

---

# Smart Cities & Communities Solutions

*European Commission: A Focus  
on Global Collaboration*

Reviewed by John Gomez May 23rd, 2021  
Documents published by EU, 2016-2021

[https://ec.europa.eu/energy/sites/ener/files/documents/  
d2\\_final\\_report\\_v3.0\\_no\\_annex\\_iv.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/d2_final_report_v3.0_no_annex_iv.pdf)

[https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-  
urban-development/city-initiatives/smart-cities\\_en](https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en)



---

# General Standard Key Points of Analysis

---

- ❖ Domains
- ❖ Restrictions
- ❖ Strategies
- ❖ Solutions Types & Value Proposition
- ❖ Governance Models (Pros and Cons) SCC Solutions
- ❖ Target Points: Citizens, Businesses, and Communities
- ❖ Replication in Sequence
- ❖ Assessments by Geographical Levels
- ❖ Institutions



# General Overview



---

# Document Structure

---

- ❖ Key Points
  - ❖ Standard of Analysis
  - ❖ Principal Main
  - ❖ Secondary Main



---

# Principal Main Key Points

---

- ❖ Methodology
- ❖ Type of Integration
- ❖ Driven Factors for Successful Integration
- ❖ Recommendations



---

# Methodology

---

- ❖ Approach Type
- ❖ Targets
- ❖ Structure
- ❖ Restrictions



---

# Goals

---

- **Integration, Scalability, Sustainability:**
  - Sustainable Urban Mobility, Districts and Built Environment
  - Integrated Infrastructure
  - Citizen Focus
  - Policy and Regulation
  - Integrated Planning
  - Knowledge Sharing
  - Metrics and Indicators
  - Open Data
  - Standards
  - Business Models



---

# Type of Integrations

---

- ❖ Reshaping of infrastructure (conditions & investments)
- ❖ Innovation by adaptability of new technologies
- ❖ Governance models, fundings, financing



---

# Drivers of Success for Integration

---

- ❖ Research and Development
- ❖ Geographical Context
- ❖ Challenges and Opportunities
- ❖ Cross-borders Partnerships



---

# Recommendations

---

- ❖ Mapping of SCC solutions against EIP-SCC
- ❖ Mapping of 10 integrations via SCC
- ❖ Designing toolkit for replicability assessment



---

# Secondary Main Key Points

---

- ❖ Relevant Literature
- ❖ Failing of Integration Solutions
- ❖ Role of Citizens and Communities
- ❖ Funding and Financing Mechanisms
- ❖ Framework Conditions
- ❖ Synergies between SCC actors



Details



---

# Part I Overview

---

- ❖ Smart Cities & EU Policy
- ❖ Long Term Challenges
- ❖ Integration Model
- ❖ Approach
- ❖ Business Model
- ❖ Restrictions
- ❖ Governance
- ❖ Financing
- ❖ Procurement Models
- ❖ Citizens and Communities
- ❖ Lessons Learned

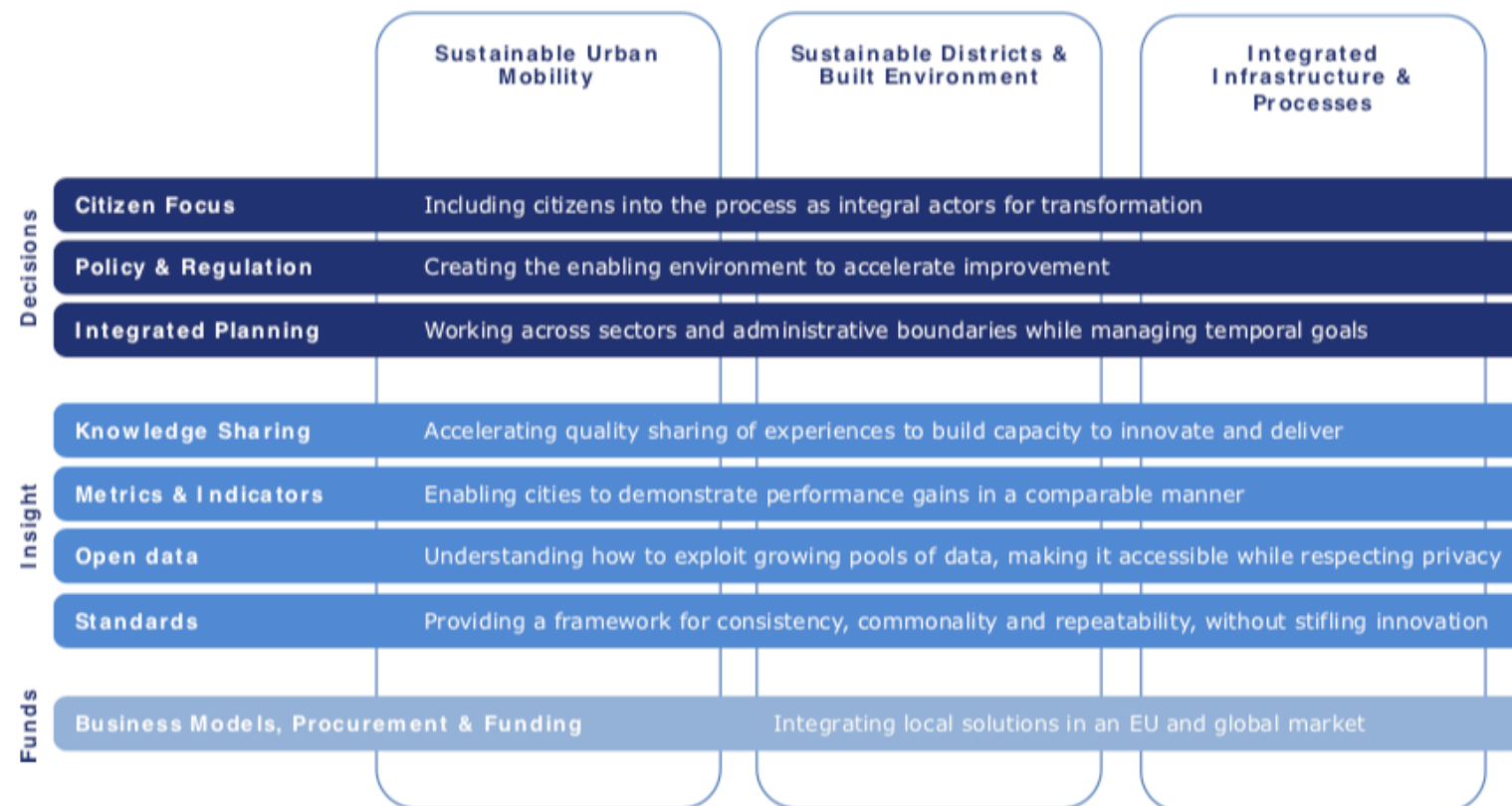


# Solutions

Integrated, Scalable, Sustainable Smart City Solutions

- ❖ Strategy and Implementation via EIP-SCC
- ❖ Operational Implementation via SIP to establish domains and relationships among 11 different priority areas

