

from Digital Twinning towards Citiverse

A digital ecosystem needs an interoperable digital infrastructure

UN-ITU Forum on AI and Citiverse: Building the Foundations for
Interoperable, Inclusive and Scalable Urban Innovation

Tampere, September 9th 2026

Municipality of Rotterdam
Roland van der Heijden
Chief Citiverse Officer



Biography Roland van der Heijden

- From origin Urban Planner (RUN, 1997)
- Since 2010 mainly active on data & digital (GIS)
- 2018-2024 Program manager Digital City Rotterdam
- 2025 Program manager Rotterdam Citiverse
- October 1th, 2025: Chief Citiverse Officer Rotterdam



UN Global initiative on Virtual worlds & AI – Discovering the Citiverse: Member Steering Committee (> jun 2025); Co-Lead Track 16 Interoperable Citiverse (> nov 2025)



European Digital Infrastructure Consortium – Network of Local Digital Twins (EDIC – nLDT): Member NL Strategy Board (> sep 2024)

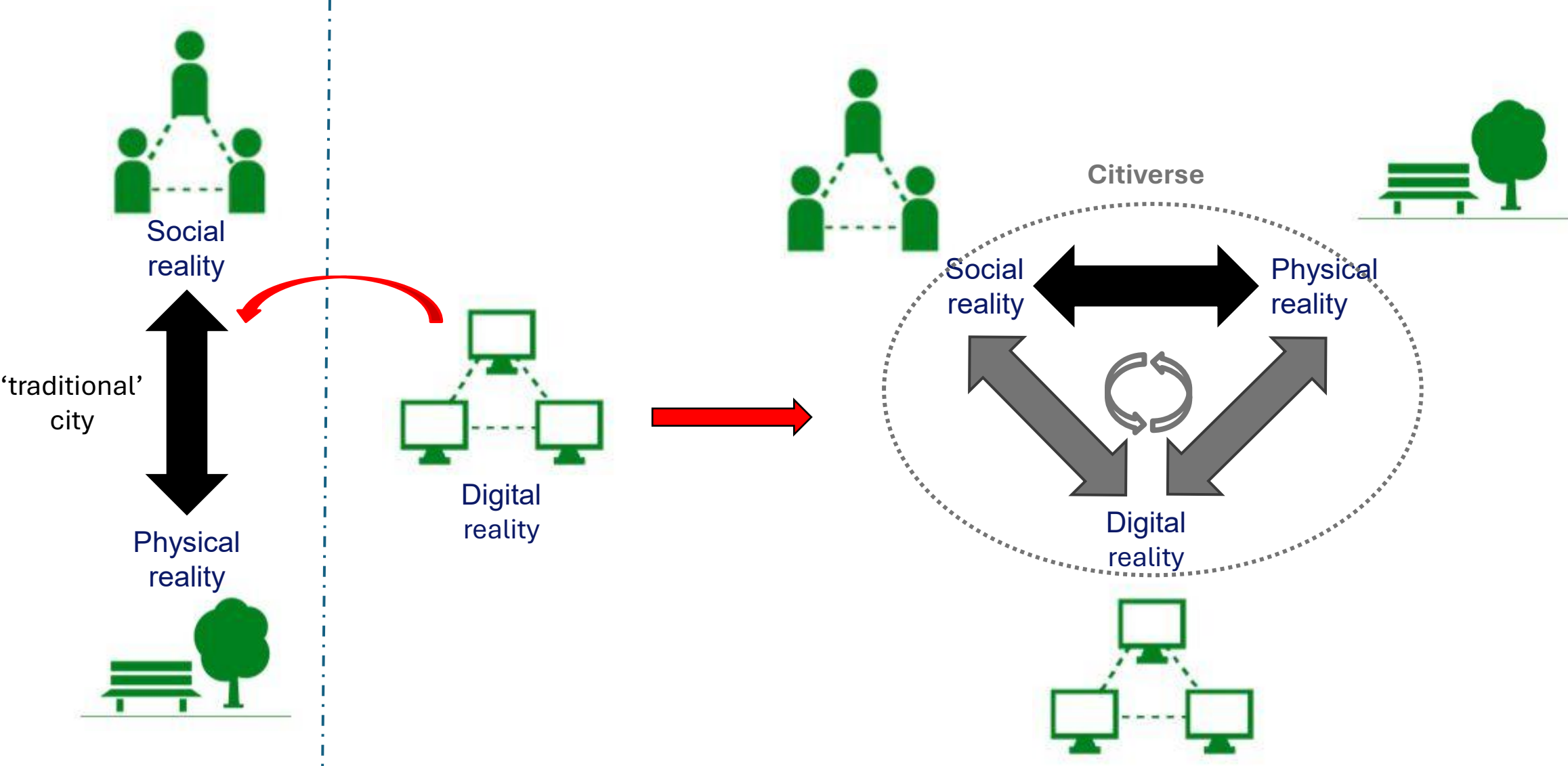


Open & Agile Smart Communities (OASCCities.org): Taskforce Leader Interoperable Citiverse (> aug 2025); Coordinator Council of Cities (aug 2023-jul 2025)

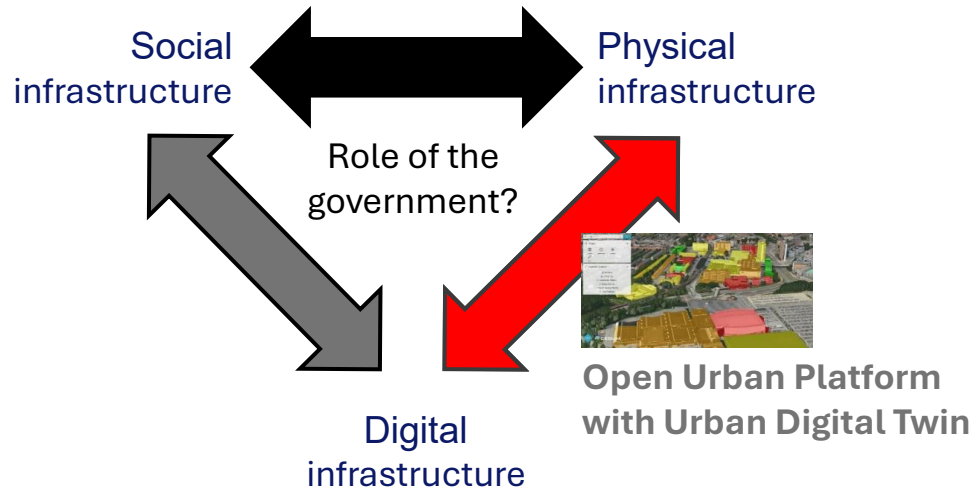
- Hybrid Intelligence Centre - Member Societal Advisory Board (> jun 2025)



