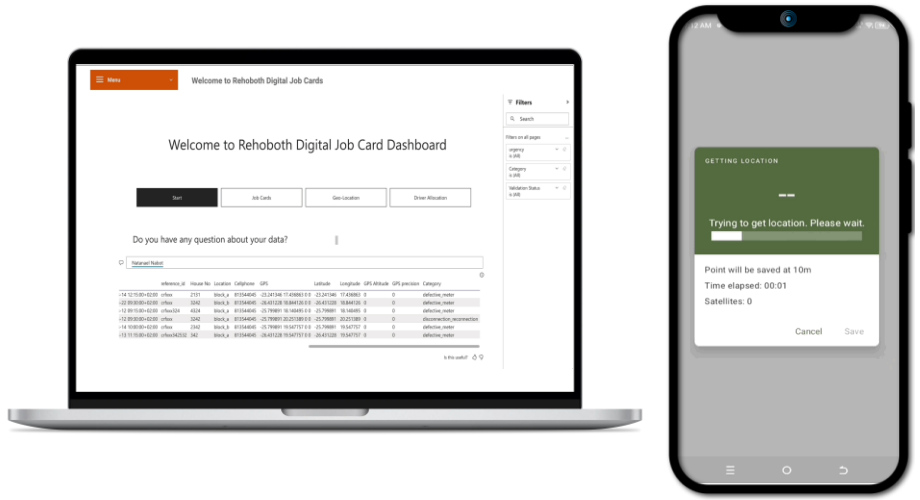
UNITAC tools

Adequate housing & land

- **BEAM (Building and establishment automated mapper)**
- Predictions in **Cape Town, eThekwini, and Guatemala City**

- Mapping of settlements with machine learning
- Data collection and validation, automation of structure numbering with satellite imagery in **Namibia**

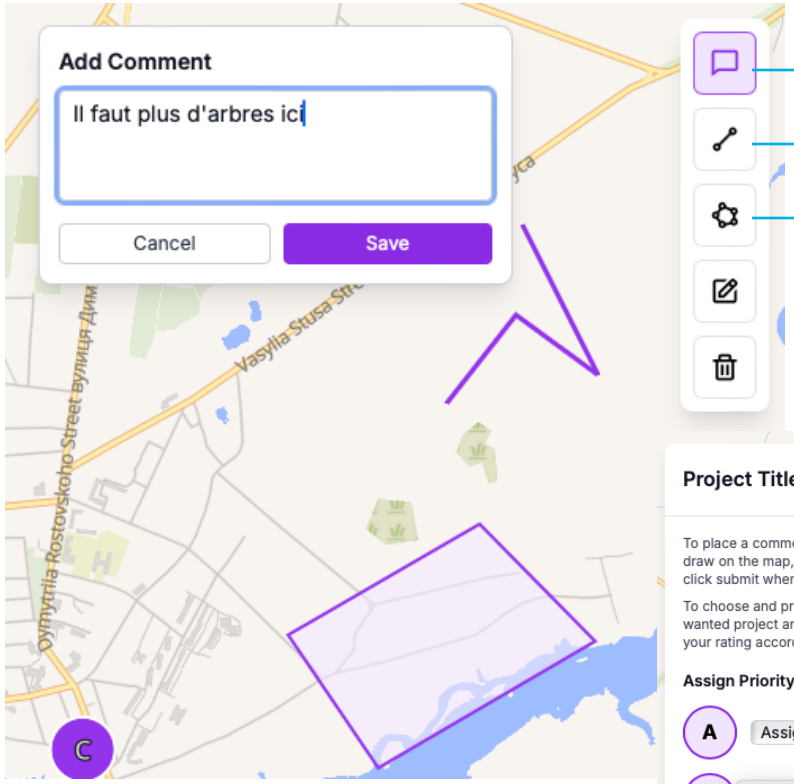
Basic services



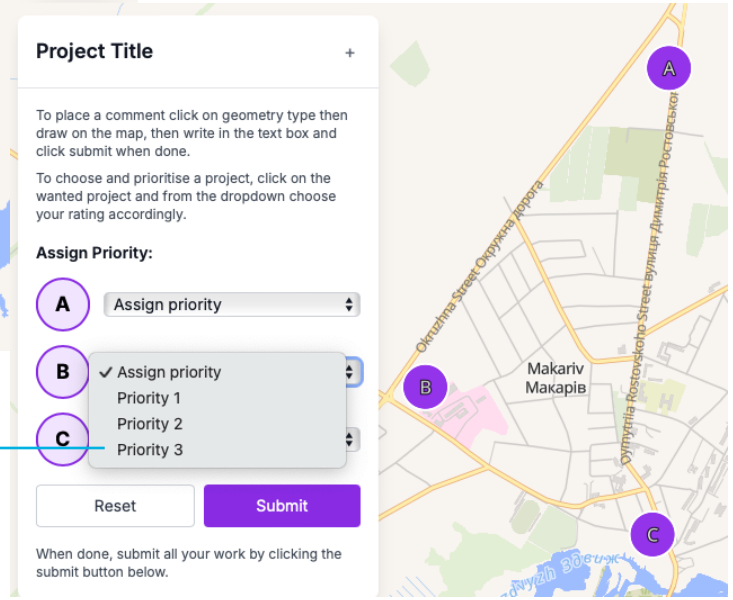
Digital Job Card: Templates and dashboards according to reporting needs (**in Namibia, with National Statistics Agency)**

UNITAC tools

Participatory multi-level governance



Location-based feedback with points, polygons and lines



Prioritization of project locations based on community input

AOVI app: inclusive policymaking, contributing to agenda setting, consultation and idea generations, in Brazil.