Figure 1: EIP-SCC Strategic Implementation Plan Priority Areas





# Planning and Strategy for Urban Development

## 1. Strategic vision of the city's development

## 2. SWOT analysis of the city (strengths, weaknesses, opportunities, threats)

## 3. Defining strategic goals to develop the City (including leveraging the benefits of existing "Smart" technologies)

## 4. Measurable indicators of city development (according to leading international city ratings)

## 5. Smart City Roadmap containing a list of initiatives and their description

Scope of initiatives

Stakeholders

Social-economic effect  
assessment

Budget and attracting investors  
and partners

Priorities and schedule

IT, utilities and  
transportation infrastructure

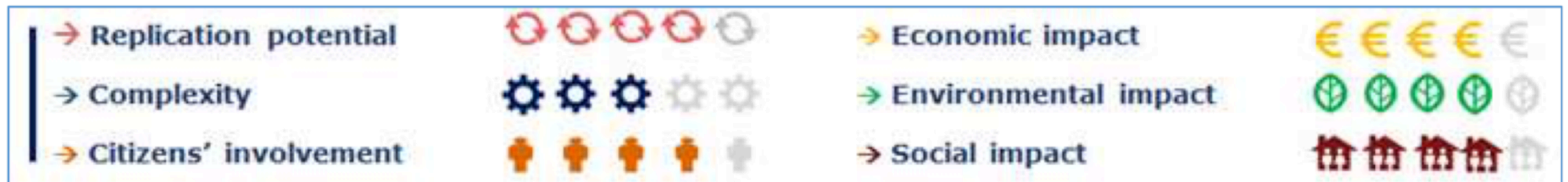
Technologies  
and IT solutions

Regulatory  
support

PMO



# Solution Assessment Example





---

# Integration Model

---

Resources Optimization

Disruptive Technologies

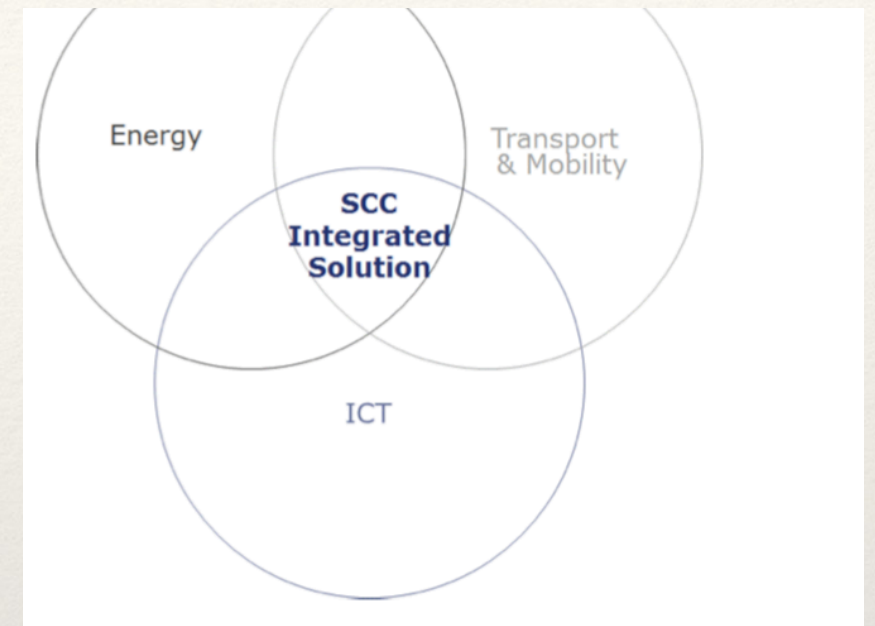
Value Chain Collaboration

Innovative Products & Services

Strong technological Components

Governance

Financing (Funding)



“The three SIP “vertical” priority areas: (1) sustainable urban mobility, (2) sustainable districts and built environment and(3) integrated infrastructure and processes. By breaking these down further into homogeneous sub-categories, 9 main types of SCC solutions were identified.”



# Approach

## SCC best practice in Europe and worldwide

Summary and analysis of influential academic publications and best practice documents of influential organisations concerning Smart Cities

Identification and description of 300 examples of SCC solutions

Description of 80 real-world applications of SCC solutions

In-depth examination of 10 case studies with a focus on their business models

Identification of 10 important failed cases and analysis of the main aspects and reasons for their failure

## European SCC solutions' replication potential and support actions

Analysis of all important aspects concerning the preconditions for a successful large scale roll out of SCC solutions

Description of the main characteristics of successful business models underlying replicable solutions

Study of the commonalities between the SCC setting of the EU and China

Identification and analysis of four key aspects of SCC solutions, namely: public procurement models, funding and financing, governance, and citizens and communities

## Synergies between SCC actors

Provision of an overview of the main groups working on the successful roll out of SCC solutions

In-depth analysis of the potential for synergies among actors

## Mapping the European SCC landscape

Making study findings visually accessible in spatial means through geographic representation and scalable maps



## Strengths and weaknesses of key types of governance models of SCC solutions

Type	Strengths	Weaknesses	Example cities
<b>Strong cross-departmental smart city governance</b>	<ul style="list-style-type: none"> <li>Allows the city to become a more involved partner in integrated solutions.</li> <li>More agile and responsive structure, which means barriers can be more efficiently addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Very dependent on the leader and thus possibly not sustainable.</li> </ul>	<b>Boston, Lyon, Tallinn, Vienna</b>
<b>Sectoral leadership with strong supportive Smart City co-ordination mechanisms</b>	<ul style="list-style-type: none"> <li>Fits cities with a multi-departmental set-up. Collaboration is established based on need and political will.</li> <li>Benefit of integrated solutions starting in a sector is the focus, and thus the often higher cost benefit analysis (CBA).</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to identify responsibility and leadership</li> <li>Difficult to manage all interests</li> <li>Budget risks due to other budget priorities at sectorial level</li> </ul>	<b>Amsterdam, Copenhagen, Seoul</b>
<b>Open governance model (platform model)</b>	<ul style="list-style-type: none"> <li>Allows a higher degree of integration with citizens and the private sector and particularly local businesses</li> <li>Innovation is driven by the private sector and the market</li> <li>Creates a framework that fosters competitiveness within the integrated solution framework</li> </ul>	<ul style="list-style-type: none"> <li>Government has less power and becomes more of an enabler</li> <li>City governments need to be willing and prepared to change.</li> </ul>	<b>Barcelona, Chicago, Helsinki, Manchester, Milton Keynes</b>



---

# Financing

---

- Central role played by PPPs in funding and financing SCC projects
- Sustainable Districts & Built Environment
- Public funds appear to be a very common funding option for Sustainable Urban Mobility and Integrated Infrastructure projects
- Private financing is equally distributed among the different SCC domains
- Provide relatively easy access to capital
- Funding
- Bond Financing
- Pension fund private placement bonds
- Equity investment and infrastructure fund managers
- Venture capital (VC)
- Crowdfunding
- Venture philanthropy



---

# Financing Schemes

---

- Project financing
- Public-Private Partnership (PPP)
- Build-Operate-Transfer (BOT)
- Design-Build-Finance-Operate (DBFO)
- Build-Own-Operate (BOO)
- Energy Service Companies (ESCO)
- Financial Lease
- Sponsorship Agreement



