Digital Europe for Smart Cities and Communities

Smart Cities Market Place, Action cluster meeting

Javier Orozco, DG CONNECT, Unit C3 Technologies for smart communities

Outline

- Policy Context
- Living-in.eu community
- Data space for smart cities and communities
- Local data platforms
- Local Digital Twins
- Policy measures at EU level

Towards climate-neutral and smart communities

- EU Green Deal & Europe Fit for the Digital Age: '*Twin green and digital transitions*' ; need to tackle the twin challenge in a holistic and systemic way

- Smart cities and communities use digital technologies to reduce resource input and improve the quality of life for their citizens (- > '*twin digital and green' transition*)

- European Digital Strategy:
  - Shaping Europe's Digital Strategy
  - Excellence and Trust in Artificial Intelligence
  - European Data Strategy

- **2030 Digital Compass: the European way for the Digital Decade**

- EU Recovery Plan:
  - At least 20% of the funds under the Recovery and Resilience Facility will be made available for the digital transition (and 30% for green)

Smart cities and communities - > 'twin digital and green' transition

State of play

- Many initiatives, pilot projects, innovative solutions but often confined to a specific vertical domain of the city (e.g. energy management or mobility)
- Digital solutions often stay fragmented, which limits the possibility to scale, accelerate take-up and deliver better outcomes & create a viable smart city market in Europe
- Despite advances in data capture and management, just 12% of city data is used for policy making

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European Commission

LIVING-IN.EU

The European way of digital transformation in cities and communities

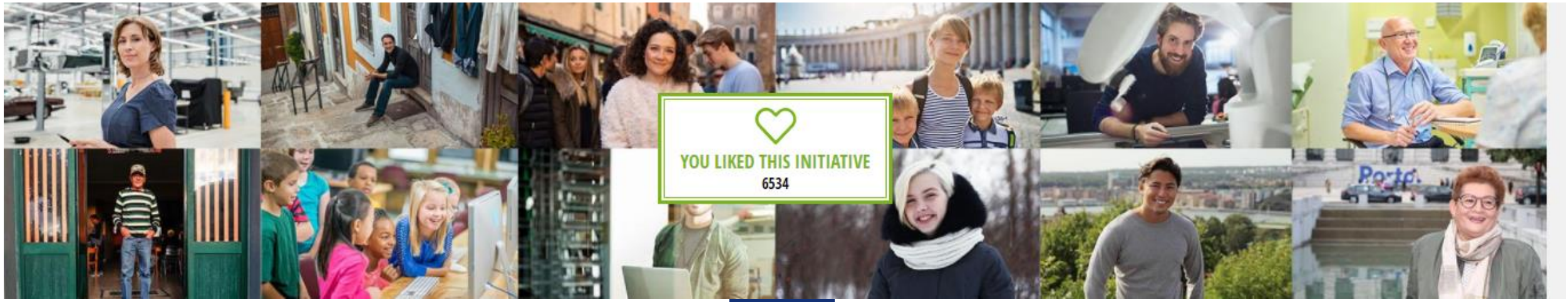
Over 100 signatures so far…
From Mayors, Regional and national Ministers

https://www.living-in.eu/

DOWNLOAD THE DECLARATION

SIGN THE DECLARATION

SUPPORT THE DECLARATION



Driven by shared principles and values

Principles:

- Citizen-centric design
- A city-led approach at EU level
- Technologies as key enablers
- Socially responsible access, use, sharing and management of data
- City as an open, living space
- Interoperable urban platforms with open standards, open/public APIs and shared data models

