

# CATRENE Study Semiconductor Technologies for Smart Cities Urban Processes

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# Fraunhofer FOKUS – FACTS

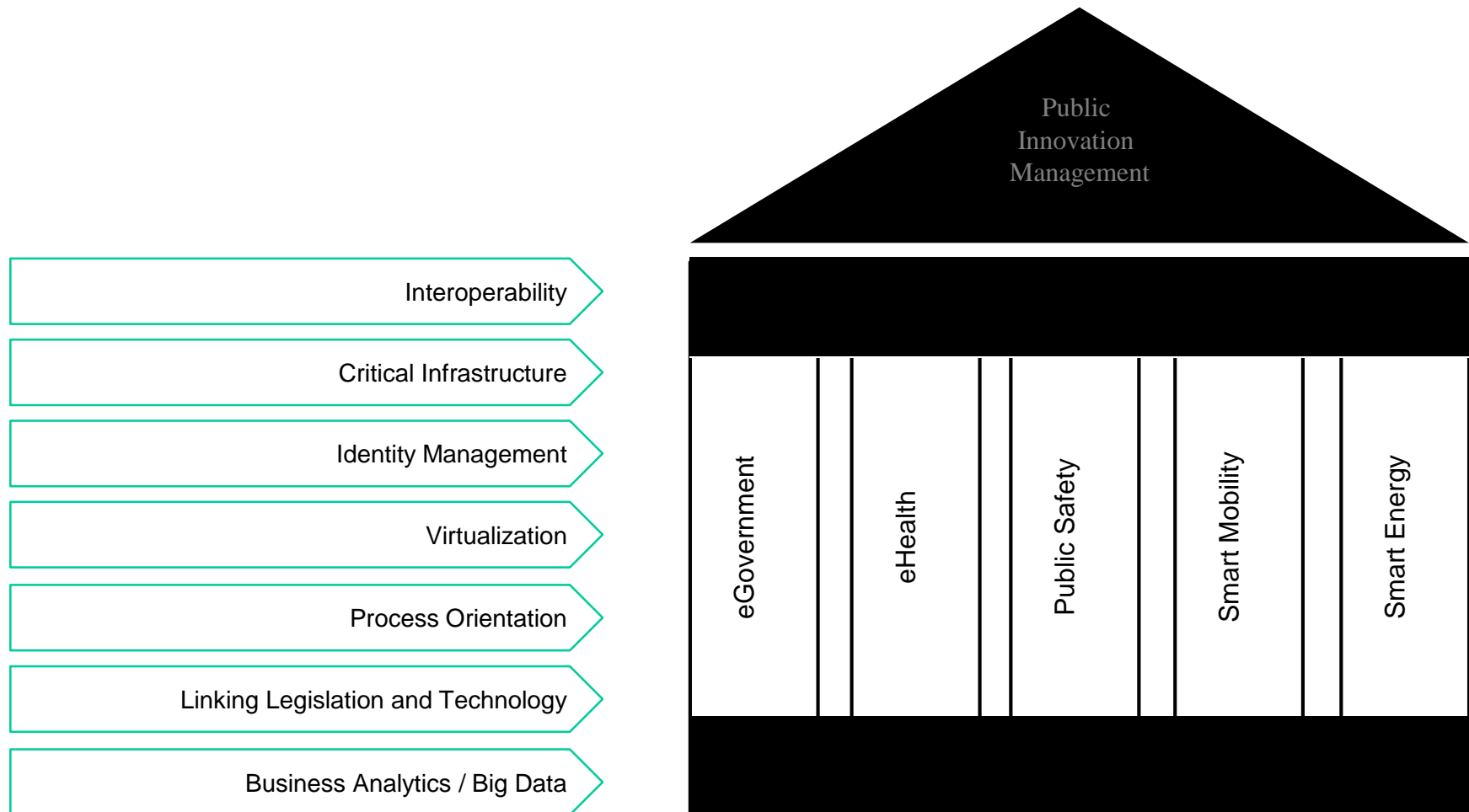


**500 Employees  
from 30 countries**