# Example

	(A) Design & Development Phase		(B) Implementation & Management		(C) Roll out phase	
	Methods	Examples	Methods	Examples	Methods	Examples
<b>(I) Providing insight, information &amp; resources</b>	Design-thinking & user-led research; crowd-sourcing; civic crowdfunding; participatory planning	Integrated bus management system, San Sebastian, Spain; App-based reporting of issues, Citizens Connect, Boston, USA	Customer insight and action research; data analytics and solutions; awareness raising, promotion and education	Real-time 2-way communication for traffic and emergency management, Rio, Brazil	Crowd-sourcing; city level data analytics; awareness raising, promotion and education	Impact data to help change behaviour gathered around multiple cities, Urban Ecomap, San Francisco, USA
<b>(II) Co-design, co-creation, collaborative problem solving</b>	Design-thinking approaches applied in pilots and demonstrations; Living labs; participatory planning & policy making	Early user inclusion in master planning, Barangaroo District, Sydney, Australia	Dynamic master planning; co-creation of services; civic technologies; open data	Co-creation of public services, Santander City Brain, Urban Platform, Santander, Spain; Establishment of open data community groups & events, Hong Kong	Incubation and acceleration techniques; Public sector research laboratories; city collaborations	Mindlab, Copenhagen, Denmark; European city network projects
<b>(III) Collaborative governance; open innovation; Joint decision-making</b>	Crowdsourcing of ideas; participatory budgeting; Civic crowd funding	Common goal-setting of the fossil free Växjö programme, Växjö, Sweden;	Multi-sided business models; multi-stakeholder partnership models (PPPPs); representation of citizens on local boards	Co-ownership & governance of renewable energy plant; Vienna, Austria	Holistic Smart City vision; representation of citizens on national boards; city collaboration; cross-border Smart City services	Stakeholder Advisory Committee (SAC), Waterfront, Toronto, Canada; Permanent consultation in Lyon Smart Community, Lyon, France
	(A) Design & Development Phase		(B) Implementation & Management		(C) Roll out phase	
	Methods	Examples	Methods	Examples	Methods	Examples
<b>(IV) Collective action; social innovation</b>	Idea camps; Community-based solutions	Open Glasgow (Hackathons, mobile engagement hubs, community mapping), Future City, Glasgow, Scotland	Nudging methods	Peer benchmarking and proactive advice on how to be more energy efficient, Issy Grid, Issy-les-Moulineaux, France; Fare saver to encourage walking, Octopus Card, Hong Kong	Impact investing; shared Smart City manifesto; support & investment in independent community solutions	Contests aimed at specific communities such as minorities & women owned businesses, Fiber Optics Smart Grid, Chattanooga, Tennessee, USA



---

# Part II

---

- ❖ Roll Out of Integrated Solutions
- ❖ Replicability
- ❖ Scalability
- ❖ Analysis
- ❖ Case Study Example
- ❖ Challenges & Opportunities
- ❖ Recommendations



# Indicators

Dimensions	Scalability	Replicability
<b>Technology</b>	<ul style="list-style-type: none"><li>▪ Modularity;</li><li>▪ Maturity of technology;</li><li>▪ Netting support;<sup>28</sup></li><li>▪ Trialability;<sup>29</sup></li><li>▪ Interface.</li></ul>	<ul style="list-style-type: none"><li>▪ Standardisation of the technology;</li><li>▪ Maturity of technology;</li><li>▪ Interoperability;</li><li>▪ Netting support.</li></ul>
<b>Socio-cultural</b>	<ul style="list-style-type: none"><li>▪ Social compatibility/ consent;</li><li>▪ Interaction.</li></ul>	<ul style="list-style-type: none"><li>▪ Social compatibility/ acceptance;</li><li>▪ Market demand/ Response to citizenry needs;</li><li>▪ IT Literacy level.</li></ul>
<b>Political-Institutional</b>	<ul style="list-style-type: none"><li>▪ Regulatory environment;</li><li>▪ Institutional support.</li><li>▪ Ecosystem</li></ul>	<ul style="list-style-type: none"><li>▪ Need to change in rules and regulations;</li><li>▪ Regulatory environment;</li><li>▪ Institutional support.</li><li>▪ Ecosystem</li></ul>
<b>Economic/Business</b>	<ul style="list-style-type: none"><li>▪ Possibility to achieve economies of scale;</li><li>▪ Profitability.</li></ul>	<ul style="list-style-type: none"><li>▪ Macro-economic factors;</li><li>▪ Business model;</li><li>▪ Market design.</li></ul>