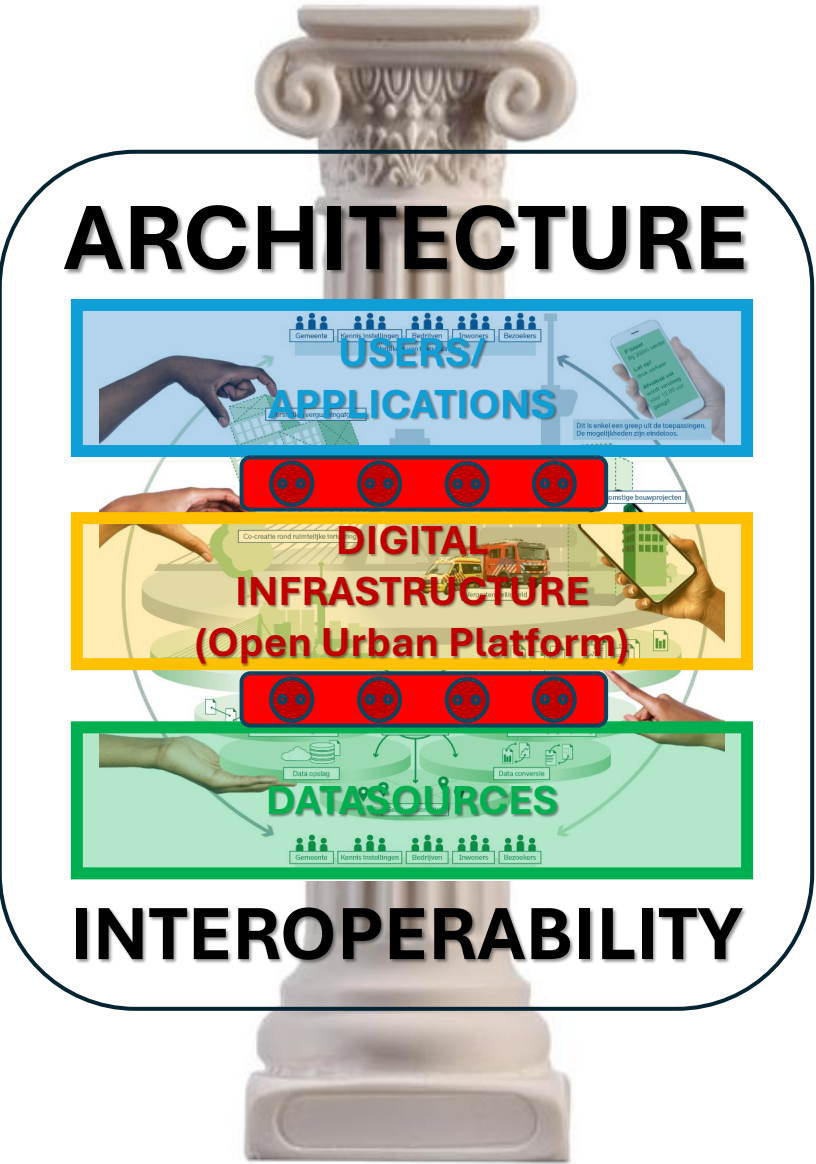
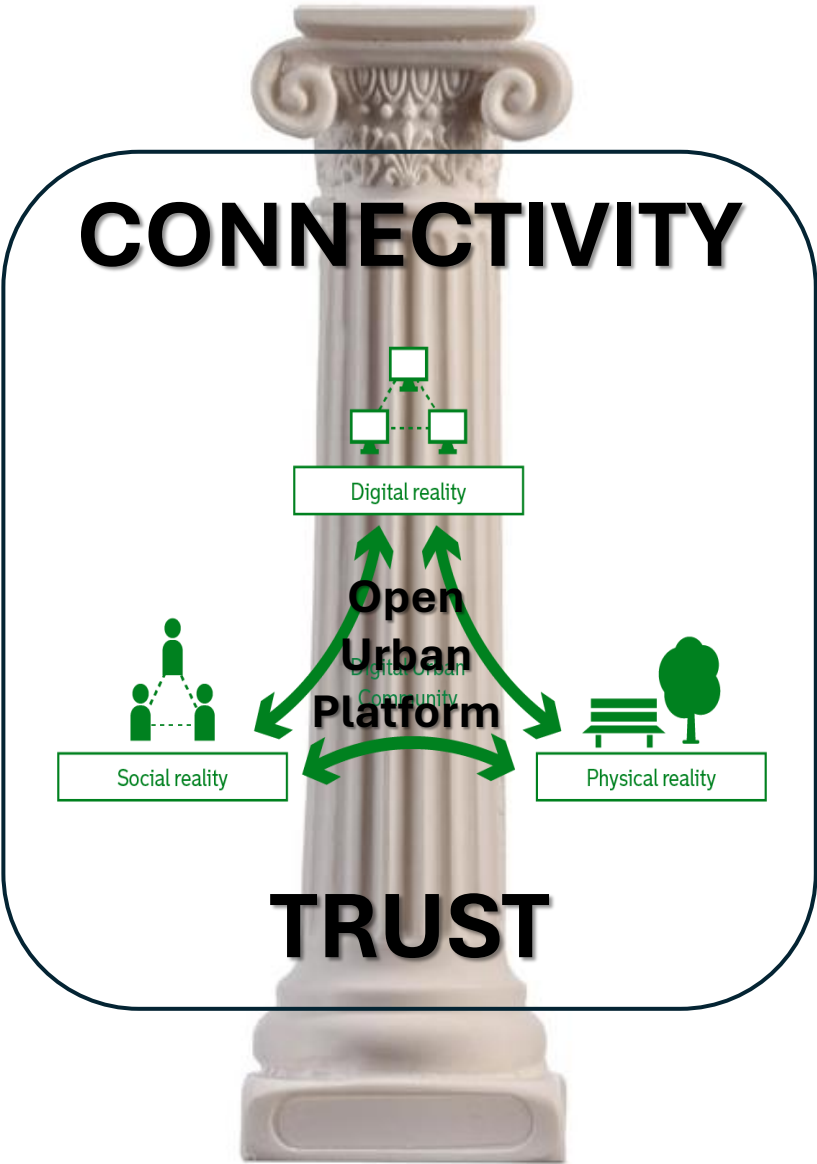
City in transformation – towards a social-physical-digital society