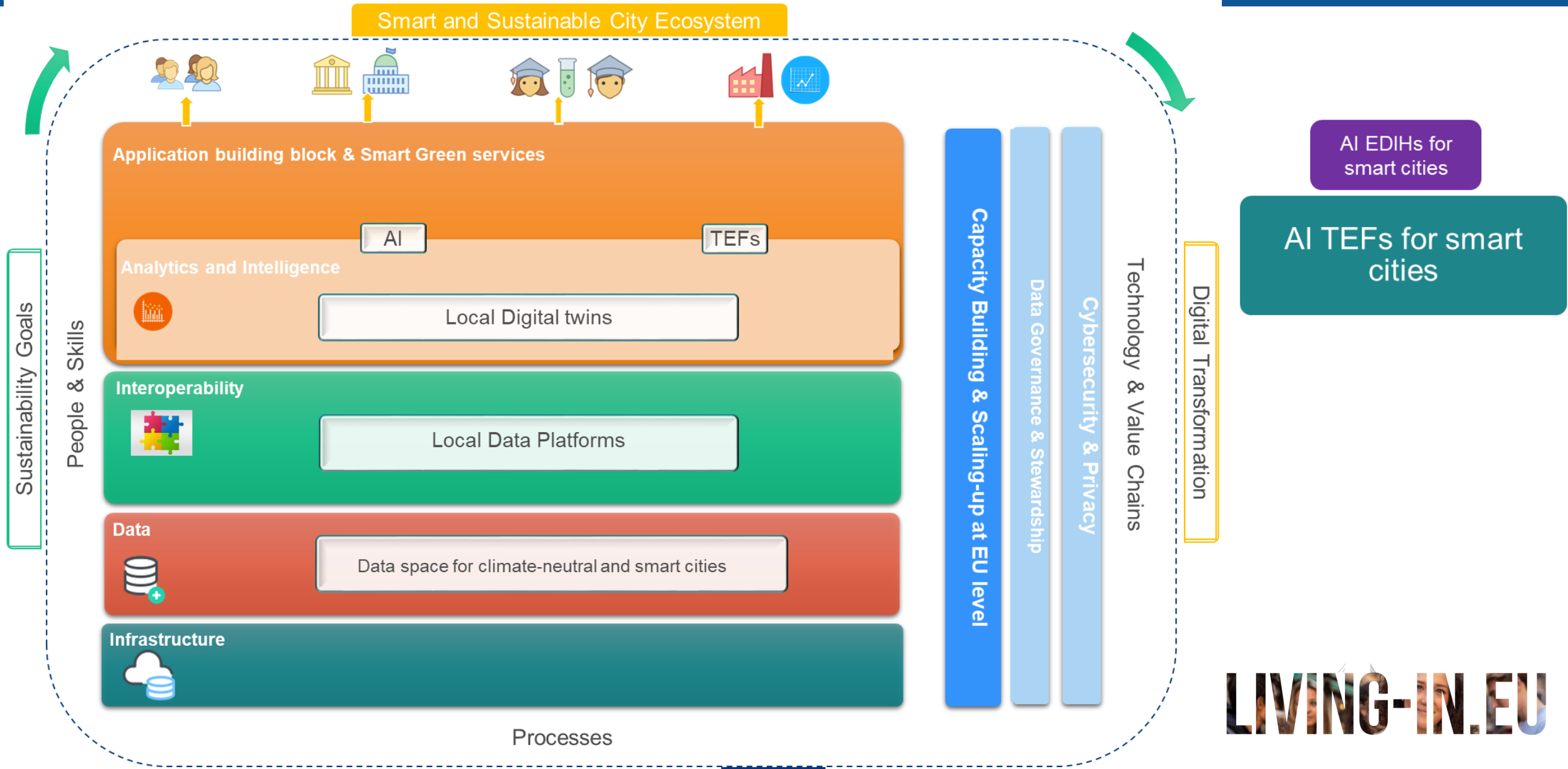
Multi-level governance

European Commission & Committee of the Regions, Finnish Presidency, EUROCITIES, OASC (Open & Agile Smart Cities), ENoLL (European Network of Living Labs), Digital Transition Partnership and cities

- **Commitments:**
  - Financial
  - Technical
  - Legal
  - Education & Capacity building
  - Monitoring and measuring

  - Steering Board

Digital capacity building for cities and communities



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Rationale

- Access to public, but sensitive data (for analytics/AI) – Data Governance Act
- Access and reuse of private data with public interest (B2G data sharing) – Data Act
- European cities need to ensure citizens' digital rights (personal data management)
- Smart cities strive for portable and affordable, innovative cross-sector services (city-to-city & cross-border)

Rollout of common European data spaces

in crucial economic sectors and domains of public interest, looking at data governance and practical arrangements.