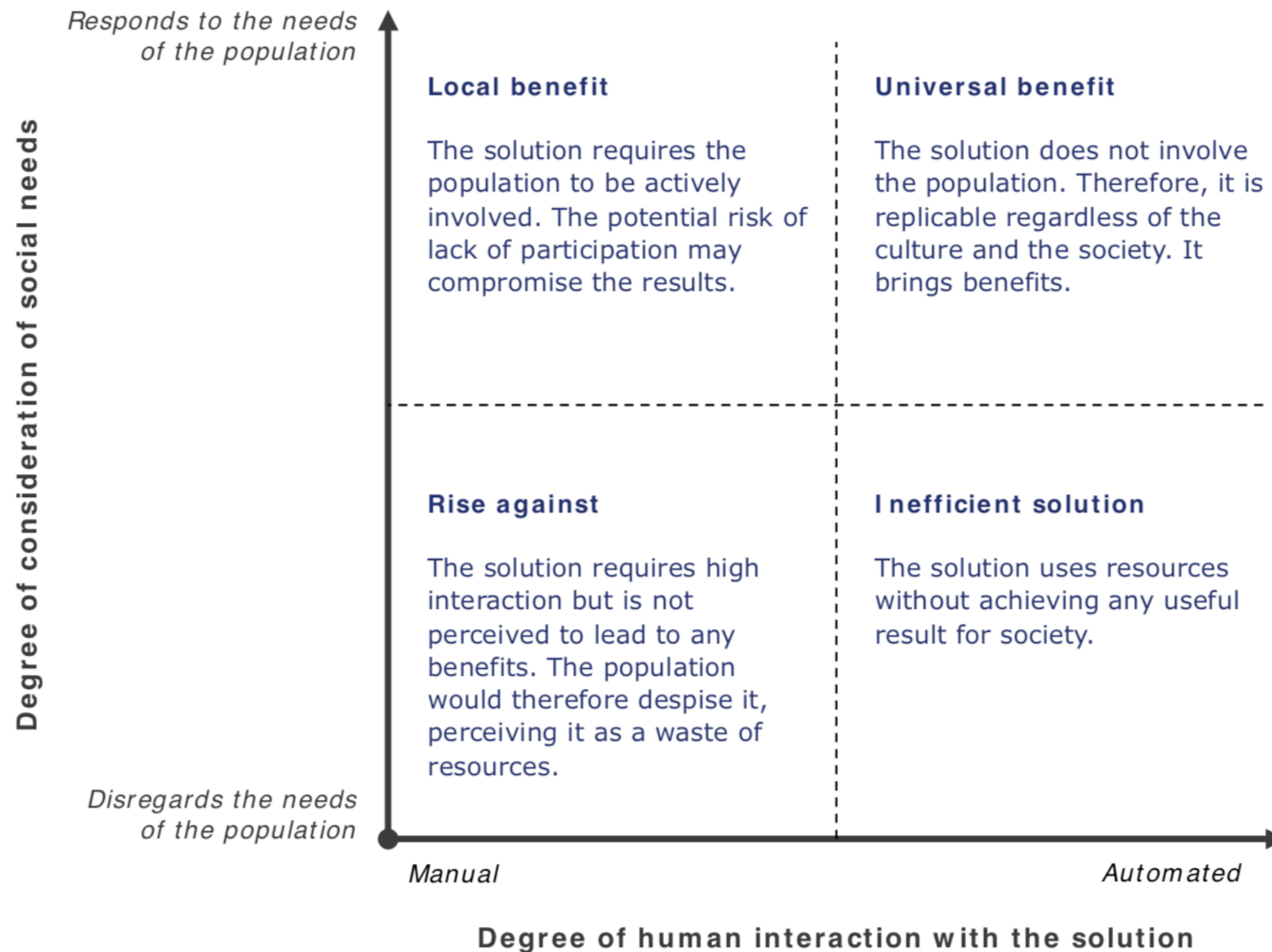


# Evaluation Criteria

Dimension	Roll-out potential evaluation criteria
<b>Technology</b>	<ul style="list-style-type: none"><li>▪ Is the technology well-established?</li><li>▪ Is the technology standardized and/or interoperable with different IT systems?</li><li>▪ How big and complex is the netting support required to sustain the project from a technological perspective?</li></ul>
<b>Socio-cultural</b>	<ul style="list-style-type: none"><li>▪ How relevant is the involvement of the society for the solution to work?</li><li>▪ Is the solution responding to a pressing need (general perspective)?</li><li>▪ Would the solution require a radical change in the users' habit?</li></ul>
<b>Political-institutional</b>	<ul style="list-style-type: none"><li>▪ Is the project requiring strong political commitment to be developed (general perspective)?</li><li>▪ Would the administration need to be directly involved?</li></ul>
<b>Economic/Business</b>	<ul style="list-style-type: none"><li>▪ Is the project able to achieve economies of scale if its size is increased?</li><li>▪ Can the project benefit economically from international implementation (e.g. standardization of technology/ equipment/ solutions, etc)?</li><li>▪ Is the business model flexible to changes?</li></ul>



# Value Proposition-Strategic Direction Essential





---

# Domains

---

- ❖ Financial Resources
- ❖ Human and Technical Resources
- ❖ Sophisticated Service Infrastructure
- ❖ Citizens and Communities



---

# Cross-Borders Relationship Challenges

---

- ❖ Cross Cultural Awareness and Sensitivity
- ❖ Government Structure
- ❖ Funding
- ❖ Potential Replication and Scaling up
- ❖ Legal Economics Frameworks
- ❖ Fields of Cooperation
- ❖ Funding Mechanism (Public, Private, Regions)
- ❖ Rural Regions in the world

## Special Note

The importance of standards, as well as the favoring of open source solutions and interoperability options



---

# Recommendations

---

- ❖ Operating models development to facilitate the involvement of all actors (Public Administrations to Urban Planning)
- ❖ **Create a unique platform all actors could jointly discuss SCC solutions (GGBP)**
- ❖ Provide a supportive legal framework for IP protection
- ❖ The centralization of the competences for both the provision of grants and forms of financing
- ❖ Break boundaries between sectorial offices (inter-sectorial, complex and integrated demand for technological innovations in service provision)
- ❖ **Develop businesses accelerators for public and private sector to succeed**
- ❖ Create a Service Level Agreements (SLAs) to integrate contractors with one another
- ❖ Conditions for integrated solutions (private sector and SMEs)
- ❖ Enable community empowerment (strategic roles) co-creating, co-developing
- ❖ Innovation experimentation set ups (citizens, ICT companies, research scientists & policy makers)
- ❖ **Data-driven management guidance, frameworks, specifications, protocols and vocabulary to create a common understanding for solutions developers, administrators and users.**



# FINAL REPORTS OVERVIEW



# SCC Solution Report Strategic Implementation Plan

Colours indicate the EIP-SCC "Strategic Implementation Plan" (SIP) priority areas (vertical/horizontal) that the initiative covers:

- Main area covered by the initiative (vertical variable)
  - Second area covered by the initiative (vertical variable)
  - Other areas covered by the initiative (across both vertical and horizontal variables)

[illegible]



# Mapping of the Roll-Out Potential of Integrated SCC Solution Report

	Technology	Socio-cultural	Political-Institutional	Economic/Business	Roll-out potential
<b>Bigbelly</b> Philadelphia, U.S.					

*Bigbelly* represents a case in which success is ensured by simplicity.

The SCC solution does not require any innovative technology (nor complex netting support) to be implemented. Similarly, it does not require an important change of habits among citizens, unless a need to pay stronger attention to recycling. Also, the population hardly notices the difference, as the solution only slightly involves human interaction.

From an economic perspective, the solution is modular, therefore can be simply scaled and is simple, therefore it can simply be replicated, without requiring to be deeply modified to be adapted to the new environment.

It may be worth however considering that the solution is most likely to be successful in cities where more users can be served (to achieve economies of scale) and where the population density is higher (higher demand for intelligent-waste systems).

## Smart Melit

Toyota City,  
Japan



Apart from a very complex solution at technological level, the Smart Melit project is very tailored to a specific culture and specific needs of a society, which may be difficult to be translated into others. Further, it requires a strong involvement of all parties, being government, households, the Consortium. In other words, the holistic approach adopted is itself challenging its replication.

From a business perspective, it requires strong infrastructure-level investments (sensors, etc.) being installed and maintained. It is expected that the project brings positive results, but rather to inform other solutions than to be replicated as it is. While difficult to roll-out as it is, the solution can still be developed at small scale and is potentially adaptable as it is scaled-up.



# Toolkit to Assess Replicability in Geographical Contexts

Dimension	Roll-out potential evaluation criteria	Sample of KPIs
<b>Political-Institutional</b>	<ul style="list-style-type: none"> <li>Is there strong enough political commitment at State level? Municipal level?</li> <li>How difficult would it be to involve the institutions?</li> <li>Which degree of involvement of the public administration is required? Is it willing to?</li> <li>Which is in the specific country/ city, etc. the level of trustiness of the population towards the political entourage?</li> </ul>	<ul style="list-style-type: none"> <li>Expenditure in R&amp;D;</li> <li>Capacity for institutions to lead development (i.e. power distance<sup>40</sup>/ trust in leadership<sup>41</sup>);</li> <li>Regulatory barriers</li> </ul>
<b>Economic/Business</b>	<ul style="list-style-type: none"> <li>Is the project able to achieve economies of scale if its size were increased?</li> <li>Can the project benefit economically from international implementation (e.g. standardization of technology/ equipment/ solutions, etc.)?</li> <li>Is the business model adaptable to the resources/ stakeholders/ etc. that present in the business environment where the solution would be rolled-out?</li> </ul>	<ul style="list-style-type: none"> <li>Business model-related KPIs</li> <li>Trialability;</li> <li>Break-even sales;</li> <li>Contribution margin;</li> <li>Conditions of the financial market;</li> <li>Risk propensity;</li> <li>Familiarity with similar products;</li> <li>Instruments offered by financial institutions;</li> <li>Size and type of potential investors.</li> </ul>



Q & A



Thank You



# Resources



---

## Smart Cities & EU Policy Challenges

---

- ❖ Focus on technological solutions
- ❖ Slogan “smart, sustainable, and inclusive growth”
- ❖ Initiative: resource- efficient Europe
- ❖ Creation of the European Innovation Partnership for intersection of resources: energy, transportation, information - communication (IoT)



---

# Long Term Challenges

---

- ❖ Climate Action
- ❖ Environment
- ❖ Resource Efficiency
- ❖ Raw Materials

“Smart Cities evolve along with new modes of value creation through the intermediation of public-private partnerships, cross-sectorial collaboration, city-led “open innovation marketplaces” and other forms of governance.”