**34 Mio € budget**

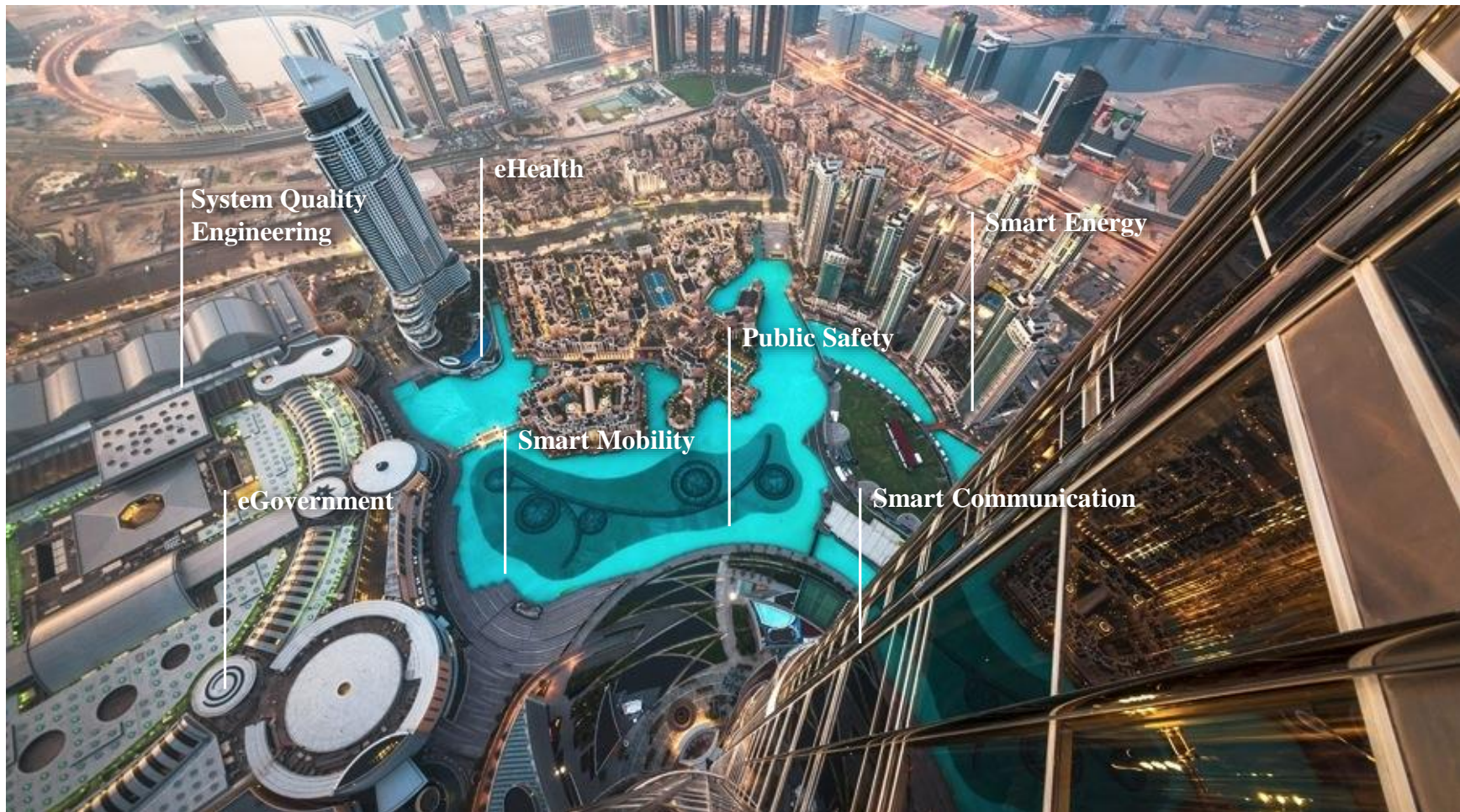
**70% own earnings**

# Fraunhofer FOKUS – Research Areas





# Topics and main focus: Smart City



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# Urban Process Characteristics