Data space: interoperable and secure environment, where currently fragmented and dispersed data can be shared among those, who become part of this data space based upon voluntary agreements and under certain conditions

Challenges – I.

- Open data paradigm helped to increase transparency, citizen engagement and create innovative services, but the data cities need is often not open data

Amsterdam	Copenhagen	London	Paris	Vienna
Transportation	Geospatial	Demographics	Transportation	Transportation
Tourism & Culture	Transportation	Employment	Administration	Environment
Health	Children & adolescents	Health	Culture	Geospatial
Urban development	Statistics	Transparency	Urban development	Administration
Environment		Housing		

Open data domains with the most datasets

- Difficult to access public, but sensitive / not open data (for analytics/AI) – see Data Governance Act

Source: https://www.europeandataportal.eu/sites/default/files/edp_analytical_report_n4_-_open_data_in_cities_v1.0_final.pdf

Challenges – II.

- Difficulty to access and reuse of private data with public interest (B2G)

Current operational models do not scale up

'More secure and regular data sharing across the EU could help public administrations use private sector data for the public good.'
(High-Level Expert Group on B2G Data Sharing)

Source: Digitranscope project

Challenges – III.

- European cities recognise citizen data as a public asset, while they need to ensure citizens' digital rights (personal data management)
- Smart cities strive for portable and affordable, innovative cross-sector services (city-to-city & cross-border)

-> From supply focus to demand focus
-> From open data to shared data

THE EUROPEAN DATA STRATEGY

European Commission

Data space for smart communities

High Value Datasets From public sector

- Driven by stakeholders
- Rich pool of data of varying degree of openness
- Sectoral data governance (contracts, licenses, access rights, usage rights)
- Technical tools for data pooling and sharing

Data space:

Interoperable, trusted and secure environment, where data can be shared under certain conditions

Creation of a '**Data space for smart communities**'

European Commission

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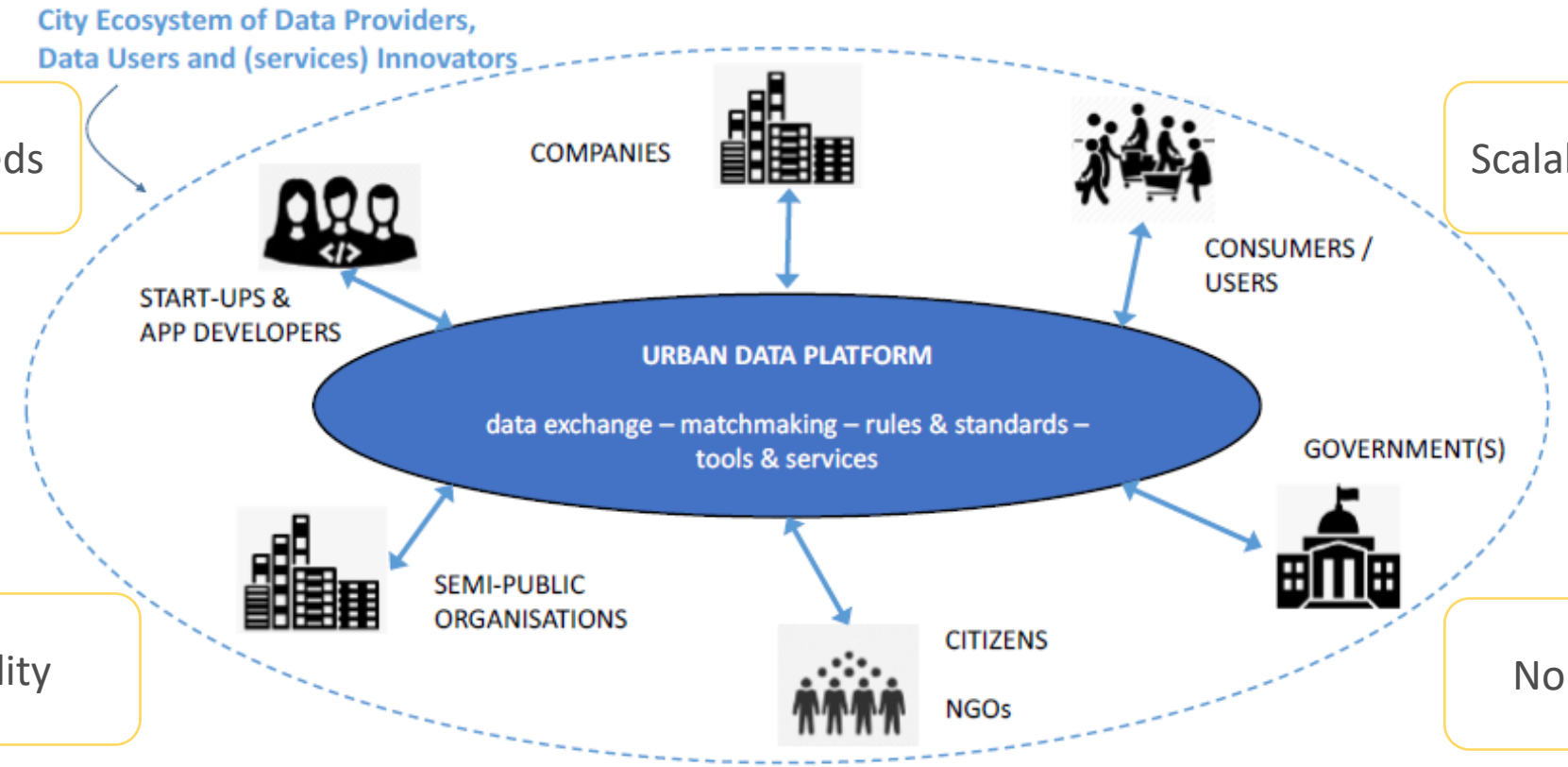
Interoperable, standards-based local data platforms