Users can **agree** or **disagree** with other entries

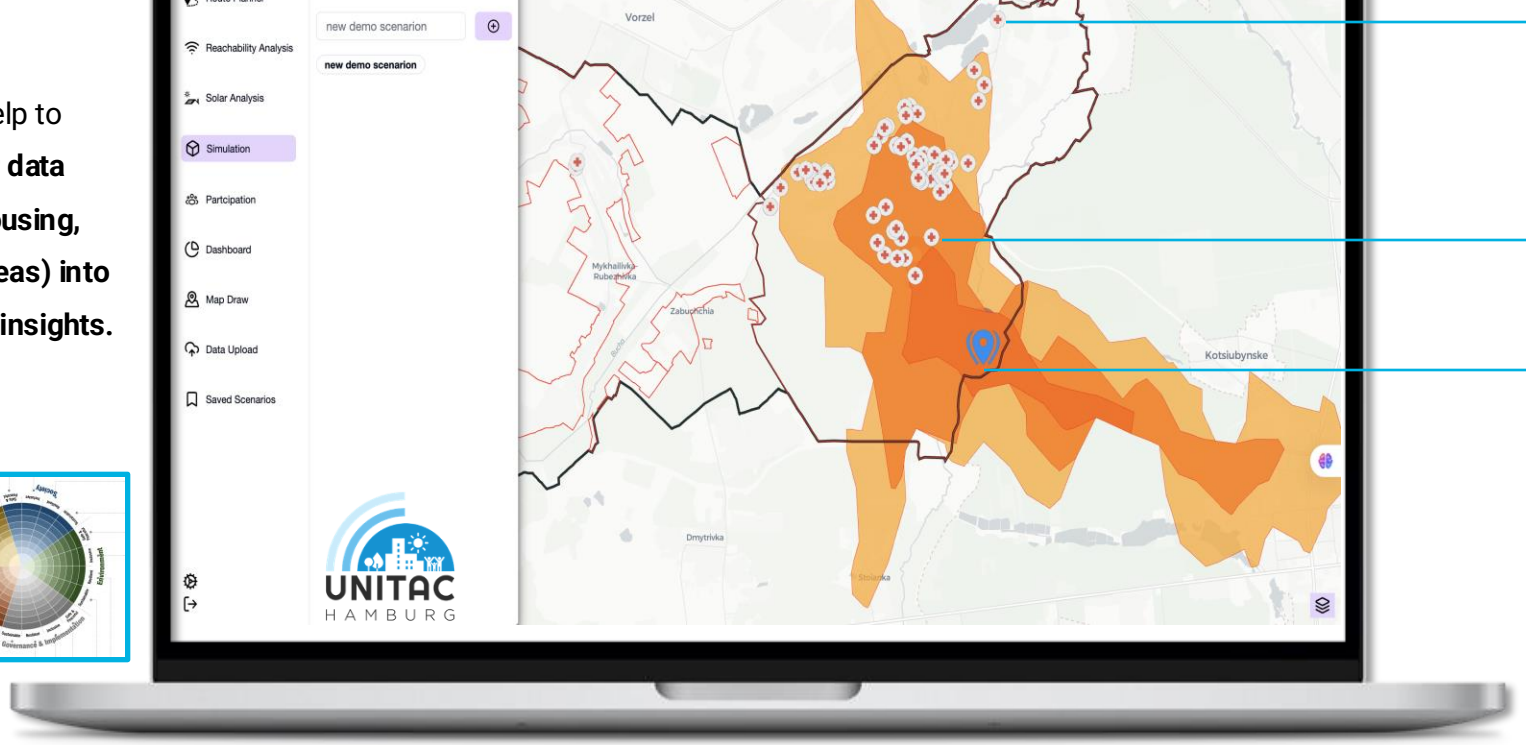
User can write ideas, suggestions, comments, reflections

UNITAC tools

Spatial decision support systems (SDSS)

These tools allow city planners, city managers and policymakers to gauge general city conditions, or elements such as the socio-economic, environmental impact or competitiveness of the city

Spatial systems help to **translate indicator data (e.g., access to housing, services, green areas) into actionable spatial insights.**



Adequacy of housing, and accessibility to basic services

Access to public space and green areas and health and education facilities

Access to public transport

- Image: SDSS developed by UNITAC for urban recovery and reconstruction to assess of damages, visualization of sectoral data, planning analysis and monitoring of data over time, in Ukraine with four municipalities in Irpin, Makariv, Drohobych and Kamianets.

HAMBURG UNITAC

Centering people in urban digital twins

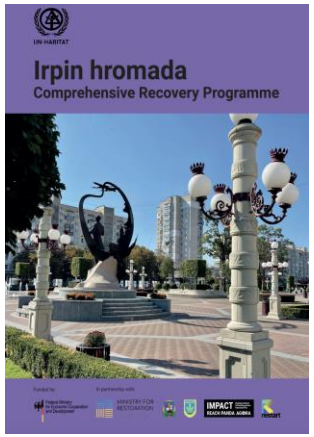
UN-HABITAT

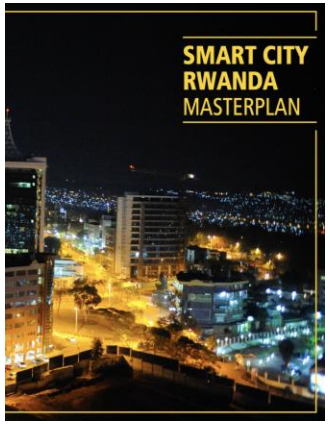
UNITED NATIONS
OFFICE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

hcu HafenCity Universität Hamburg

Start with urban challenge: a needs-driven approach

Directionality approach and mission-oriented innovation





Core Values

1 A tool for local governments

Value 1: Smart city technology is not a solution, but rather a tool that can help local governments address complex social, economic and environmental challenges.

2 Public interest

Value 2: Smart city technologies are most effective when evaluated using an equity lens, and for their ability to serve a clearly specified public interest.

3 Community involvement

Value 3: Residents should be involved in the determination of smart city goals and the evaluation of a technology's ability to meet their own needs.