## From Urban Planning to Sustainable Development

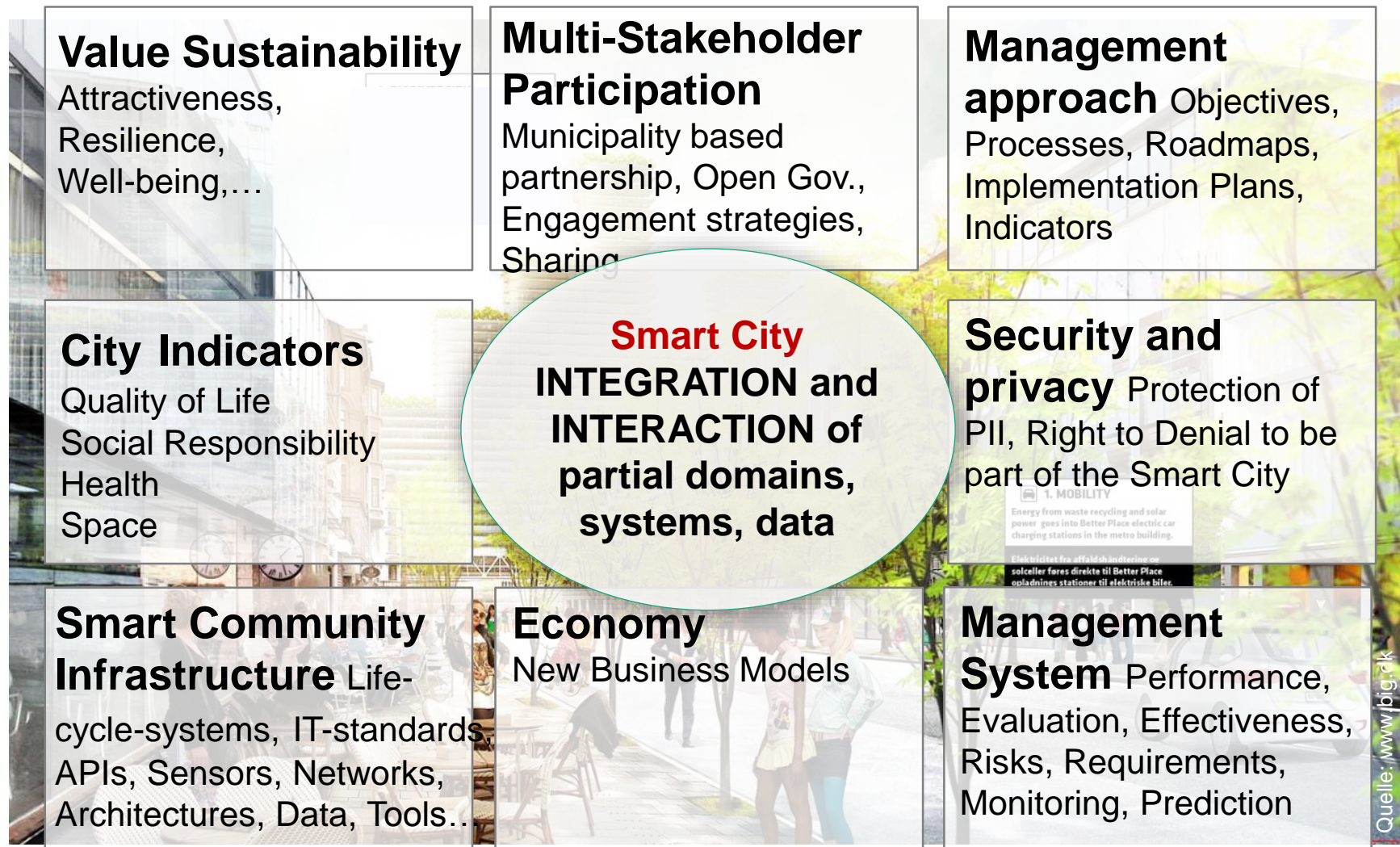
- Management approach, business-like
- Participatory oriented (stakeholder involvement)
- Integrated cross-sectoral approach
- Based on sustainable development
- Sees ICT technology as enabler

Term „process“ derives from the reckoning of an the city as an organisation, that needs to be managed correctly.

Responsive-readiness, change-sensitivity, city stays in transition, in permanent self optimisation in a control loop ..



# What makes a city smart



Titel: Sustainable development of communities  
— Management systems — Requirements with  
guidance for resilience and smartness

# DRAFT INTERNATIONAL STANDARD ISO/DIS 37101

This international standard establishes the requirements of a management system for sustainable development and provides guidance on smartness and resilience of communities, taking compliance obligations and relevant information into consideration, in order to:

- manage sustainability and foster smartness and resilience of communities, while taking into account
- the territorial boundaries to which it applies;
- improve the contribution of communities to sustainable development;
- assess the performance of communities in progressing towards sustainable development and the level of smartness and of resilience that they have achieved.