Tailored to the needs

Scalability of solutions



Interoperability

No vendor lock-in

A **Local Digital Platform** is the "operating system" on which digital services can be provided to smart cities and communities, integrating data flows within and across city systems by exploiting modern technologies, such as sensors, cloud services, mobile devices, analytics, etc.

Development of Local Data Platforms in the EU

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44%

Exploring & Planning

Alexandroupolis	Évora	Rennes
Alkmaar	Genth	Reykjavik
Amsterdam	Gothenburg	Riga
Bassano del grappa	Graz	Santa Cruz de Tenerife
Berlin	Kerava	Skellefteå
Budapest	Malia	Suceava
Cluj-Napoca	Manchester	Smolyan
Derry	Oostende	The Hague
Eskişehir	Parma	Umeå
Essen	Porto	

25%

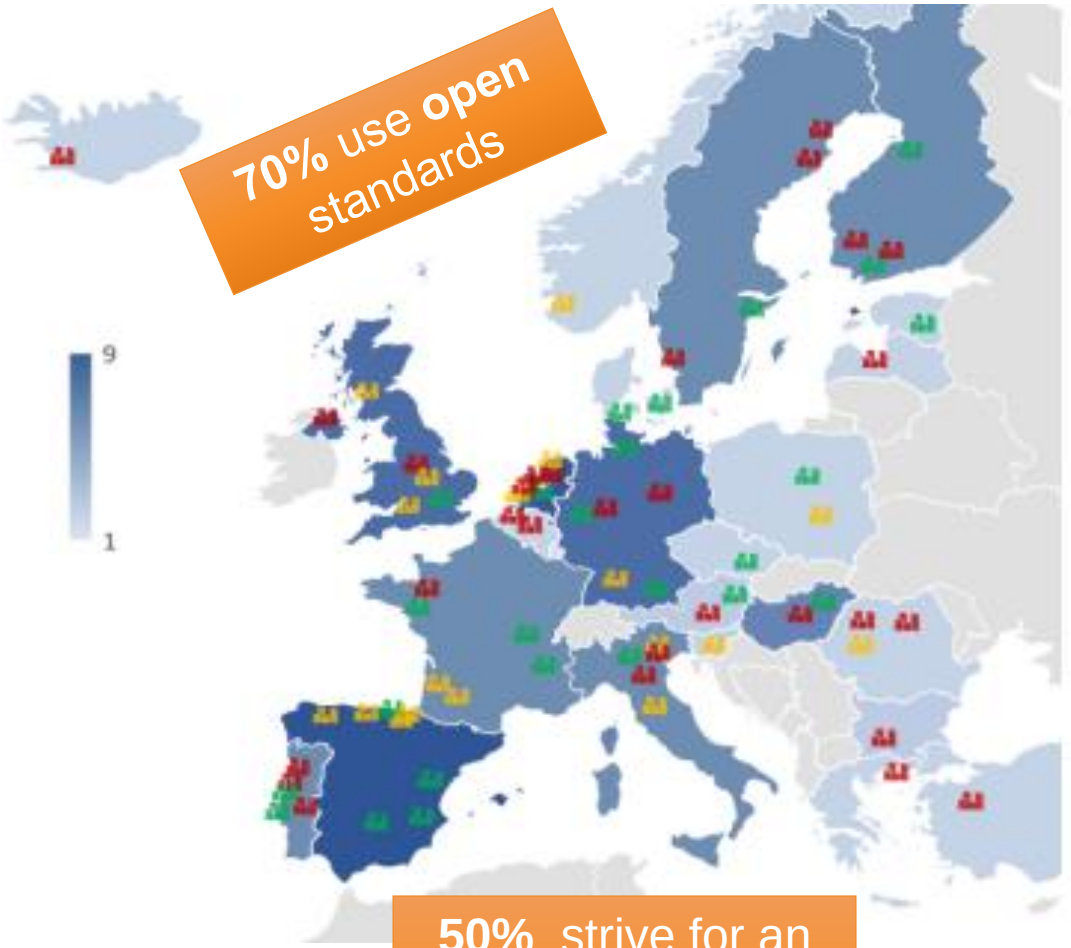
Building & Implementing

Alba Iulia	Linköping	Stavanger
Bilbao	Maribor	Stuttgart
Bordeaux	Nottingham	Trento
Bristol	Pamplona	Tampere
Groningen	Rotterdam	Firenze
León	Saint-Quentin	Glasgow
Lublin	Santander	

31%

Operational

Albacete	Lisboa	San Sebastian
Barcelona	London	Sonderborg
Brno	Lyon	Stockholm
Cologne	Matosinhos	Tartu
Copenhagen	Milan	Utrecht
Grenoble	Munich	Valenica
Hamburg	Nantes	Vienna
Helsinki	Oulu	Warsaw



70% use **open** standards

50% strive for an **open** interoperable platform for **multiple** services

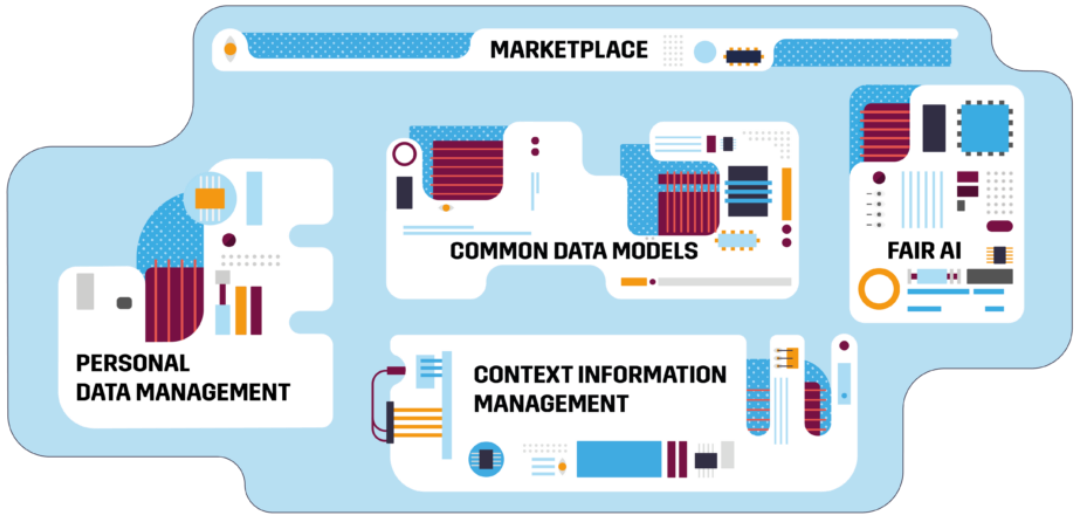
Source: Research Study on Urban Data Platforms in Europe, ERASMUS Centre for Data Analytics, January 2020