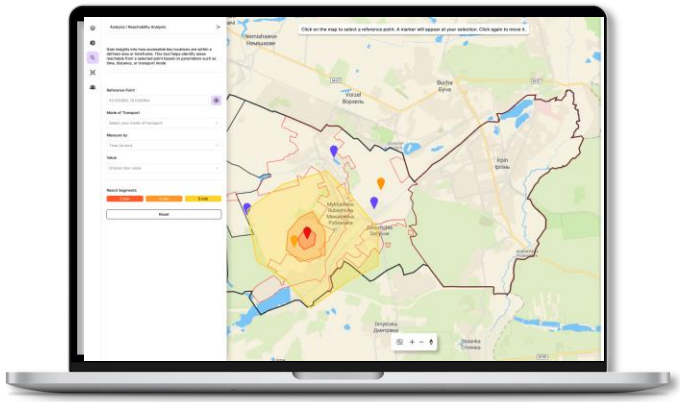
IMPLEMENTING
THE NEW
URBAN AGENDA

SUSTAINABLE DEVELOPMENT GOALS

Start with urban challenge: a needs-driven approach

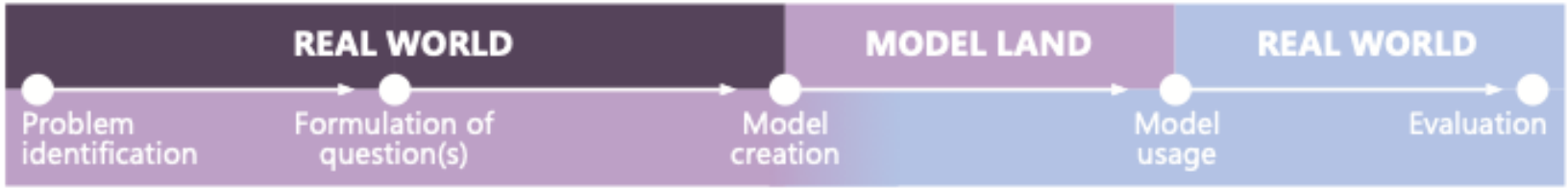
UN-Habitat's Strategic Plan: Adequate housing and basic services for all

ADEQUATE HOUSING AS A CATALYST ACROSS THREE IMPACT AREAS

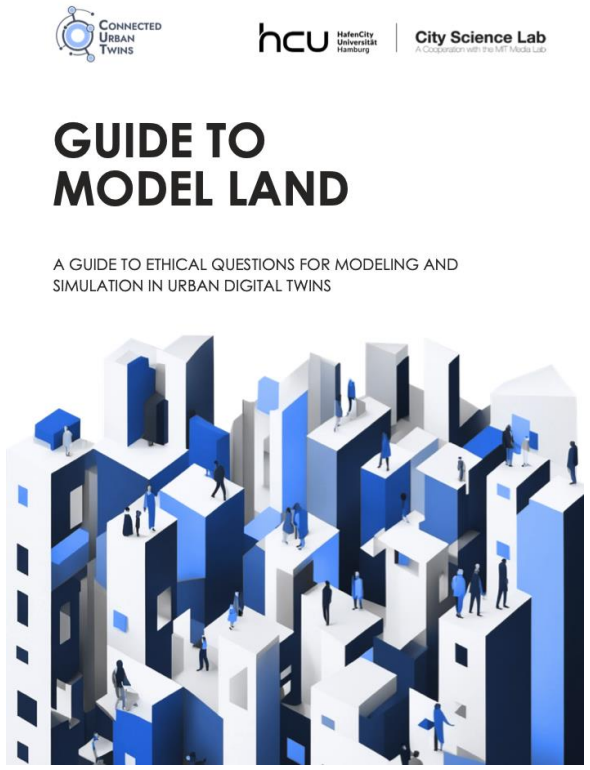


Start with urban challenge: a needs-driven approach

Setting the stage for simulations and models



Problem identification	- How was the problem brought to attention? - What data underlies the problem identification? - What is the scale of the problem? - Have similar problems already been modeled? What perspective do they take on the problem? - Were crucial parameters overlooked in existing problem treatments?
Formulation of question(s)	- What is an appropriate framework for narrowing down the question? - Are there multiple questions related to the same problem? - Should these questions be modeled in a single model or in multiple models? - Which areas are indirectly related to the problem? - Are they important to consider?
Conceptualizing the process	- What is the purpose of the model? - Who is involved? - Which parameters are relevant? What uncertainties exist? - Which parameters are intentionally omitted and why? - How is data collected, stored, used, structured, visualized, and provided? - Should the model be qualitative, semi-quantitative, or quantitative? - What technological means are used? Is AI being employed? - What theories underpin the modeling of social structures?
Model creation	- How are social values, human behavior, and emotions translated into code? - How are subjective and individual experiences meaningfully translated and incorporated? - How relevant are they to a central/general problem? - How flexible and reusable is the code? - How is the model validated and verified?



Canvas exercise:
Start with urban challenge: a needs-driven approach

Is my strategic direction clear?

What communication channels or infrastructure can I leverage?

How is my strategy, mission, goals communicated in my organization and to external stakeholders?

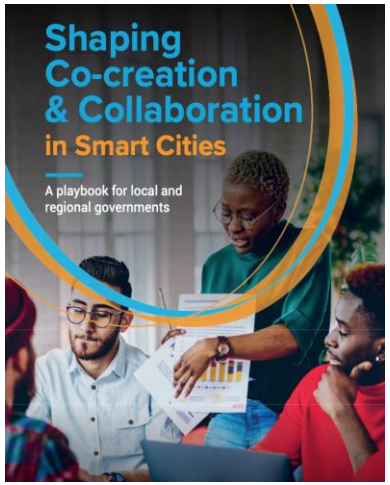
Who was involved in my UDT conceptualization and development?

Other thoughts?

Centering people in urban digital twins

Co-creation and collaboration

- Agenda setting, deliberation, feedback loops
- Contributions to policy making
- Co-creation of vision, purpose, objectives
- Information and literacy
- Relevance for public policy
- Community mapping and data validation



Centering people in urban digital twins

Example: Reallabor Tracker

- The team presented the project during a local youth congress to encourage young adults from the city to download the “Reallabor Tracker” app on their smart phones.