# Restrictions/Limitations

Main limitations	Mitigation strategies put in place
<ul style="list-style-type: none"><li>▪ The study relies on searching through and analysing available literature and online material, which is inevitably affected by the lack of:<ul style="list-style-type: none"><li>○ Common terminology;</li><li>○ Time for successful SCC solutions to be published (particularly for the more recently implemented cases);</li><li>○ Consistent data across SCC solutions.</li></ul></li></ul>	<ul style="list-style-type: none"><li>▪ A number of types of solutions have been identified and the most relevant areas in which SCC solutions are likely to emerge – like mobility/transport, smart neighbourhoods/districts, built environment or energy/smart grids – have been systematically reviewed.</li></ul>
<ul style="list-style-type: none"><li>▪ Some cities may over-emphasise the current level of activity of SCC solutions implemented, making it hard to provide a consistent approach in the measurement of impacts.</li><li>▪ The limited amount of available detailed information on SCC solutions at different lifecycle levels makes it less feasible to concretely connect the assessments made with statistical evidence from empirical observations.</li></ul>	<ul style="list-style-type: none"><li>▪ Where possible, data produced by cities and/or countries in which the cases are located has been validated through direct contact with the SCC solution representatives.</li></ul>



---

# Other Restrictions

---

- High cost/high impact:  
District level demonstrators of energy efficiency and Smart Grid projects
- Low cost/high impact:  
Intelligent transport solutions
- Low cost/low impact:  
Data solutions



---

# Governance Business Models

---

- **Strong cross-departmental Smart City governance:**  
In particular, larger cities and cities with strong leaders and an established focus on Smart City projects have developed governance entities to manage the digital transformation required by SCC solutions.
- **Sectoral leadership with strong supportive Smart City co-ordination mechanisms:**  
Most cities operate in silos and demonstrate a weak SCC solution governance and co-ordination structure. This is a barrier to integrated solutions, as innovation leaders develop solutions that only fit into the innovation profile of their own sectoral priorities.
- **Open governance model (platform model):**  
Data is transforming cities as it is becoming available in increasingly large quantities and qualities.



---

# Governance

## Another Key Feature Models

---

- ❖ Cross Departamental Governance
- ❖ Data Exchange Across Cities Departments (Ownership, Management)
- ❖ Design of City Platform (Interoperability)

Note:

- No Blue Print for City Government Investing in Smart Technology
- Juristions Diferences
- The Need for Projects and Programers cooperative planning



---

# Procurement Models

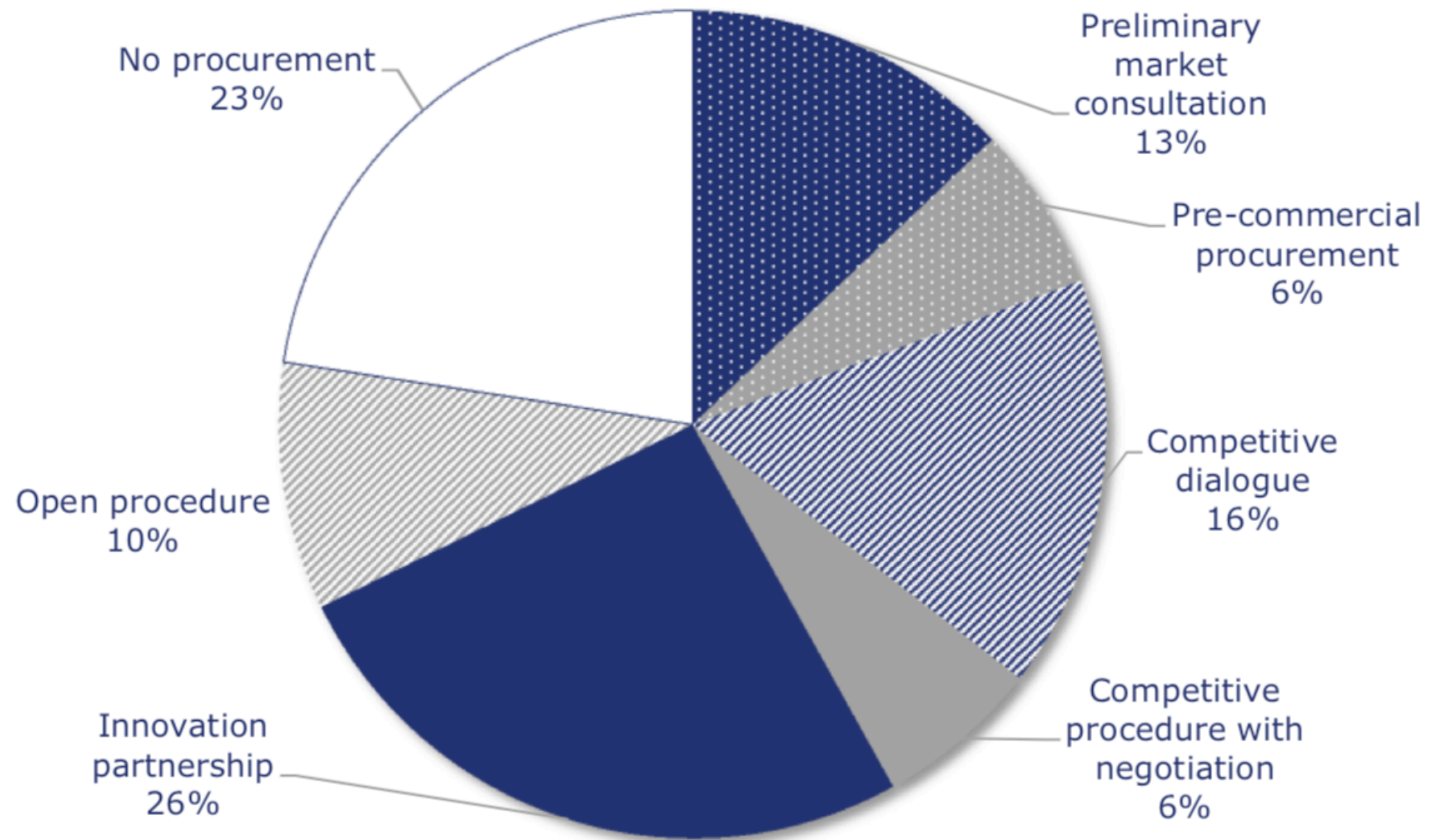
---

- ❖ Continues Innovation Process
- ❖ Stakeholder Approach by Categories
- ❖ Public Procurement to Incentive Innovation

“Opening up procurement mechanisms to make them accessible to younger, smaller businesses allows cities to access a wider range of new ideas and technology than traditional market procurement”



## Procurement models adopted by SCC solutions





# Innovation Platform

## The use of an innovation platform in Copenhagen, Denmark

By 2025, Copenhagen's ambition is to become carbon neutral. With this aim in mind, in October 2013 the Copenhagen Cleantech Cluster and the City of Copenhagen established a strategic partnership to explore new methods for using public procurement. The result of this was the setting up of a platform where companies could meet and get to know each other, and where they could apply their specific knowledge and skills to create solutions together.