# DRAFT INTERNATIONAL STANDARD ISO/DIS 3710

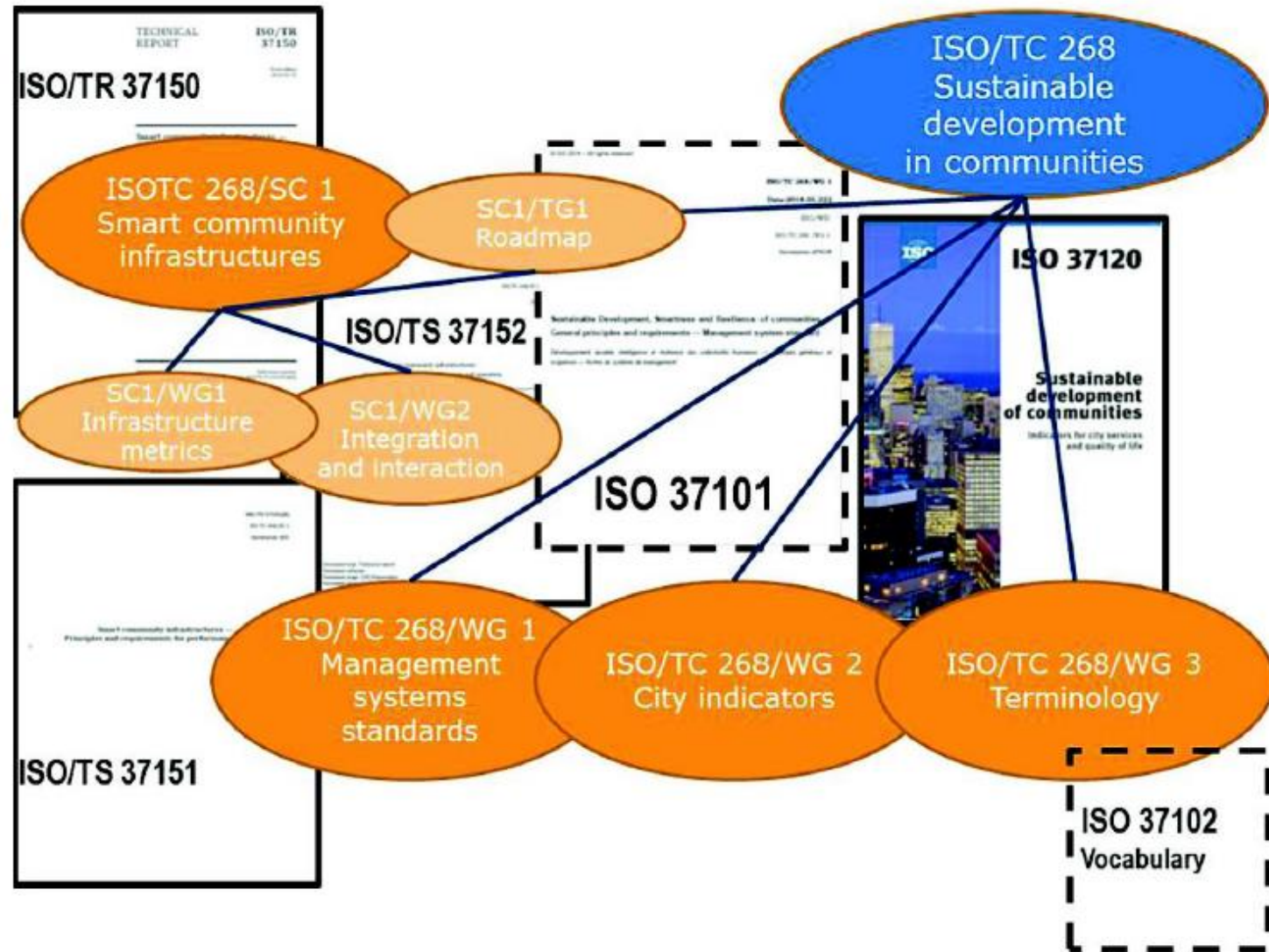


Figure 1 — TC 268 deliverables inventory

A full frame indicates that the standard or deliverable was published, while a punctuated frame indicates that it is still under development.