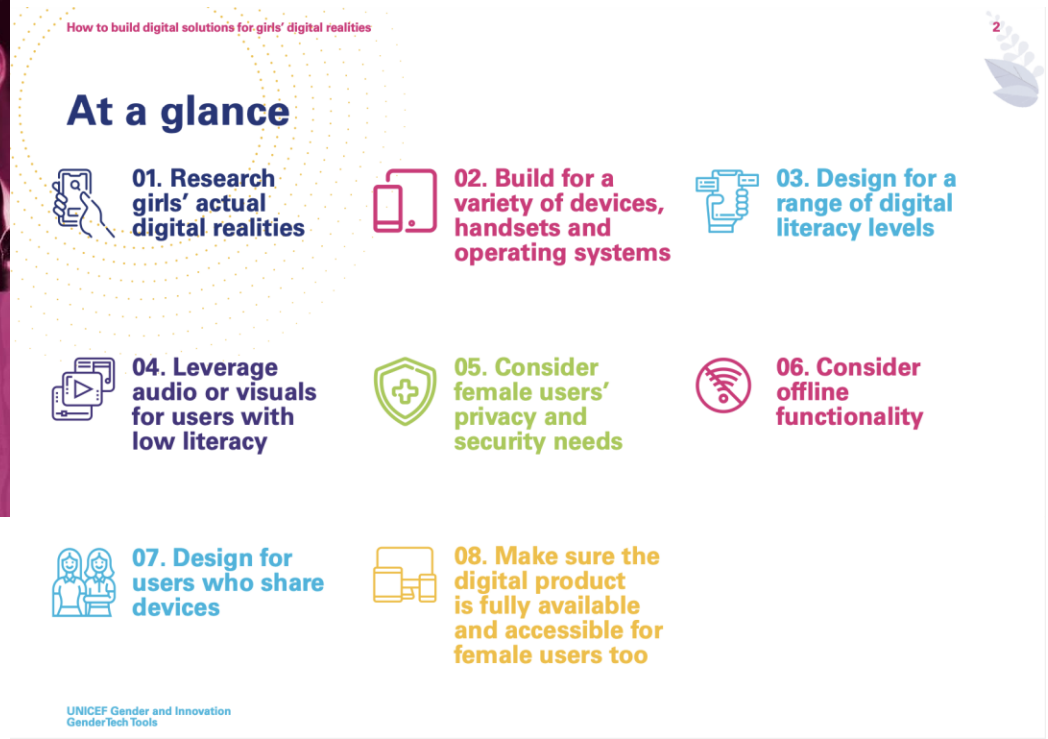
- The app was designed as a “volunteered geographic information” application, encouraging users to submit how they feel in certain locations or whether they regularly see heavy traffic congestion or pollution in a particular area.

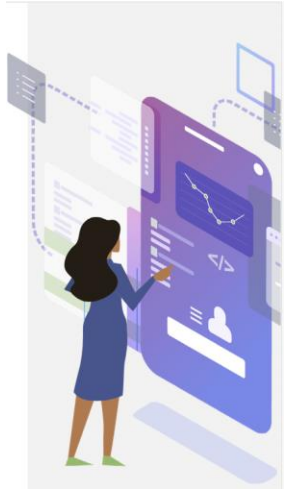
- High-Performance Computing Center Stuttgart (HLRS)

The digital twin for Herrenberg was exposed to approximately 1,000 citizens using a mobile and stationary Virtual Reality environment. (Photo: Fabian Dembski)

Centering people in urban digital twins

Diversity and inclusion of population groups





Centering people in urban digital twins

Citizens engagement with urban data initiatives

- Study with 11 European cities
- Challenges the idea that individuals are passive producing data and suggests that people is more aware and able to be active in urban data governance

Receiver of information	Data collection	Skilled re-users	Public consultation	Data literacy initiatives
Communication of initiatives, plans or data	Community mapping	Hackathons	Contribute with ideas, feedback, suggestions	Awareness campaigns
Transparency portals	Citizen science, sensing kits (water meters)	Challenge competitions	Propose projects	One-day camp
				Fairs