** Based on data gathered from more than 100 respondents in 80 European cities*

European Commission

The operating systems of smart cities & communities

- Local Data Platforms (LDP): Enabling digital technologies to integrate data flows via open standards within and across city systems used by both the public and private sector
- LDP can handle open and shared data (with access restrictions) for the dataspaces
- LDPs will deliver the big data for AI (smart objects, sensors, mobile data, social media data, etc.) & LDP digital infrastructure components will enable the use of artificial intelligence and analytics



Minimal Interoperability Mechanisms (MIMs Plus)

- Context Information Management
- Common Data Models
- Marketplace Enablers (Ecosystem Transaction Management)
- Personal Data Management
- Fair Artificial Intelligence
- …and many more to come…

U4SSC

G20 Global Smart Cities Alliance

A set of practical capabilities based on open technical specifications that allow cities and communities to replicate and scale solutions globally

Interoperable, local digital platforms Examples

Eindhoven : Eindhoven's Open Urban Data Platform is based on the SynchroniCity architecture as well as the Living-in.EU principles; the technology aspects of which is captured in the 'MIMs plus' (Minimal Interoperability Mechanisms) document. It uses FIWARE-based Context Broker (CEF building block) (open, modular).

Valencia : Valencia is leading the platform architecture efforts at U4SSC and ITU-T & UN-Habitat UN smart city initiative. Their platform is the informational repository of the city, integrating information from IoT and information systems, providing inter-domain actuations over real-time information, and analytical capabilities providing solutions to citizens and municipal services.

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Potential of AI in cities & regions

- Shared digital workspace, **productivity** and collaboration tools
- **Efficiency and effectiveness** through automated content management and digital workflows
- **Personalised services** by interpreting geographical and temporal data (where and when)
- Public **health** promotion, disease prevention and management
- **Environmental** monitoring (air, noise and water quality, weather monitoring)
- **Public safety**, security, surveillance, monitoring and law enforcement
- Automating operation decisions in **traffic, waste and energy management**
- **Evidence-based policy making**, simulations, modelling, scenario building for strategic decisions

Source: Smartcitiesworld.net

Local Digital Twins

- Urban digital twins are the **virtual representation of a city's physical assets, processes and systems**
- Connected to **data** related to those assets facilitates AI algorithms, data analytics and machine learning
- Combining numerous technologies to create digital **simulation models** that can be updated and changed (**real-time**) as their physical equivalents change
- Providing **a risk-free testing environment** that increases the precision of long-term predictions, improves monitoring and impact assessment of certain decisions for the city's ecosystem
- **Possible benefits**: operational efficiencies, cost savings, more informed decisions, adaptation to climate change, increased resilience, effective urban planning and urban infrastructure management, crisis management, effective coordination of emergency services, participatory governance, improved services for citizens and increased safety and security

Urban digital twins can change the way cities are planned, operated, monitored and managed *('policy-ready-data-as-a-service'*)*
'A playground for city planners' **

European Commission

* DUET project
** OASC

Potential of (AI-enabled) Digital Twins

- Operational decisions (short-term) - reactive

  Public safety and crowd dynamics , traffic management, public transport and pedestrian management, facilities management, etc.