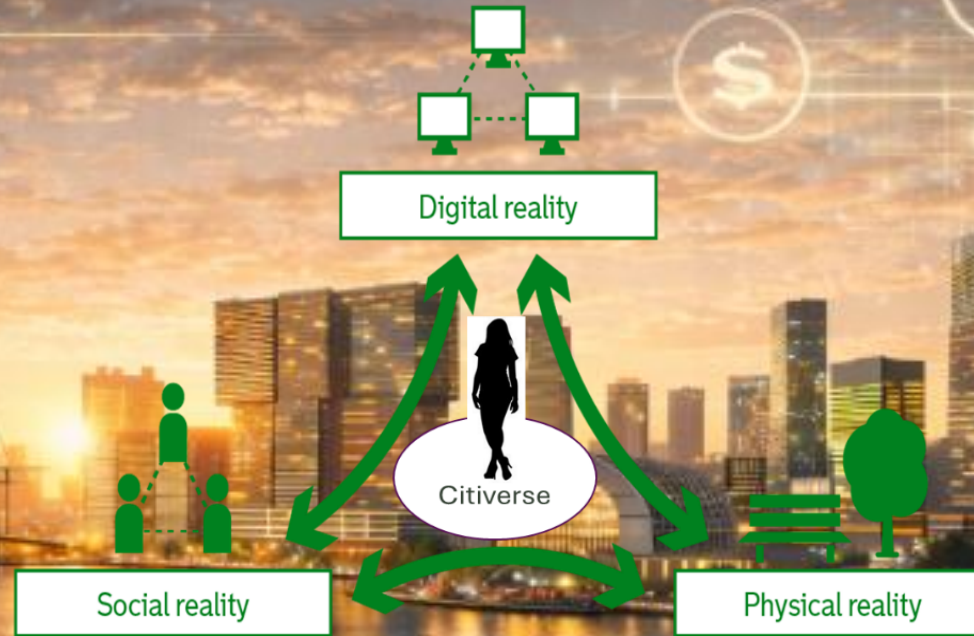
Digital infrastructure and the role of the government



Building up a digital ecosystem: 3 pillars



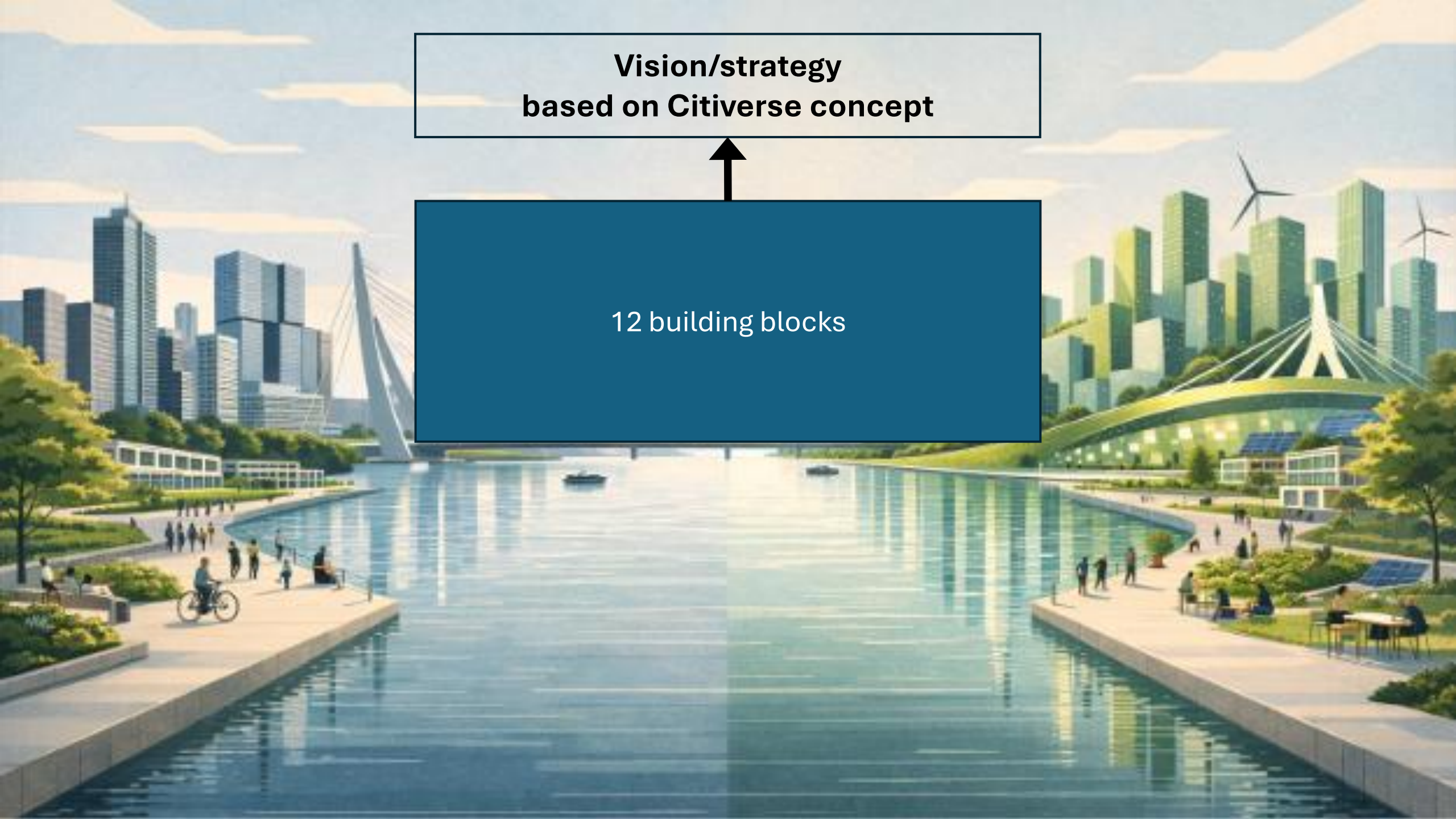
Next step: Towards Rotterdam Citiverse



Human centered concept 'Citiverse'

- Main ambition: creating a resilient city with resilient citizens, companies and institutions through a better understanding of the impact of the digital transformation on our citizens and on the city's ecosystem as a whole.
- The Citiverse ('Citizens Verse') is about understanding how the digital transformation towards a social-physical-digital world (city) impacts the daily life of citizens.
- The Citiverse is seen as a concept to help us understand this movement from a social-physical society towards a social-physical-digital world due to the impact of the digital transformation, and how to keep the citizens in the center of this transformation.
- By better understanding this new social-physical-digital reality, we can anticipate on it and on what is coming towards us in the future (as well better utilize opportunities).
- Main goal: creating a vision & strategy, based on the Citiverse concept.
- Duration: 2025-2027/2028





**Vision/strategy
based on Citiverse concept**

12 building blocks

12 Building Blocks

1

Circular Economy

Optimizing urban resource flows and reducing waste through data-driven collaboration and digital technology to achieve a sustainable and resilient economy.