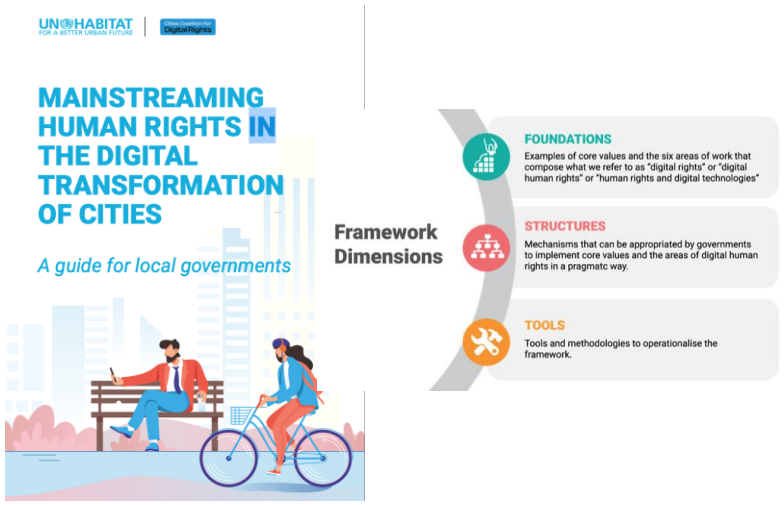
Centering people in urban digital twins

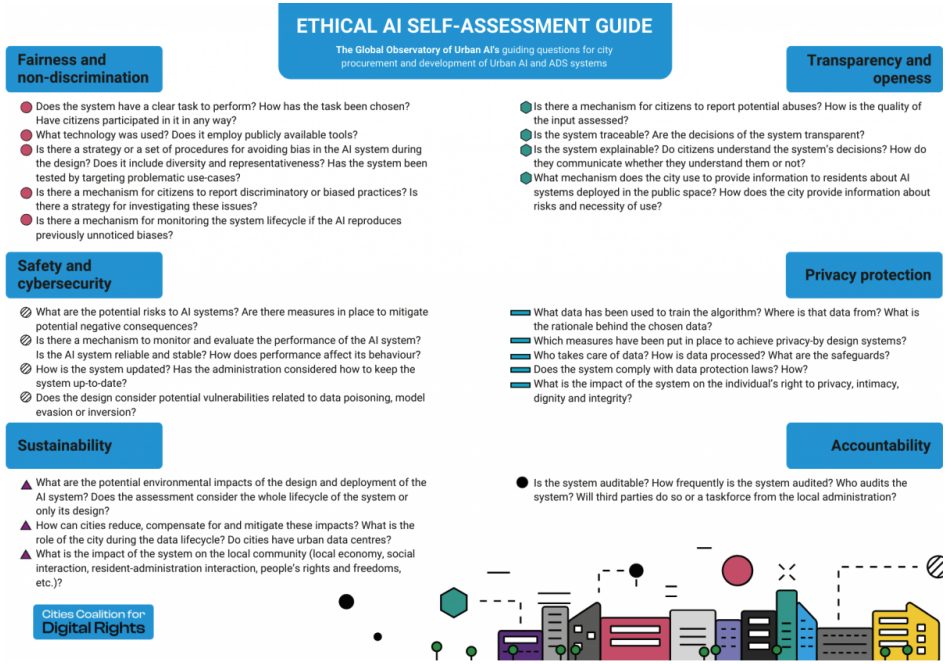
PEOPLE POWERED
Global Hub for Participatory Democracy

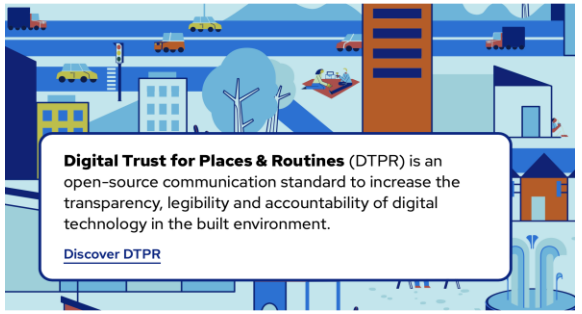
Digital Participation Resources

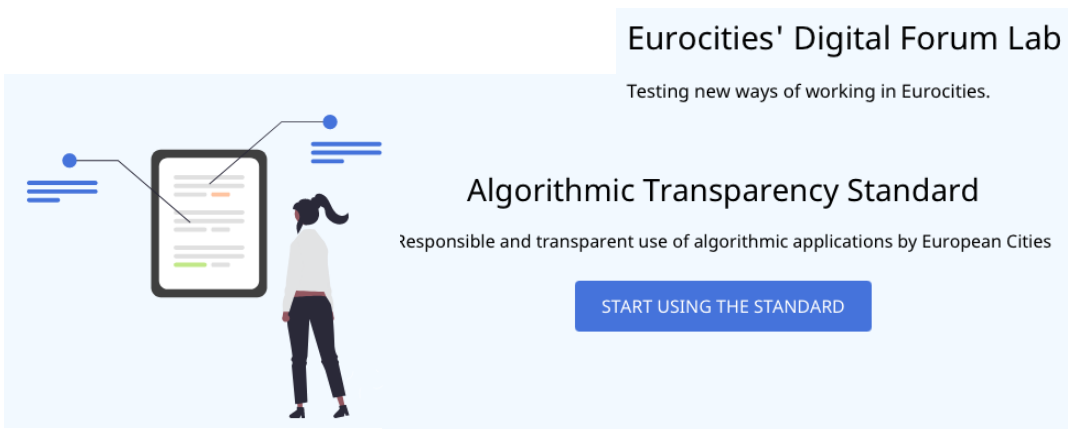
Centering people in urban digital twins

Human rights and ethics





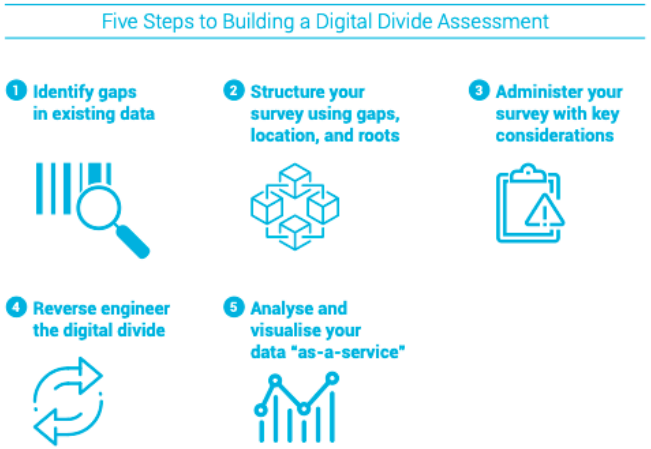


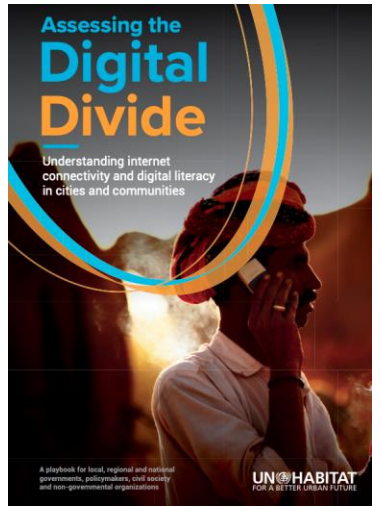


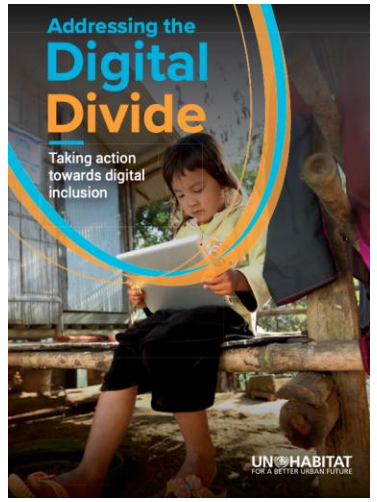
Centering people in urban digital twins

Data gaps and lack of representation

Without meaningful connectivity, smart city projects will leave behind those who doesn't have access to devices, connectivity or literacy.