- Strategic (long-term) decisions - predictive

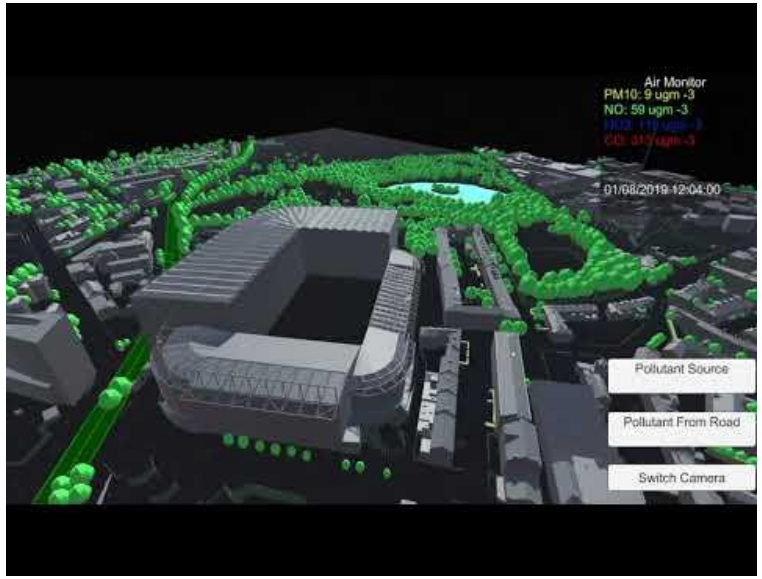
  Urban planning and development, asset and infrastructure management, environmental and climate monitoring & planning, energy usage and solar deployment, etc.

Local Digital Twins can save USD 280 billion in city planning, development and operating plans
(Source: ABI Research)

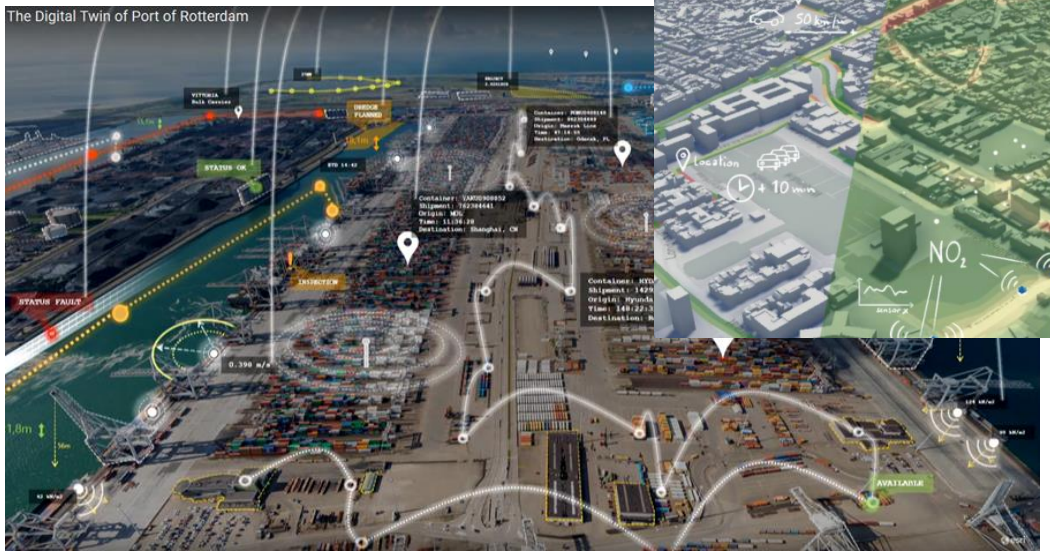
Local Digital Twins can:
- Reduce operating costs by 35%
- Boost productivity by 20%
- Cut emissions by 50-100%

(Source: CityZenith)

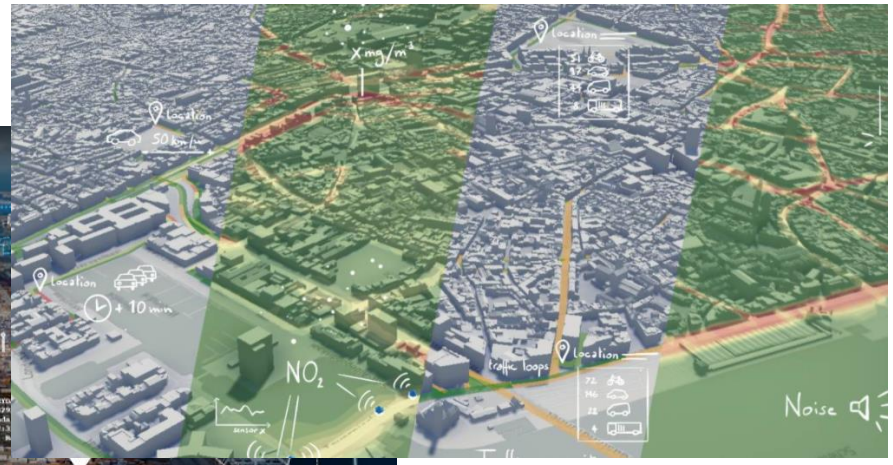
Examples of cities & regions with AI-powered digital twins