2

Adaptive Infrastructure

Making vital infrastructure climate-resilient and robust through smart monitoring, simulations, and adaptive management.



3

Port Economy

Strengthening the competitive position of the port through digital integration, real-time collaboration, and sustainable maritime innovation.



4

Future of Education and Skills

Reducing the gap between the labor market and skills through digital learning environments and technological innovation.



5

Youth-Driven Innovation

Actively engaging and empowering young people as co-creators of the city through digital learning environments and technological innovation.



6

Digital Identity and Autonomy

Developing secure and inclusive digital identity solutions that give residents control over their data.



7

(Cyber) Security and Crime

Increasing digital safety and city resilience through smart detection, prevention, and security by design.



8

Socially Responsible Entrepreneurship

Stimulating entrepreneurship that connects social impact and economic value through digital platforms and collaboration.



9

Preventive Healthcare

Promoting preventive care through data analysis and digital technologies to improve health and reduce healthcare costs.



10

Citizen-Centered Public Services

Developing accessible, personalized, and co-creative public services using digital technology.



11

Citizen-Centered (Digital) Public Space

Creating inclusive and livable public spaces through digital co-design and participatory urban development.



12

Sustainable Spatial Development

Achieving sustainable and data-driven spatial growth that supports climate goals and optimally uses scarce space.



**Vision/strategy
based on Citiverse concept**

**4 angles of
approach**

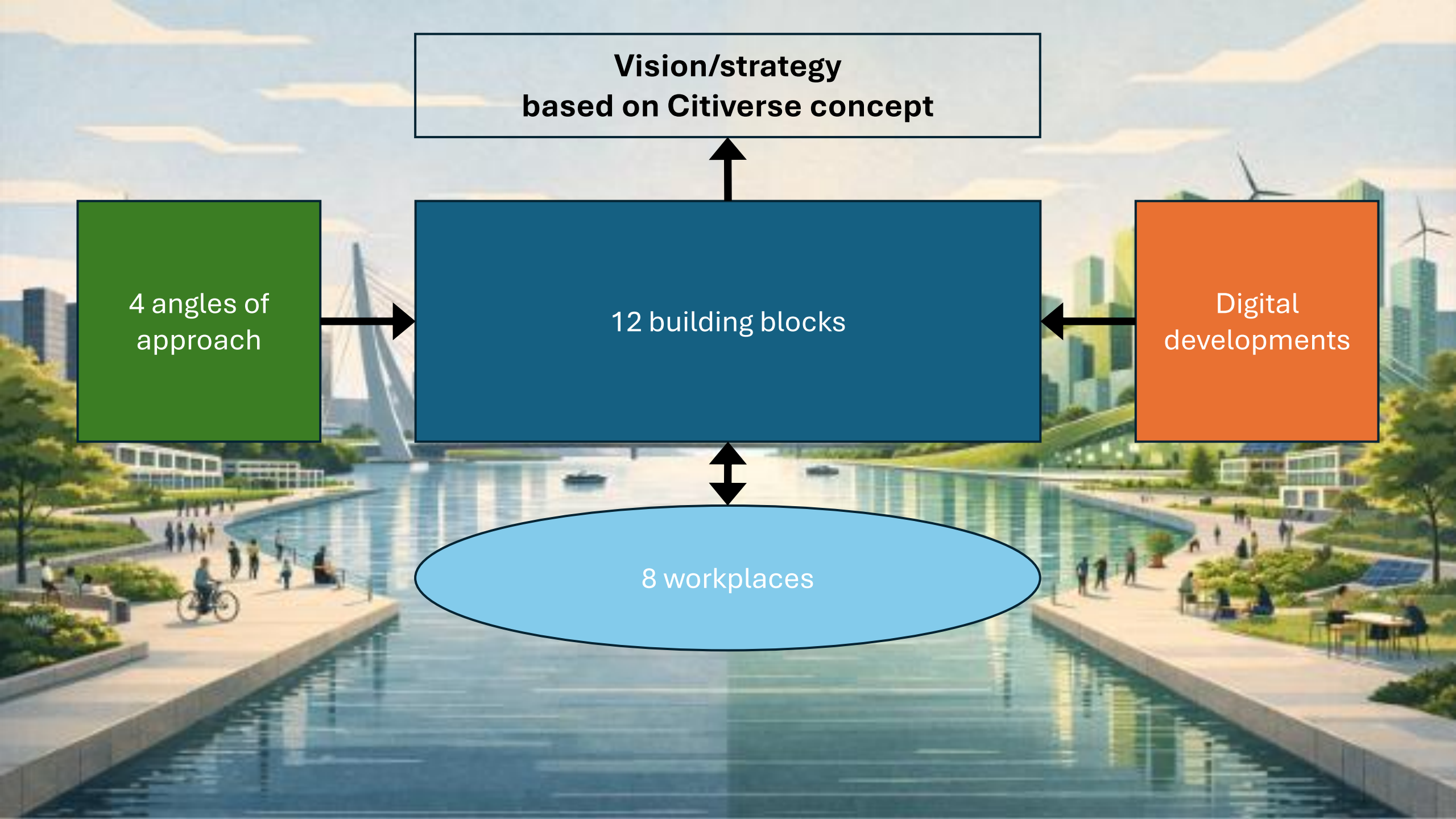
12 building blocks

**Digital
developments**

Four 'angles of approach'

- I. **Digital inclusion & equality**
- II. **Digital economy**
- III. **(Digital) public services**
- IV. **Governance digital ecosystem**
(facilitating role → infrastructure, compliance)