Centering people in urban digital twins

Qualitative data visualization

ARTICLE | Open Access

Creating stories for impact: Co-producing knowledge with young people through story mapping

Lorraine van Blerk, Janine Hunter, Wayne Shand, Laura Prazeres

First published: 29 June 2022 | https://doi.org/10.1111/area.12816 | Citations: 4

https://rgs-ibg.onlinelibrary.wiley.com/doi/full/10.1111/area.12816

- Overlay household survey indicators spatially: add interview locations or zones, and embed narrative pop-ups or story flows.
- Semantic tagging or basic ontology: tag each interview/quote with place(s), theme(s), time etc so that the visualisation can filter by theme.
- Create layers in the UDT for the qualitative data: use participatory/co-creation annotation with participants marking places, notes, photos on the map.
- Interactive map/story-map or 3D viewer (depending on tool access) to allow users to explore quantitative, qualitative and spatial data combined.
- Narrative journeys: show a “path” of a household’s experience (survey → interview → place visit) moving through space and time, and overlay the quote/story.
- User interface: ensure the map doesn’t just show data points, but invites the user to click and reveal “voices” (quotes, photos) and to filter by themes (from interviews/survey).
- Storytelling: You might create a guided “tour” of the twin: e.g., 3-5 story “chapters” (places) where you walk the viewer through a combination of survey results + interview narrative + spatial context.

- Ethical considerations: anonymize or generalize as needed, to avoid exposing households/interviews

Canvas exercise:
Centering people in urban digital twins

How is public participation included in my UDT?

Is there a plan to engage people during the whole system lifecycle?

Are there other population groups that could be engaged?

Is there open data portal or how would people access the results of your UDT initiative?

What standards and practices are in place to protect ethics and huma rights?

Other thoughts?

Capacities for people-centred approaches

Capacities to leverage opportunities and mitigate risks

GOAL #1 Target and address common barriers to digital transformation capacity

GOAL #2 Set the stage for digital literacy and capacity training.

GOAL #3 Establish key roles in your organisation to champion digital transformation efforts, training and literacy.

Core Values

1 Investing in digital capacity

Value 1: Investing in the digital capacity of city staff in addition to recruiting new talent enhances smart city efforts.

2 Strategic approach

Value 2: Taking a more strategic approach to structuring technology leadership and digital capacity within the organisation is critical for local governments to be able to adapt to the digital era.

3 Leadership commitment

Value 3: Leadership commitment at top levels is necessary for a successful digital transformation.

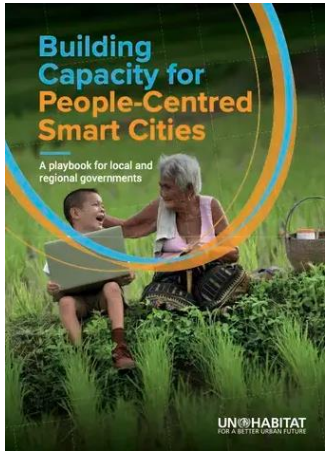


Table 5: Core competencies for public servants

Core competency for public servants	Areas of study
A public servant values the experience of service users and can collaborate with specialists to understand user needs, then design, test and adopt effective solutions.	• User centred design • User testing
A public servant can anticipate and mitigate the privacy, security and ethical risks that are inherent to governing in a digital era.	• Data science basics • Privacy (local laws and international standards) • Cybersecurity • Ethics in AI • Digital Rights
A public servant understands the need to blend traditional public service skills with modern, digital skills, and can effectively work within and lead multidisciplinary teams.	• SCRUM and agile methodology
A public servant understands the importance of iteration and rapid feedback loops and can create a working environment that can continuously learn and improve outcomes.	• Digital services • Performance management and KPIs
Can identify the opportunities to improve government operations, service delivery or policy making and can overcome structural and institutional obstacles to change.	• Procurement
Can use a range of techniques and tools to make government more open, collaborative and accountable.	• Open government • Open digital standards • Open data platforms • Open digital service standards
Understands how to use data to inform decisions, design and run services, and create public value inside and outside government.	• Data analytics tools such as GIS, Tableau, and Ushahidi
Understands the current and evolving affordances of digital technologies and can assess how they can be used to improve public outcomes.	• People Centred Smart Cities Playbook

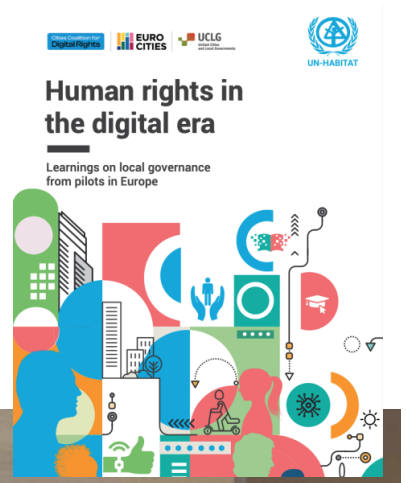
Capacities for people-centred approaches

Expanding institutional capacities

Privacy, transparency and accountability workshop

- Videos on human rights and ethics in digital technologies
- Asking questions to a technology vendor
- Public spaces and privacy concerns
- Values of personal data and trade-offs
- Trust in the organizations

- Cross-functional units
- Group discussions
- Introduction to concepts and fields



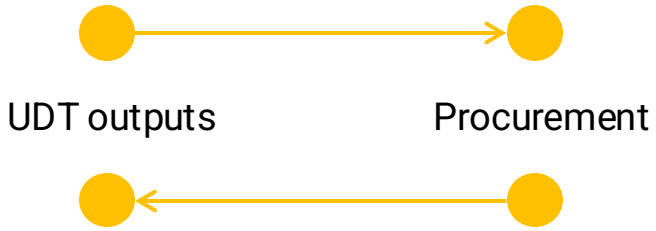
Capacities for people-centred approaches