The project was based on a **Public-Private Innovation**, a model that can be divided into several phases:

- **Identifying and prioritizing challenges:** The public authority identified and prioritizes challenges.  
*In this case, Copenhagen's ambition to become a SC was set as the grand challenge.*
- **From grand challenge to specific problems:** The public authority collects information about the challenge, as well as ideas on how it might be solved.  
*In Copenhagen, experts, entrepreneurs and other stakeholders were invited to help to understand the grand challenge in more detail, and break it down into more specific problem areas. The first finding was that citizen engagement and data availability were the most important issues, thereby making it possible to give the platform a better focus.*
- **Innovation teams:** Partners and stakeholders with the competencies to contribute to solving this more specific challenge are identified, and possible solutions and barriers are explored in greater detail.  
*The topics addressed in Copenhagen included data availability, open versus closed standards, business models for establishing a digital infrastructure, waste management, water management, transportation, energy consumption, etc.*
- **Procurement and implementation:** Based on the information collected, the next step is to issue a tender for a new solution. The identity of the procurer is not given; it might be a public authority, or an association with public sector backing.  
*In the case of Copenhagen, a test case was developed in the area of traffic. The city wishes to reduce CO<sub>2</sub> emissions produced from traffic generated by looking for available parking spots.*



---

# Citizens and Communities

## Key Stages

---

- **Co-developing city solutions:** Giving citizens a voice in local matters;
- **Crowdsourcing the city:** Citizen-led issue reporting, data crowdsourcing, crowd-funding;
- **Co-designing tomorrow's cities:** The role of the citizen in living labs, test-beds, demonstrators;
- **Community-driven SCC solutions:** Citizen-owned energy grids, grassroots community projects, sharing economy;
- **Smart neighbourhoods and districts:** Regeneration projects with the vision and design of smart districts;
- Ensuring inclusive innovation;
- **Outside-in innovation:** Tapping into collective community action.

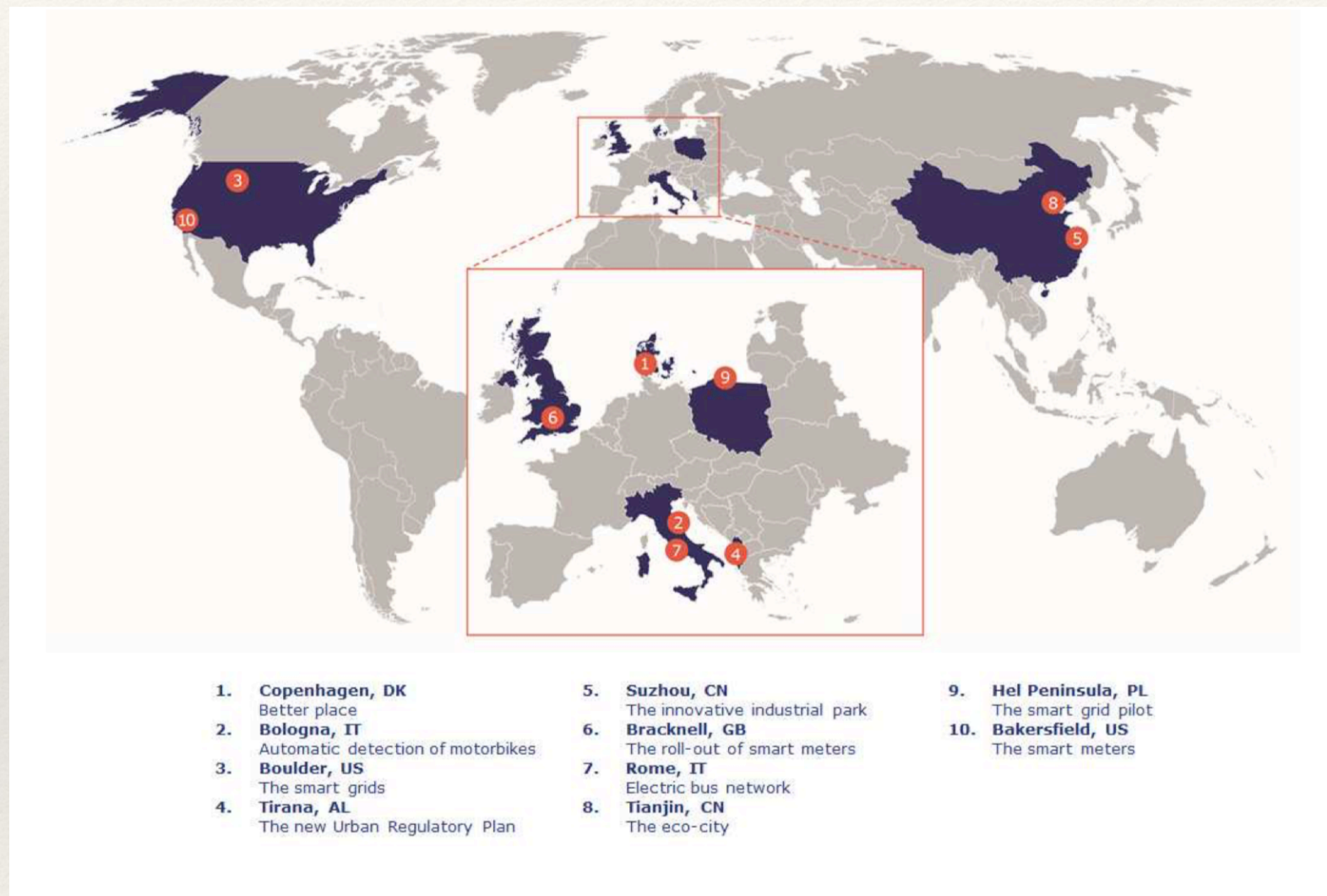
### Citizen Engagement:

- Giving citizens a voice
- Active participation in planning phase
- Crowdsourcing the city
- Community driven innovation
- Smart neighbors and districts
- Inclusive innovation
- Outside -In -Innovation



# Lessons Learned

The ten selected examples of SCC solutions presenting elements of failure



“Empirical findings, confirmed also by the literature review, have shown that SCC solutions often focus principally on the ICT dimension, which is designed around innovative technologies, rather than adapting these to the social and cultural dimensions.”

“Designing solutions starting from the citizenry is possibly the most relevant lesson that can be learnt from past experiences.”