**Vision/strategy
based on Citiverse concept**

4 angles of
approach

12 building blocks

Digital
developments

8 workplaces

Workplaces

Workplace x-CITE



Workplace Ecosystem of Applications



Workplace Digiderius



Workplace Digital identity & autonomy



Workplace Visualisation for Participation & Co-creation



Workplace Future of Education & Working skills



Workplace Harbor & City



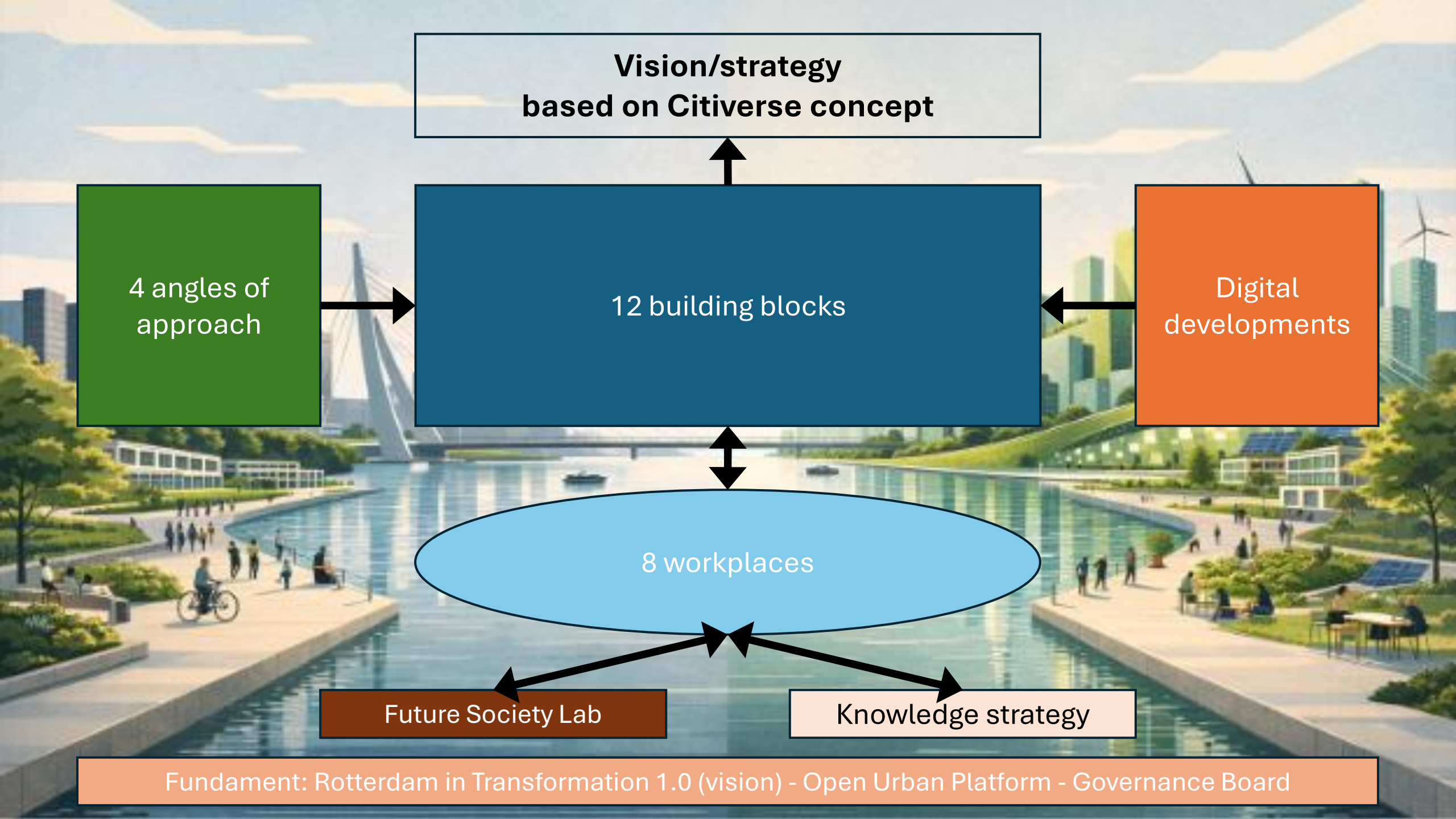
Workplace Youth-led innovation & involvement



Workplace (Preventative) Healthcare

Workplace Urban resilience





**Vision/strategy
based on Citiverse concept**

4 angles of
approach

12 building blocks

Digital
developments

8 workplaces

Future Society Lab

Knowledge strategy

Fundament: Rotterdam in Transformation 1.0 (vision) - Open Urban Platform - Governance Board

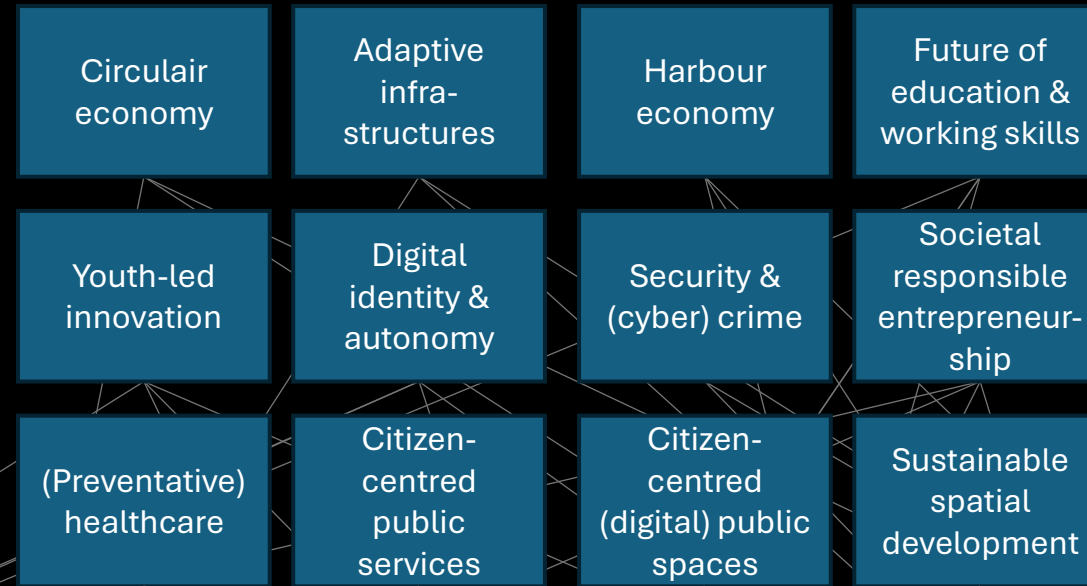
Vision/strategy based on Citiverse concept

- Ongoing(/repeatable) process
- New story on content end 2027 (1th 'milestone')