# SMARTNESS

NEW: Draft International Standard ISO/DIS 37101

Smartness contributes to sustainable development, through soundly based decision making and the adoption of the long and short term perspective.

- *Note 1: Smartness is embedded in the process of sustainable development, i.e. **sustainable development** is the overarching process, while smartness is a characteristic. It implies an **holistic approach**, include **good governance** and **adequate organization, processes** and behaviours, and **appropriate innovative use of techniques, technologies and resources**.*
- *Note 2: Smartness is addressed in terms of performance, relevant to technologically implementable solutions.*

# Sustainable development

- Strategic guideline for urban development since 1990
- Focus on ecological, economic and social aspects
- Normative approach: respecting the fact, that each city has values and interests of their own
- Requires a multi-actor process
- Requires degree of organization from the community
- Requires an “integrated-cross-sectoral view” from the management

# Integrated cross-sectoral Management

Different, diverse  
technological Systems

Integrated Systems

Effectivity and Effizienz arise out of Integration of  
technological systems



Measure,  
Aggregate,  
Filter

Analyse and  
Decode

Optimize

***ICT is an enabler but  
not a precondition for  
achieving smart  
community  
infrastructures.***

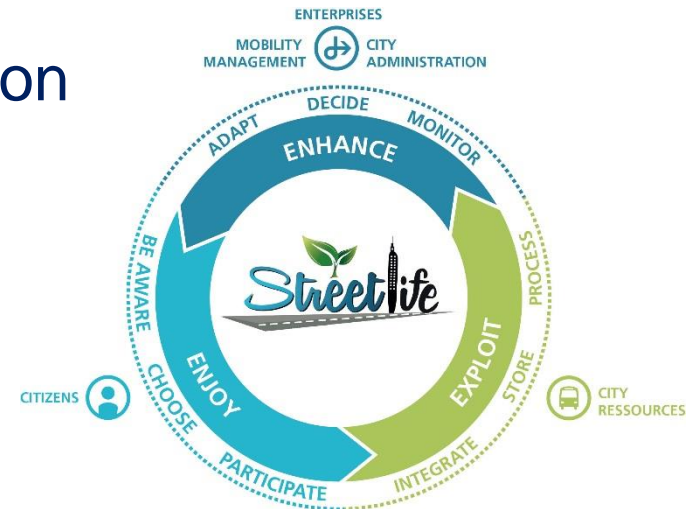


# Integrated Management Process/Control Loop

## Business Project Management

Process: set of interrelated actions and activities which transforms input into outputs - Process covers diverse knowledge areas

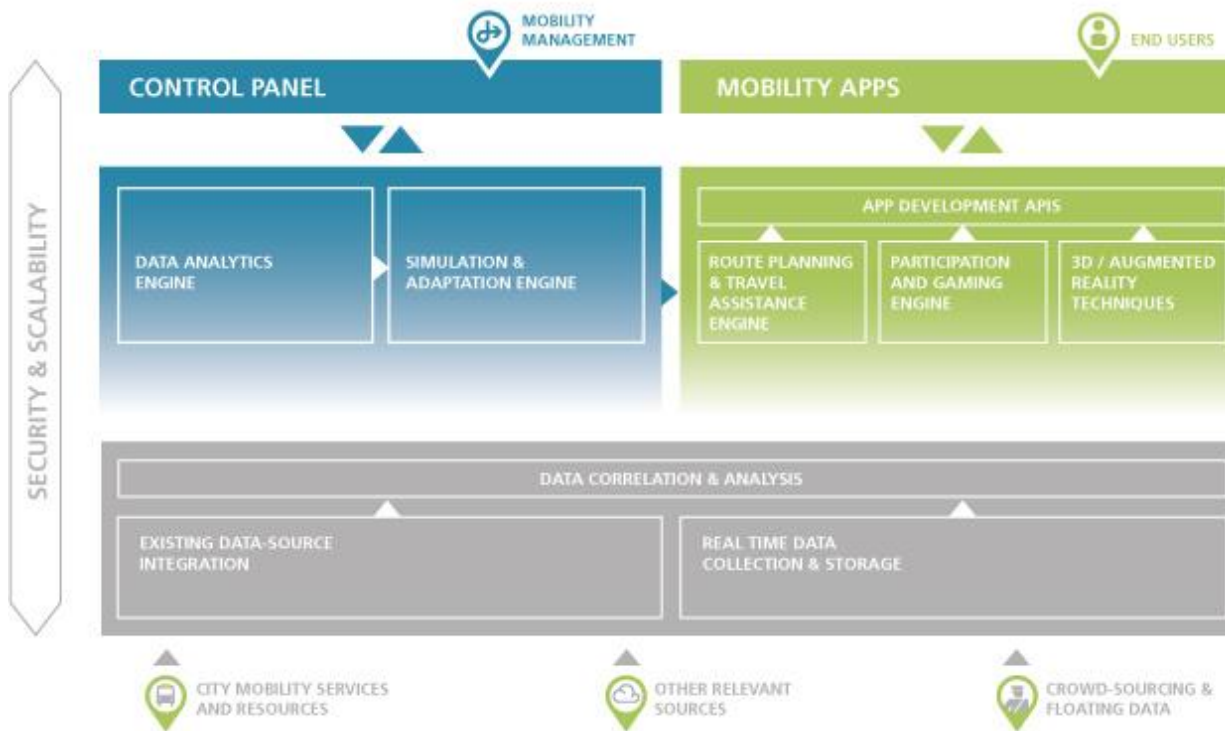
- Initiation, Planning, Implementation
- Participation, Decision
- Monitoring, Simulation
- Forecasting, Controlling
- Closing: Optimization