---

# Approach Philosophy

---

- ❖ By study and definition of communities or businesses
- ❖ By interactions of resources (energy, materials, services, financing)
- ❖ By determination of Strategic plans (ICT) for implementation (Plan EIP-SCC) - Infrastructure, Services, Transparency, Urban Planning, Management



# Value Proposition

	Type	Short description	Examples of solutions	Value proposition
Sustainable Urban Mobility	<b>Real-time road user information</b>	Deliver real-time traffic information to road users.	Deployed technologies include variable message signs displaying traffic and parking information, bus stops with neighbourhood-specific information, dynamic pricing updates and mobile applications showing the location of the closest taxi stop and providing updates about train arrivals.	Enable people to take informed decisions about their mobility, saving time and energy.
	<b>ITS-based enhancements of public transport</b>	Public transport provider uses intelligent transport systems (ITS) as a support for the management of its assets and to enhance its service for the users.	Examples of technologies include contact-less public transport cards, sharing economy concepts for public fleets as well as applications for mobile payment.	Reduce waiting time as well as emissions, and facilitate intermodal commuting.
	<b>ITS for traffic monitoring, management and enforcement</b>	Collection and central processing of information to adjust traffic flows in urban areas.	Sensors for traffic monitoring, such as automatic traffic counting, cameras, vehicle location or even satellite imaging linked to central traffic control centres.	Optimise fleet management and route scheduling.
Sustainable Districts & Built Environment	<b>Smart technologies for the built environment</b>	Involve technologies and approaches for smart and intelligent management of assets and resources within the built environment.	Typical solutions integrate ICT to increase the level of automated monitoring and control of equipment, such as smart meters and appliances, home automation and outdoor automation, and intelligent waste collectors. Included here are also smart streets, i.e. limited geographic areas that concentrate a variety of technologies such as open Wi-Fi, building energy management, smart lighting, traffic or air quality measurement, smart waste management, electric vehicle charging and bike sharing.	Pursue better living, resource efficiency and waste reduction.
	<b>Sustainable districts</b>	Has a wider geographic scope and entails district energy systems, energy efficient neighbourhoods and eco-urban developments.	Smart waste water networks, district-wide building energy management solutions, district heating and cooling networks, EV integrated infrastructure, district-level smart lighting, interconnected systems of decentralised energy sources, urban	Reduce emissions and resource consumption by embedding integrated energy efficiency technologies.



Type		Short description	Examples of solutions	Value proposition
			development projects that re-qualify entire districts based on state-of-the-art technologies.	
	<b>Place making</b>	Focus is clearly on community engagement, favouring the communication between the public entities and the single citizen.	Smart places that stimulate the valorisation of community data, community development and collective awareness platforms to promote sustainability and social innovation or mobile-based civic engagement and empowerment.	Create communities of interest that can be key to support integrated SCC solutions.
Integrated Infrastructure & Processes	<b>Smart City Platforms</b>	Integrate large amounts of data and information collected by distributed sensors within the city, possibly including humans as sensors, which are then used by city managers or urban planners to guide the Smart City development process as a whole.	Typical solutions in this area are large-scale, transversal ICT platforms able to collect and analyse large amounts of data coming from a variety of sensors, common digital infrastructures that in a sense connect the entire city.	Allows real time monitoring and preventive steering of cities.
	<b>Intelligent City Services</b>	ICT-enhanced public service provision mechanisms.	Examples of solutions in this area are city open integrated data hubs, GIS applications, technologies bridging different sources of data such as social media and real-time monitoring tools, smart IT-based toolkits to ensure reciprocal communication between city authorities and citizens.	Co-ownership of local matters and outcomes. Efficiency savings for city administrations. Stimulate involvement at local level.
	<b>Smart grids</b>	Address energy issues with innovative ICT and data related components.	Analysed smart grids range from modernisation of distribution networks to more advanced, fully automated systems that include smart meters and appliances at the household level. Some reviewed solutions also integrate electric vehicles as storage units or develop parallel energy markets where prices try to reflect real-time demand and supply status.	Collected information and insights may serve planners and managers, but are often also shared with users, who can take more informed decisions and can also become <i>prosumers</i> , i.e. users that can switch from being energy consumers to becoming producers based on the circumstances.



---

# Assessments

---

- -Data Driven information
- -Fast Growing of Sensor Environment
- -Open Standards
- -Involvement with Community and Local Business
- -Sustainable solutions (Triple Bottom Line)



---

# Business Model

---

- **Public procurement** models for SCC Solutions;
- **Funding and financing** mechanisms of SCC Solutions;
- **Governance** of SCC solutions;
- **Citizen and community involvement** in SCC solutions.



---

# Financing Schemes

---

## ***Investment platforms***

Investment platforms are co-investment arrangements – which can be supported by EFSI – structured with a view to catalysing investments in a portfolio of projects (as opposed to individual projects) with a thematic or geographic focus<sup>12</sup>.

Investment platforms aim to **reduce transaction and information costs** and provide more efficient risk allocation between various investors. Ultimately this enables financing solutions to be spread over a wider range of projects, some of which would otherwise not be reached by other means (e.g. the EIB).

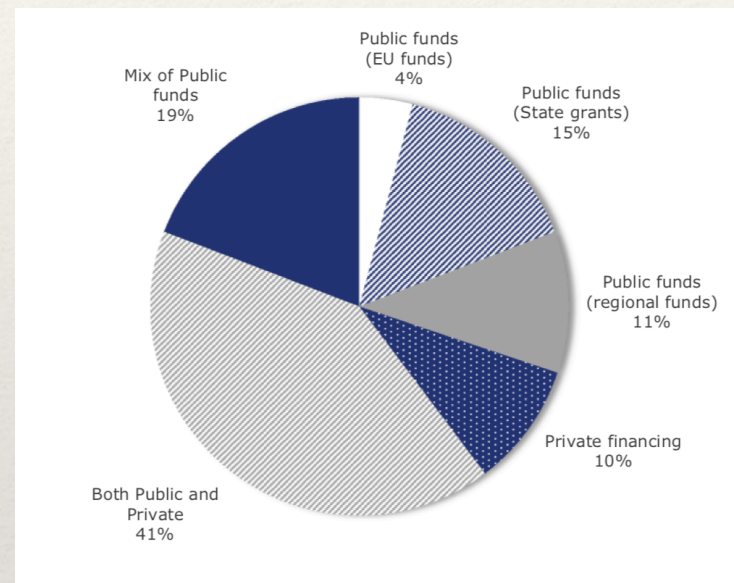
The range of products that can be provided through platforms is vast and includes:

- **Equity and quasi-equity** investment in projects or funds;
- **Loans** to projects, including subordinated loans to those provided by, for example, National Promotional Banks or private investors;
- **Guarantees**, which can include both guarantees directly to projects or guarantees and/or counter-guarantees to intermediaries who invest in projects.



# Financing Schemes

Funding/financing options chosen by SCC solutions





# Other Key Finding

## **Key findings:**

### **Lessons learnt on failure of SCC integrated solutions**

The joint analysis of the case studies, the literature and the opinions of stakeholders made it possible to identify certain commonalities that unsuccessful integrating SCC solutions shared. These are related to two main dimensions:

- **Inability of solutions to integrate with the urban dimensions** that their success depend on. In particular, this risky element has been recognised when designing and developing solutions without the sufficient involvement of the citizenry and – in several cases – of the political-institutional authorities. This involvement has rarely been constant throughout the project duration; most often it has been focused on the initial phases only.
- Despite a strong vision on how SCC solutions had to evolve and integrate with the urban environment in the long-term, a common **inability to translate the long-term orientation into a coherent action plan** strongly contributed to limit the chances of success of the cases analysed.

The technological dimension was hardly an issue at all.