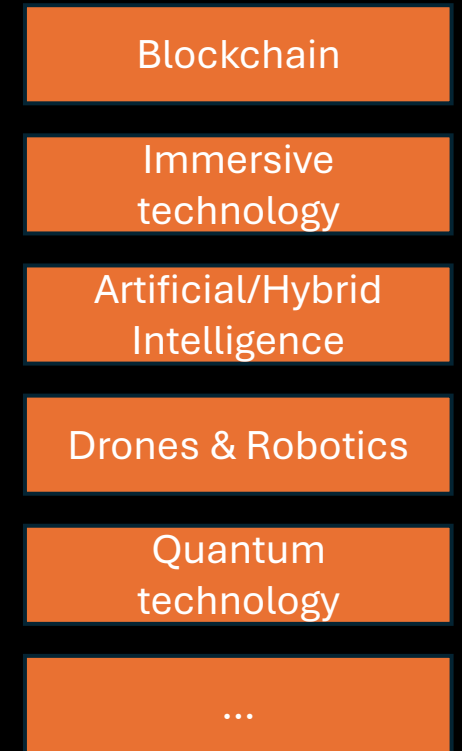
Angles of approach



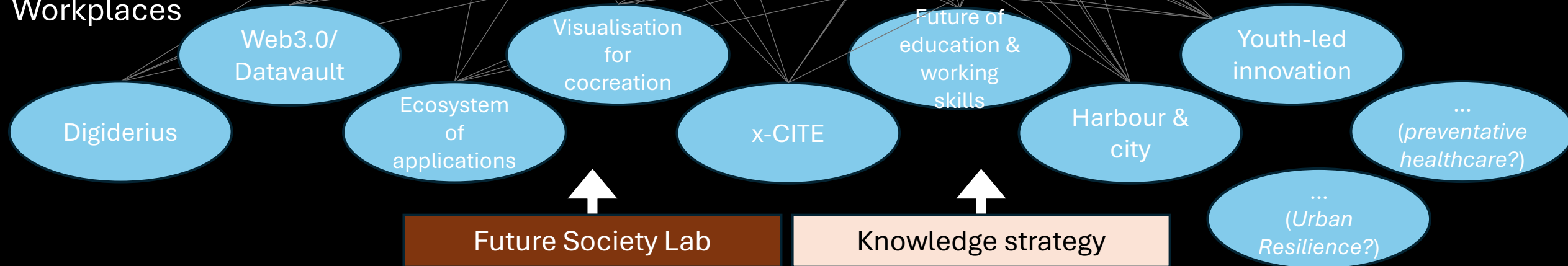
Building blocks

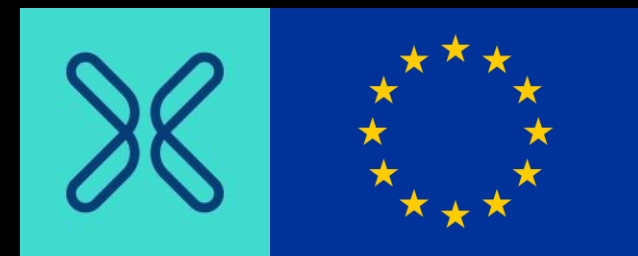


Digital developments



Workplaces





Workplace x-CITE
*physical-digital
neighborhood & school
of the future*

Workplace

Digital identity & autonomy

Identiteit & Autonomie - Visie Citiverse

Onderzoek & kennissysteem



Cross-city usecases



Eén federatieve demonstratie

- Grensoverschrijdend
- Interoperabel
- Schaalbaar voor Europese steden

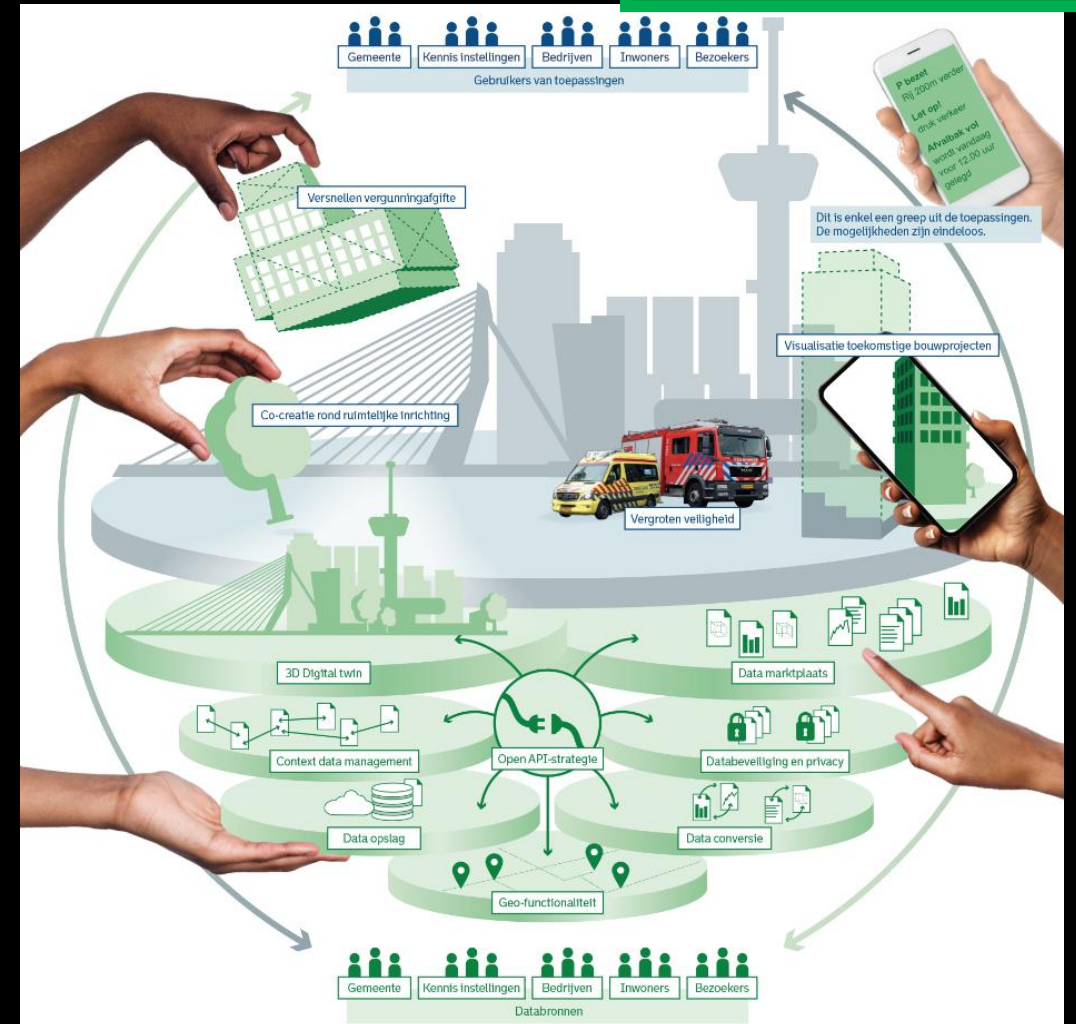
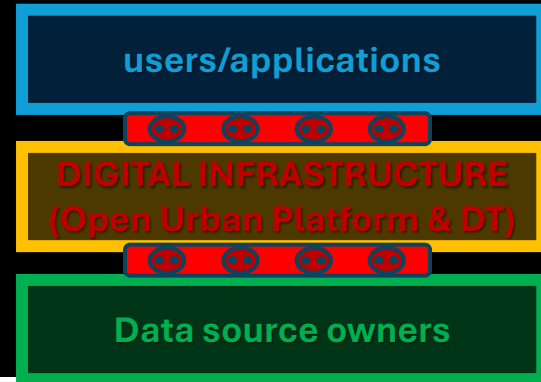