Newcastle



Port of Rotterdam



3D copy of Antwerp

Helsinki

SPHERE
BIM DIGITAL TWIN PLATFORM

Buildings in Finland, Austria, Italy and Netherlands

LEAD

Madrid, The Hague, Budapest, Lyon, Oslo and Porto

DUET

Flanders, Athens, Pilsen

+ Amsterdam, Angers, Cambridge, Gothenburg, Herrenberg, Kongsberg, Rennes, Stockholm…

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Capacity-building measures IV.

- Experimentation, testing, piloting
- Guidance for (innovation) procurement

ETAPAS H2020 project - Ethical Technology Adoption in Public Administration Services:
- Responsible Disruptive Technology Framework and Code of Conduct
- Governance model and
- Prototypical software platform

(to be validated by two AI DIHs)

AI4CITIES

Six European cities and regions are jointly procuring AI solutions on mobility and energy to accelerate carbon neutrality
(Pre-Commercial Procurement)

AMSTERDAM COPENHAGEN HELSINKI
PARIS REGION STAVANGER TALLINN

AI DIH network

Framework Cooperation Agreement signed by 25 DIHs

AI Digital Innovation Hubs Network

European Network of Living Labs (ENoLL) contributes with its infrastructure of labs to the European AI Alliance and Piloting Process of the Ethics Guidelines for Trustworthy AI

EU funding
Digital Europe Programme

European Commission

Data

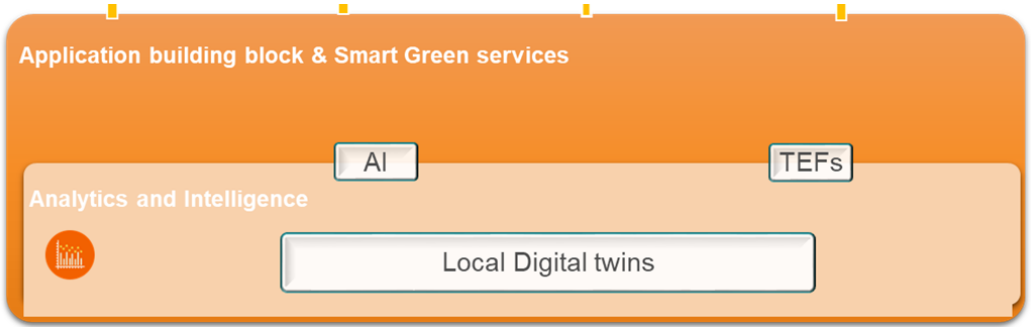
Data space for climate-neutral and smart cities

- Developing data governance scheme
- Blueprint of data space (building blocks)
- Priority data sets aligned with blueprint standards and principles
- Roadmap
- Validation of the blueprint on at least two of the European Green Deal action areas

Interoperability

Local Data Platforms

Help prepare the procurement and deployment of the interoperable local platforms



Develop a European toolbox for Local Digital Twins that all European cities could use when developing urban digital twins.

LIVING-IN.EU

The European way of digital transformation in cities and communities

Other EU funding
CEF2 & Horizon Europe

- **5G Communities** - deployment of 5G networks in communities
- **Operational digital platforms** to contribute to the digitalisation of energy and transport
- **Synergy projects** to fund energy or mobility project with dedicated funding allocated to digitalising the infrastructure

- **Cluster 5** – Climate, energy and mobility
- **Cluster 4** – Digital, industry and space
- **Mission** on climate-neutral and smart communities

Thank you!

European Parliament Think Tank - Artificial Intelligence and Urban Development (fresh from the print):

https://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2021)690882

European Commission