Takes place against defined Implementation Plans/KPIS

# Smart City Architectures

## FUNCTIONAL BLOCKS OF THE STREETLIFE MOBILITY INFORMATION SYSTEM



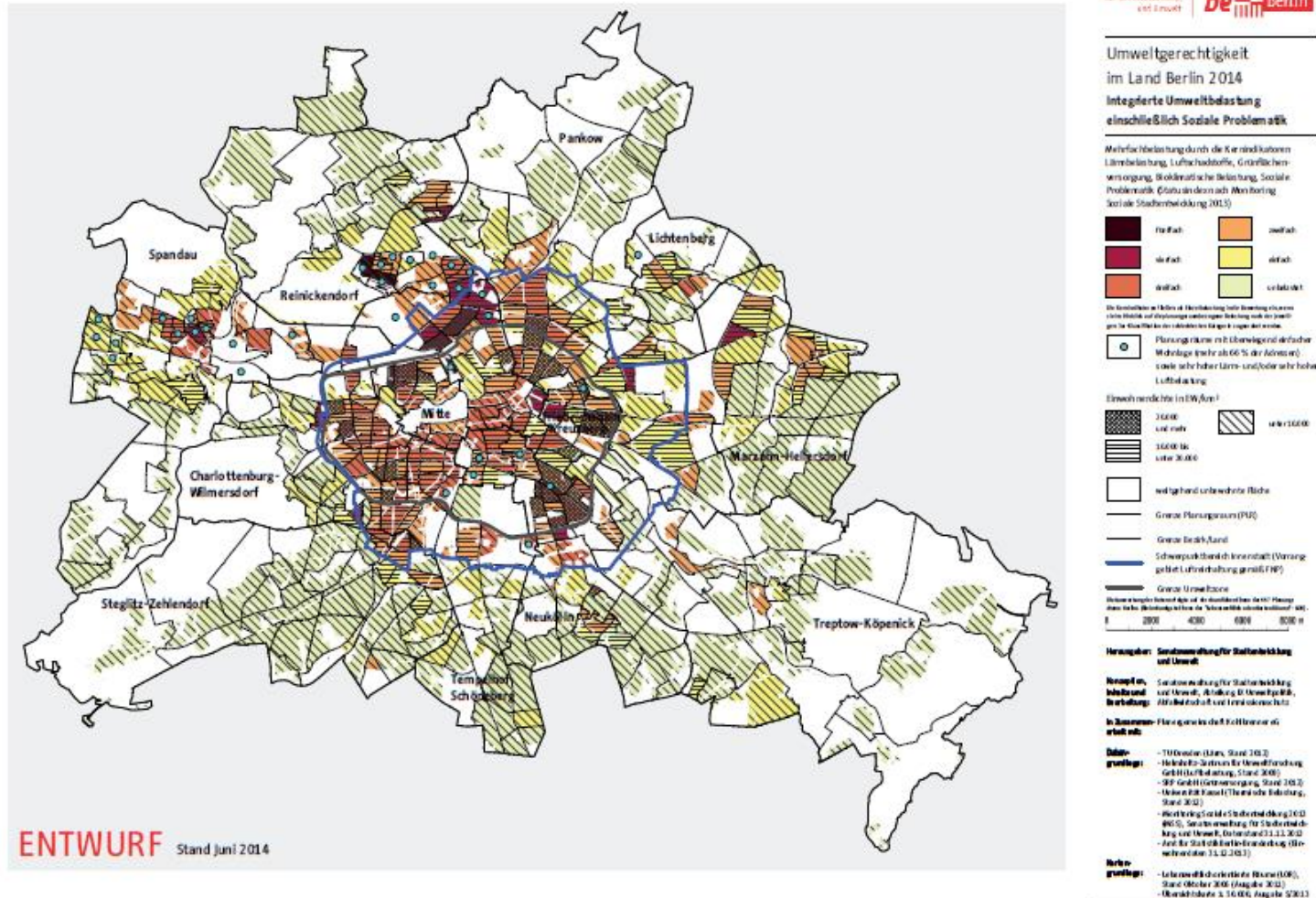
Trends:

Smart City Cockpits  
(Algos, Simulations Predictions)  
3D City Models with Aug. & Mixed Reality)  
User Engagement  
Fog Computing  
Real Time Data Service Hubs  
Networktechnologies

Copyright: FP7 STREETLIFE project @ [www.streetlife-project.eu](http://www.streetlife-project.eu)

## Berlin Integrated Environmental Stress Map Including Social Problematics

Abbildung 2: Integrierte Mehrfachbelastungskarte (Berliner Umweltgerechtigkeitskarte 2014). Quelle: SenStadtUm.



**Source: UMID: Umwelt und Mensch – Informationsdienst, Nr. 02/2014**  
**ISSN 2190-1120 (Print), ISSN 2190-1147 (Internet)**

**Herausgeber:** Bundesamt für Strahlenschutz (BfS), Bundesinstitut für Risikobewertung (BfR), Robert Koch-Institut (RKI), Umweltbundesamt (UBA)



# Mixed Reality Visualisations

**Source: A Mixed Reality Interface for Real Time Tracked Public Transportation; Antti Nurminen, Juha Järvi, Matti Lehtonen in: 10th ITS European Congress, Helsinki, Finland 16–19 June 2014. at: [streetlife-project.eu](http://streetlife-project.eu).**

Android client

- AR/3D map mode switchable
- Basic 3D touch screen manoeuvring

- GPS+orientation sensor support

- No application level features yet

- Linux back end

- Tampere bus tracking via SIRI Lite

- Matches SIRI data to squeezed OSM

- Transmits via binary tokenised XML TCP/IP protocol

- Indicative results

- 4-5s latency a challenge

- 3D map useful, AR yet to prove itself



# Requirements

- Area-wide, permanent measurement of a set of indicators on small-scale city level
- Variability of the monitoring network according to city-specific conditions (climate, architecture, topography)
- Low maintenance costs
- Indicators measured on one instrument
- Set of indicators on a mobile for crowd sensing, sourcing
- Protection of Personal Identifiable Information
- Durability and eco-friendliness
- AI
- Efficiency, flexibility, adaptability, low-power-consumption, security, privacy, interoperability, identifiable..

# Status Urban IT

- Build on ERP-Systems (Enterprise Resource Planning)
- Many Bottlenecks between ICT and „reality of the city“
  - Sectors with their data divided from each other
  - Interactions possible restricted
  - No tailored, little real-time Information
  - Interoperability issues, diverse legacy systems of all domains
  - Severe privacy issues: „regarding protection of personal identityfiabel information“ and „provision of the right to denial“ to citizens to be part of the smart city.

# Summary Urban Processes supported by IT

- ICT is an enabler but not a precondition for achieving smart community infrastructures.
- It is a infrastructure task
- Is more than communication: offers: Data, Informationen, Services, Processes
- View: City as Cyberphysical System
- Handlungsfelder in »Integrierende IKT für die Stadt der Zukunft«, acatech, January 2014
- Referencearchitecture in » Towards an ICT Framework for Smarter Cities«, Fraunhofer FOKUS, definiert
- Examples and Blueprints in several Pilots and projects



# ENGINEERING ICT FOR SMART CITIES

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