Workplace Ecosystem of applications - the 'digital' challenges

- Digital more and more merging with 'traditional' social-physical city
- Scattered landscape
- Silo-developments
- 'Death by pilots'
- Missing digital infrastructure
- Lacking of public supervision
- Growing digital divide



- Shared reality → Digital Twin
- Shared digital infrastructure → Open Urban Platform
- Common language → open standards, separation of data and applications
- Interoperability principles → European Interoperability Framework
- Governance structure → trust, inclusive and public values
- Ecosystem of applications (appstore+) → network of applications and services working together as a whole



Ecosystem of applications (Appstore+) – Results ‘Rotterdam Weatherwise’ (‘DT a CoGo’)



Contact

Thank you for joining the journey from Citiverse Vision to Strategy & Execution.



Roland van der Heijden

Chief Citiverse Officer
Municipality of Rotterdam

Let's keep building a responsible,
safe, fair and transparent social-
physical-digital world together.

Get in touch →

More info →



Connect on LinkedIn

Scan the QR code

Go to:

www.rotterdamcitiverse.com

www.rotterdam-oup.nl

Mail: CitiverseBCO@rotterdam.nl

[National launch OUP](#)

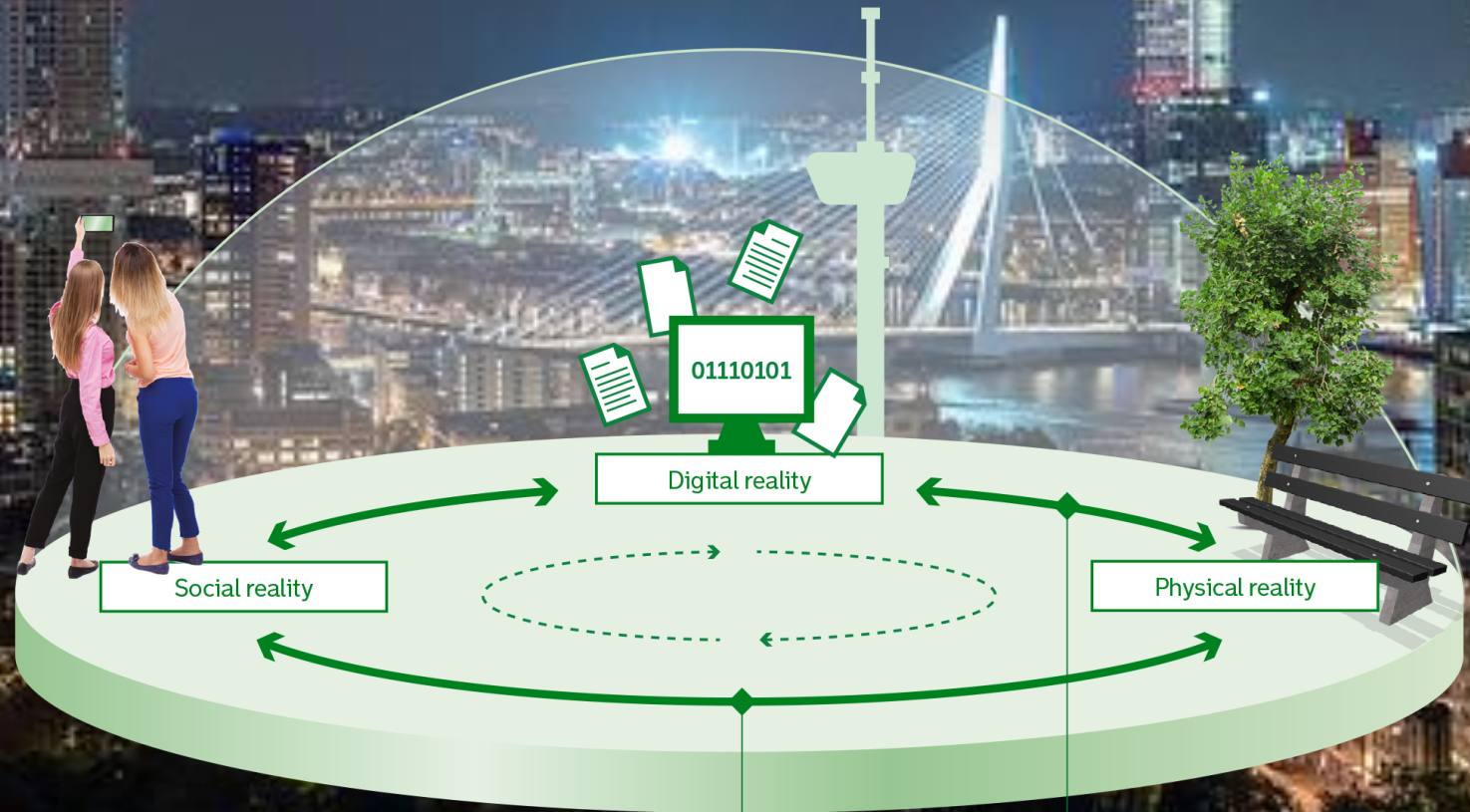
[Open Urban Platform](#)