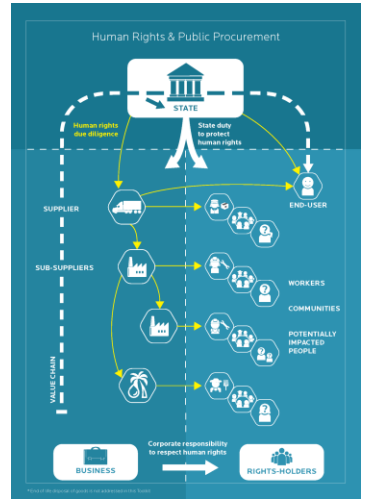
Establishing informed partnerships and services

Cities should prioritize open-standard solutions to avoid vendor lock-in, leverage existing infrastructure and datasets to reduce costs, and adopt incremental approaches rather than attempting fully integrated systems from outset.

Examples:

- Understand potential risks to human rights, data autonomy
- Define a selection criteria structure that can ask the right questions to address risks
- Establish clear guidelines in the partnership conditions with solution providers





European Commission

Procurement of AI

Support public buyers in procuring AI-enabled solutions that are trustworthy, fair and secure.

EU model contractual AI clauses to pilot in procurements of AI

Capacities for people-centred approaches

Collaboration with stakeholders

Cities can use public procurement to drive best practices with suppliers, for instance, to address data governance and human rights concerns when establishing partnerships.

Examples:

- Understand potential risks to human rights, data autonomy
- Define a selection criteria structure that can ask the right questions to address risks
- Establish clear guidelines in the partnership conditions with solution providers

CONNECTED URBAN TWINS

© Angela Pfeiffer

© Angela Pfeiffer

© Angela Pfeiffer

Cities Coalition for Digital Rights

TO PROTECT AND UPHOLD DIGITAL RIGHTS AT THE GLOBAL AND LOCAL LEVEL

EURO CITIES

UCLG United Cities and Local Governments

Cities Coalition for Digital Rights

06/06/25

Cities shaping their digital rights future at the CC4DR Annual Meeting 2025

Read more >

17/04/25

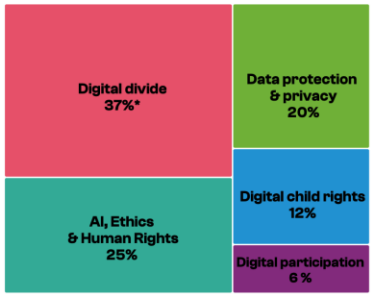
Advocating for ethical digital practices with Alexandra Briem (meet digital rights politicians advocates #1)

Read more >

26/02/25

Developing a rights-based AI governance at city level - Recommendations from the Cities Coalition for Digital Rights

Read more >



Canvas exercise:
Capacities for people-centred approaches

How is the UDT initiative introduced in your organization?

Are there training sessions for training and capacity development? Which ones?

What stakeholders are you engaged directly and indirectly in your work related to UDTs?

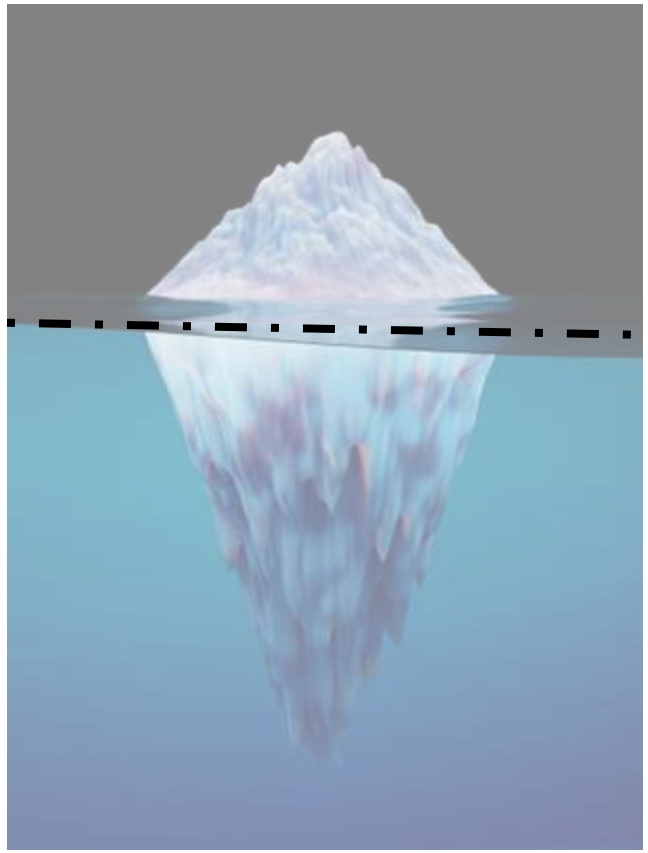
Are there spaces for staff to discuss the UDT developments?

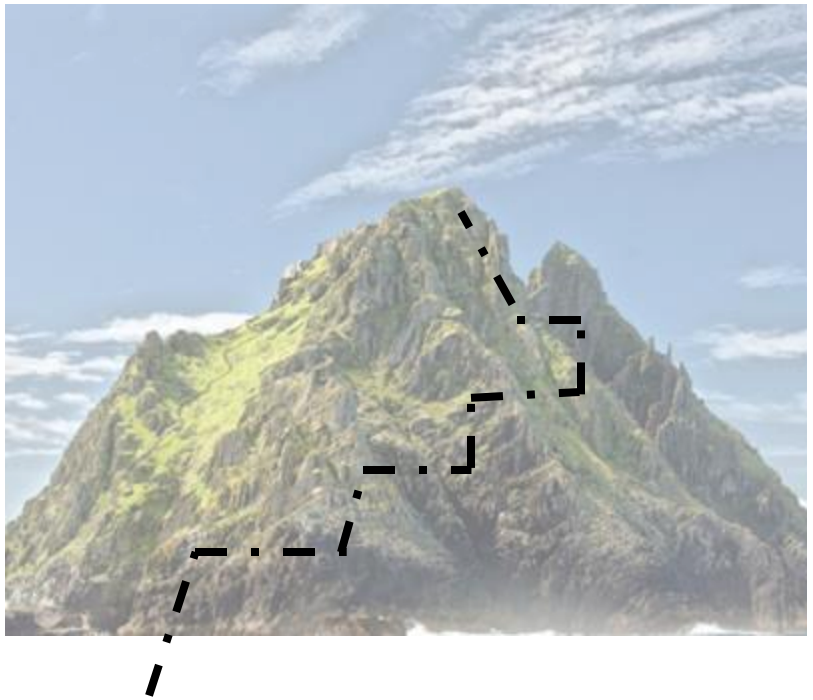
Other thoughts?