## **Key findings:**

### **Possible approaches to avoid the failure of SCC solutions**

- **Simulations:** These can be especially useful to determine how the system reacts to the different stimuli produced by users' interaction. User interaction with the technology is a necessary enabler of integrated SCC solutions. Coherently, the use of simulation models like agent-based models (ABSs) and individual-based models (IBMs) to account for the different scenarios depending on user behaviour can help to identify and prevent situations leading to failure.
- **User Experience (UX):** Also in relation to the central role of humans in SCC systems, UX enables the assessment of what citizens need and what they experience when dealing with any specific SCC solution. As they would determine its success or failure, understanding how and if their needs are (over-) satisfied or neglected by solutions is essential.
- **Round-tables:** By definition, integrated SCC solutions involve different aspects of the urban dimension, which are to be carefully planned and accounted for by experts. What appears to be often lacking is the inclusion of experts such as urban planners, sociologists, transport experts, psychologists and ICT engineers, at least in the planning phase, when identifying the main risks and success factors.



---

# Roll Out of Integrated Solutions

---

- Report on the outcome of the analysis on replicating and scaling integrated SCC solutions
- Carry out a macro-level analysis of the the roll-out potential for SCC solutions, with a specific focus on the case of China and its potential partnership opportunities with the EU.



---

# Scalability

---

- **Scalability** refers to the possibility of increasing the size of a project without compromising its efficiency and effectiveness. Scalability is the characteristic that projects must have to evolve from experiments to full-scale urban projects.



---

# Replicability

---

- **Replicability** refers to the possibility of applying the same solution/technology to achieve the same objective in a different city. Replicability may be in terms of both scale (i.e. the extent to which a solution can adapt to the different configurations of the environment) or a specific case (i.e. whether the solution can be replicated in a specific, different context).

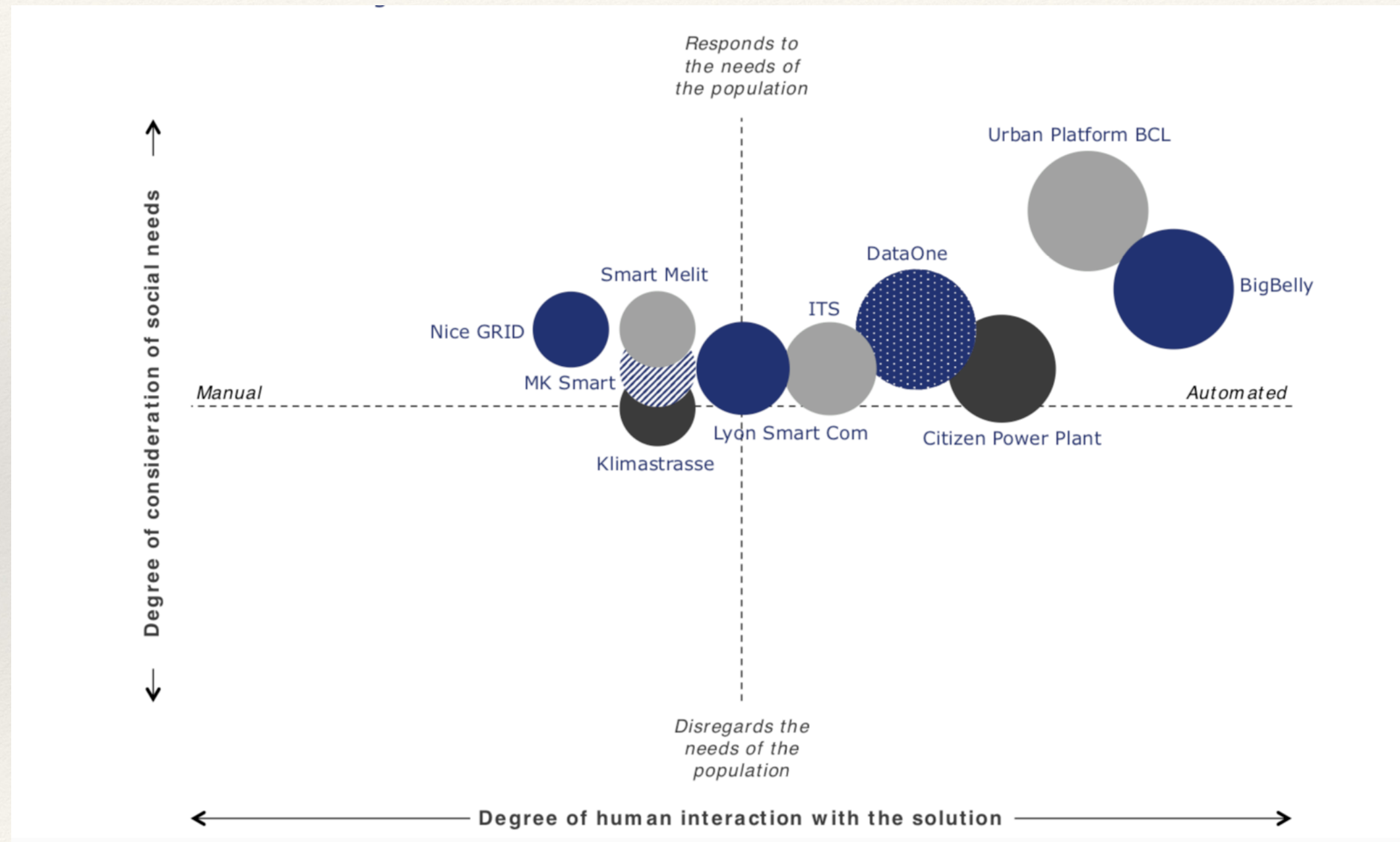


# Favorable Ecosystems

- **Organisational synergies**, which relate to collaboration among actors in the social, cultural and political dimensions, e.g. joint training programmes, knowledge sharing practices, as well as joint participation in higher coordination bodies.
- **Policy synergies**, which relate to collaboration among actors in the political-institutional dimension, e.g. joint membership to thematic groups/committees, promotion of country level goals, sharing of organisational strategies.
- **Operational synergies**, which relate to collaboration among actors in the economic/ business dimension, e.g. joint research activities, carrying out projects together to be more effective, co-organisation of relevant events, and collaboration in writing papers.
- **Most well-known and attractive organisations** (high awareness, high synergy attractiveness, many cooperation activities in place): This category groups actors recognised as the most well-known and attractive in terms of synergy potential (e.g. Eurocities, Iclei, Polis, Covenant of Mayors, EIP-SCC). They are most helpful in shaping the supporting environment of SCC solutions.
- **Organisations with good potential** (lower awareness, high synergy attractiveness): These organisations have been rated with good levels of synergy attractiveness, even though they are less well-known. Other actors who are aware of them appreciate their work and would like to cooperate with them (e.g. Concerto, Epomm, EIT).
- **Single player organisations** (lower awareness, lower synergy attractiveness): This cluster includes organisations that are less known, and which are regarded as slightly less attractive for creating partnerships. As depicted in Figure 14, there seems to be a direct correlation between the ability of organisations to support cooperation – and, ultimately, SCC roll-out – and the degree to which such organisations are known and attractive for stakeholders to partner with.



# Case Study Example





# Smart Cities Target Market





# Smart Cities Technologies Revenues Per Region