www.digitaalecosysteem.nl

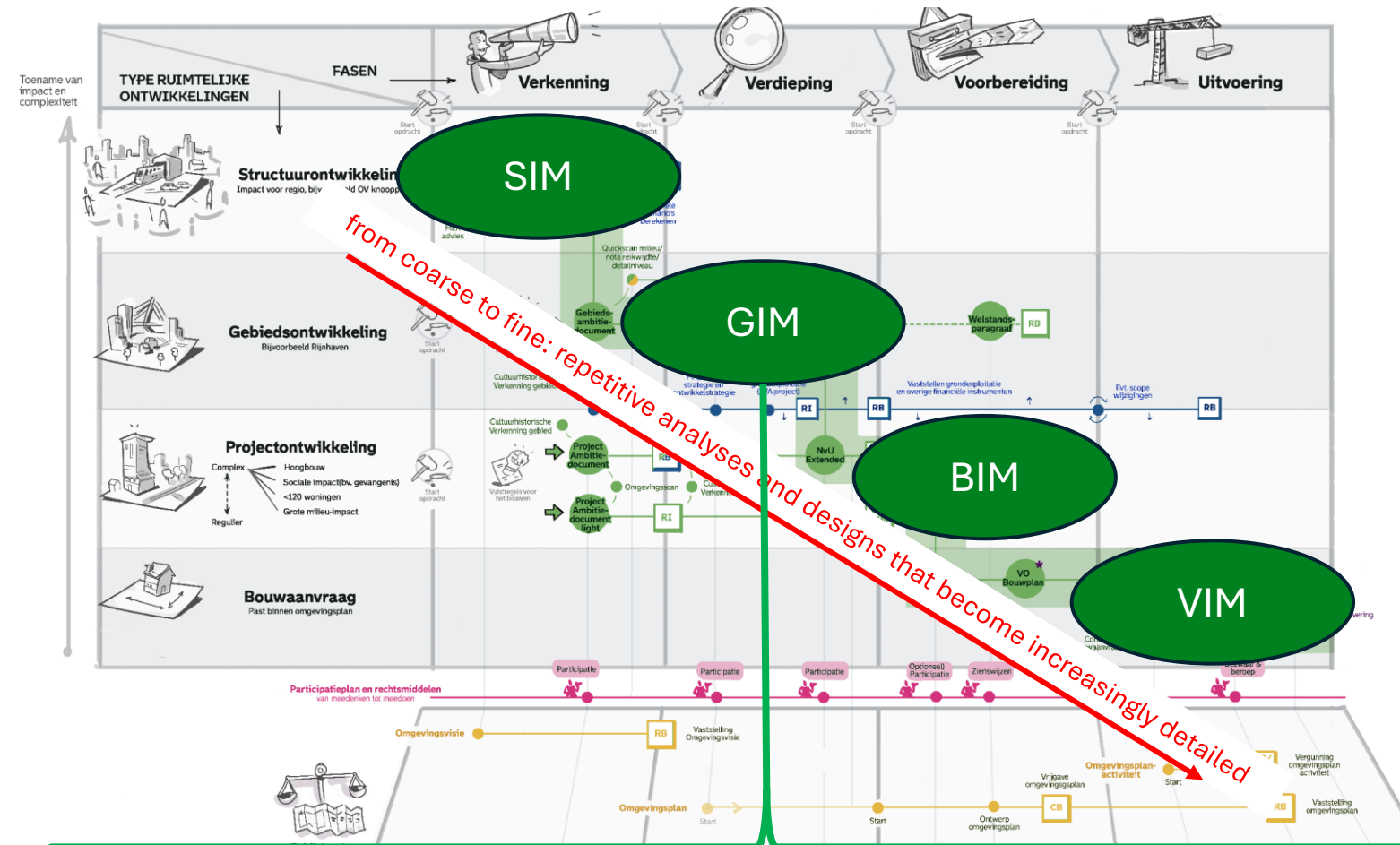
[Heatstress, water flooding and mobility
in Unreal viewer](#)



Thank you for your attention!



Rotterdam Decision Support Model for Spatial Planning



Mogelijke toepassingen

Quick Scan risicoinventarisatie

Grondbalans doorrekenen

GREX-doorrekening

Financiële haalbaarheidsindicatie

Automatische toetsing aan wet- en regelgeving

Controle GIM/BIM/SIM op ILS-afspraken

Opwerken van 2D naar 3D-gebiedsmodel

Visualisatie ontwerp + knelpunt analyse

Impactanalyse (hitte, water, CO₂, geluid, lucht)

ESG analyses tbv duurzame financieringen

Ecosystem of integral connected digital applications and services:

Schiehaven Noord

Analysis:

- Heatstress
- Water flooding
- Mobility

Schiehaven Noord

Design:

t.b.d.

Schiehaven Noord

Visualisation:

- Standard webbrowser
- Game engine (Unreal)

Schiehaven Noord

Participation/co-creation

t.b.d.

Schiehaven Noord

Decision support:

- KPI's
- City support system?

Ecosystem of Applications (Appstore+) → userstory 'Rotterdam Weatherwise' ('DT a CoGo')

1. OUP configuration



De Hub-beheerder logt in op het Open Urban Platform.

Daar kan de gebruiker de configuratie van de dataspace (controlplane) opbouwen, die bestaat uit:

- Toegangsrechten en gebruikersrollen
- Verbonden toepassingen
- Actieve abonnementen op verbonden applicaties
- Generieke instellingen zoals ouderhub, vindbaarheid van de hub en authenticatiemethoden.

De inrichting van de OUP Hubs kan ook worden gedaan met de integratie van de Eclipse dataspace-connector.

2. Registration of datasources

The Hub beheerder logt in op het Open Urban Platform.

De gebruiker kan van de dataspace opbouwen (data plane), dit bestaat uit:

Register van data services en bijbehorende meta data

Digital Twin configuraties



3. Semantic translation



De Hub-beheerder maakt verbinding met het PPB-platform om de vertaling van hun dataservices naar het generieke semantische informatiemodel te configureren.

Het PPB-platform registreert de resulterende datadienst naar de bijbehorende hub van de gebruiker via de AIM-integratie met de OUP.

4. Update analyse modellen

De modelaanbieders verbinden de semantisch coherente dataservices van de Hub met hun platforms om de geautomatiseerde update van hun rekenmodellen te configureren. Optioneel kunnen ze de mogelijkheden van het PPB-platform gebruiken om een vertaling naar hun interne datamodellen te bouwen.

Op basis van de integratie van de IAM-component en de Hubstructuur van het OUP worden de dataservices naar de bijbehorende berekeningsmodellen geleid.



5. Publication of analysis results on the OUP

Na het uitvoeren van een berekening worden de resultaten geregistreerd op de hub van de gebruiker.



6. Translation of analysis results

De beheerders van de modelproviders verbinden zich met het PPB-platform om de vertaling van hun dataservices naar de gewenste uitvoertalen te configureren op basis van de Hub.

Het PPB-platform registreert de resulterende dataservices bij de bijbehorende hub van de gebruiker via de AIM-integratie met de OUP.

7. Visualisation of data services

De gebruiker logt in op de Digital Twin applicatie en kan vervolgens de in het OUP geregistreerde Digital Twin configureren met de people group.



Door middel van plug-ins is het mogelijk om de analyses te starten en worden de resultaten getoond.