From data to policy

Limited understanding of digital twins

Lack of awareness of risks, requirements, digital literacy

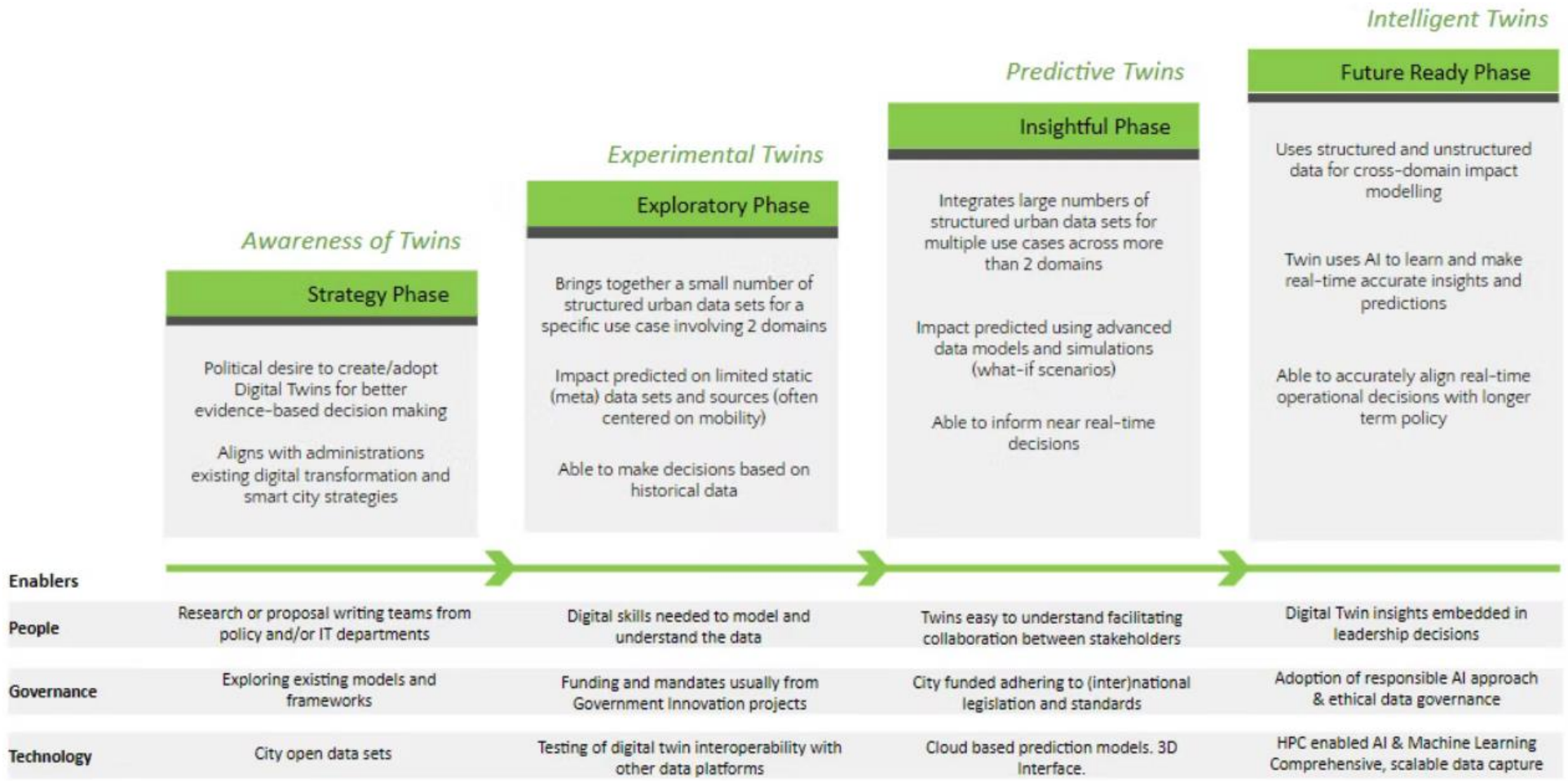




- Informed and strategic approach to UDTs
- Awareness of complexity, step-by-step approach

From data to policy

Digital Twin Maturity Model



Final considerations

Final considerations

Data is not neutral
•What is not seen/collected, will not be visualized or analysed
•Impact caused by lack of representation in datasets
•Bias and discrimination

Data storytelling
•What story is the data telling?
•How accessible or user-friendly a platform or dataset is affects knowledge transfer and understanding of insights

Incremental approaches in capacity development
•Simple visualization or analysis as an entry point for less technical users
•Incrementally increase the complexity of systems
•Introduction of conceptual concepts in practical ways, according to individuals and local contexts

Needs-driven approaches
•Ground the practical applications in real needs
•Build rapport between the tool, data and user

Importance of standard processes
•Communication and feedback loops
•Training and capacities
•Mechanisms for inter-organization collaboration
•Innovation culture

United Nations
Innovation Technology
Accelerator for Cities

United Nations
Office of Information and
Communications Technology

UN-HABITAT

HafenCity
Universität
Hamburg