Smart Urban Observatory for Smart Cities
Strengthening Urban Observatory

Second Forum

Urban Observatory of Riyadh City

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Content

Purpose Urban Observatories

- Create sustainable urban monitoring, planning and management systems
- Generate value-based urban data and across various sectors and partners within the city or country;
- Facilitate the participation of communities and public and private stakeholders in the monitoring processes for informed policies: Promote Local Ownership
- Strengthening capacities to select, collect, manage, analyze and apply indicators in overall policy planning

- Endless growth of cities in the periphery -Low density settlements
  - Consumption of land: up to 3 times

Population growth

  - Motorized means of mobility

Level of Intervention

The level of intervention refers to the geographic area that the observatory is covering.

The level is determined by the institutions involve, the thematic focus, the **scope** and the problems that is addressing.

Observatories could cover different administrative and geographical areas:

- Regional Level
- National Level
- City Level

Historic of the Global Urban Observatory

Monitoring the Habitat Agenda (1996-2016)

*"All partners of the Habitat Agenda, including local authorities, the private sector and communities, **should regularly monitor and evaluate** their own performances in the implementation of the Habitat Agenda through **comparable human settlements and shelter indicators** and documented best practices" [Habitat Agenda, 1996, Para 240]*

Habitat Agenda: chapters, goals and indicators

Chapters

- 1 Shelter
- 2 Social development
- 3 Environmental management
- 4 Economic development
- 5 Governance

Millennium Development Goals Slum Target (Target 7D)

- Access to improved water
- Access to improved sanitation
- Access to secure tenure
- Durability of housing
- Sufficient living area

Habitat Agenda Goals

1. Shelter	2. Social development and eradication of poverty	3. Environmental Management	4. Economic Development	5. Governance
Promote the right to adequate housing	Provide equal opportunities for a safe and healthy life	Promote geographically-balanced settlement structures	Strengthen small and micro-enterprises, particularly those developed by women	Promote decentralisation and strengthen local authorities
Provide security of tenure	Promote social integration and support disadvantaged groups	Manage supply and demand for water in an effective manner	Encourage PPP and stimulate productive employment opportunities	Encourage and support participation and civic engagement
Provide equal access to credit	Promote gender equality in human settlements development	Reduce urban pollution		Ensure transparent, accountable and efficient governance
Provide equal access to land		Prevent disasters and rebuild settlements		
Promote access to basic services		Promote effective and environmentally sound transportation systems		

Global Urban Indicators (Methodology)

Chapter → **Goal(s)** → **Indicator (s)**

1 Shelter

1. **Promote the right to adequate housing**
2. **Provide security of tenure**
3. **Provide equal access to land**
4. **Promote equal access to credit**
5. **Promote access to basic services**

Indicator 1. Durable Structures
Indicator 2. Overcrowding
Qualitative data: right to adequate housing
Extensive Indicator: house price and rent / income

The Global Urban Indicators Database

- **GUID 1**
- 1993 data
- 46 key indicators
- 237 Cities

- **GUID 2**
- 1998 data
- 23 key indicators
- 242 Cities

A five year production cycle

- **GUID 3**
- 2003 data
- 20 key indicators
- 353 Cities

- **GUID 2008**

20+Key indicators
1000+ cities

A two year production cycle

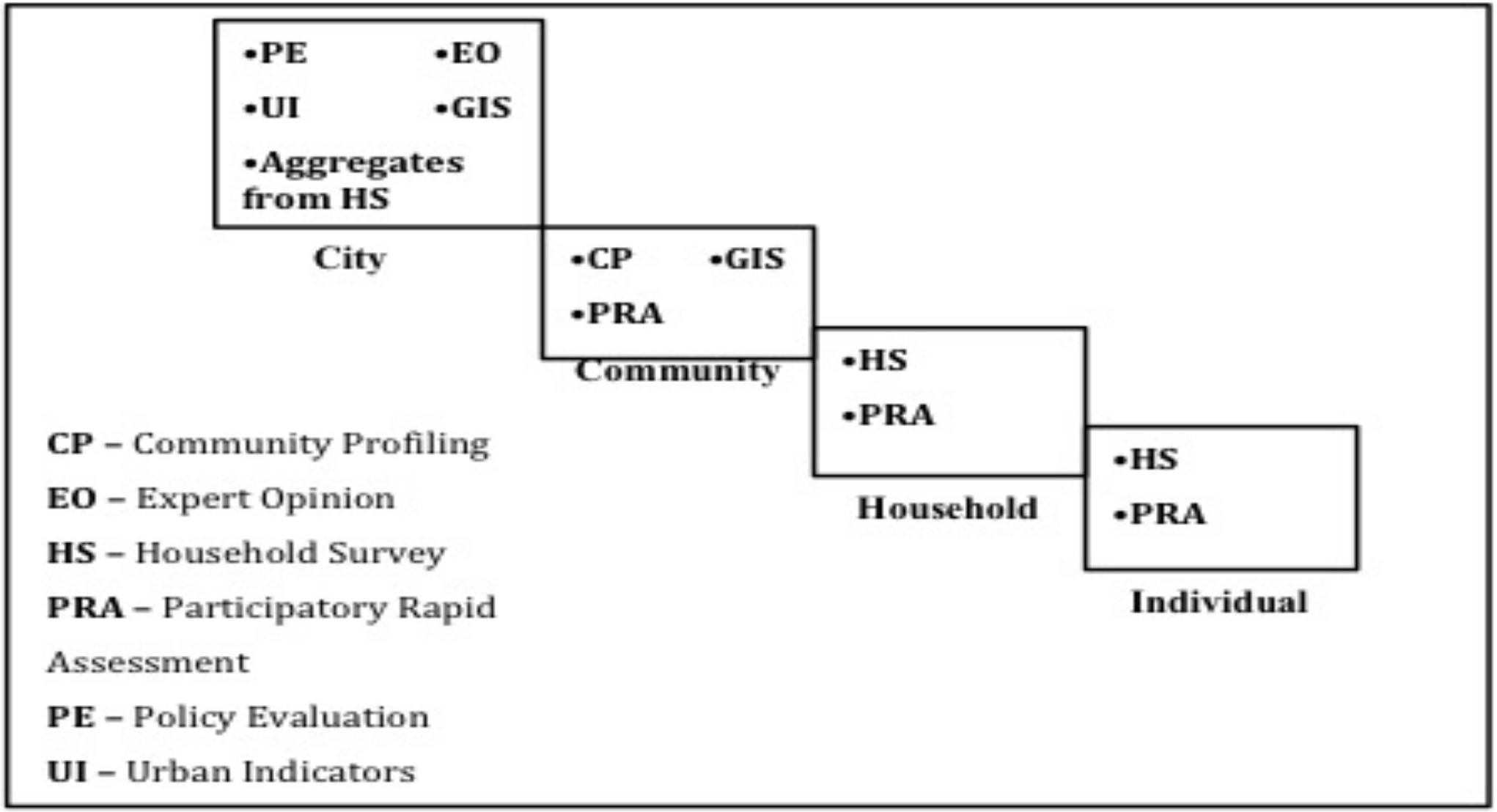
- **GUID 2010**

20+Key indicators
1000+ cities

- **GUID 2012, 2014**

20+Key indicators
1000+ cities

Instruments and tools by level monitoring and reporting: Classical Urban Observatories



Strengthening Urban Observatories towards Smart Urban Observatories

- **Monitoring and Reporting of multiple Post -2015 agendas, national and local agendas**

- **Respond to the Need for Smart Cities with Real-Time Information**

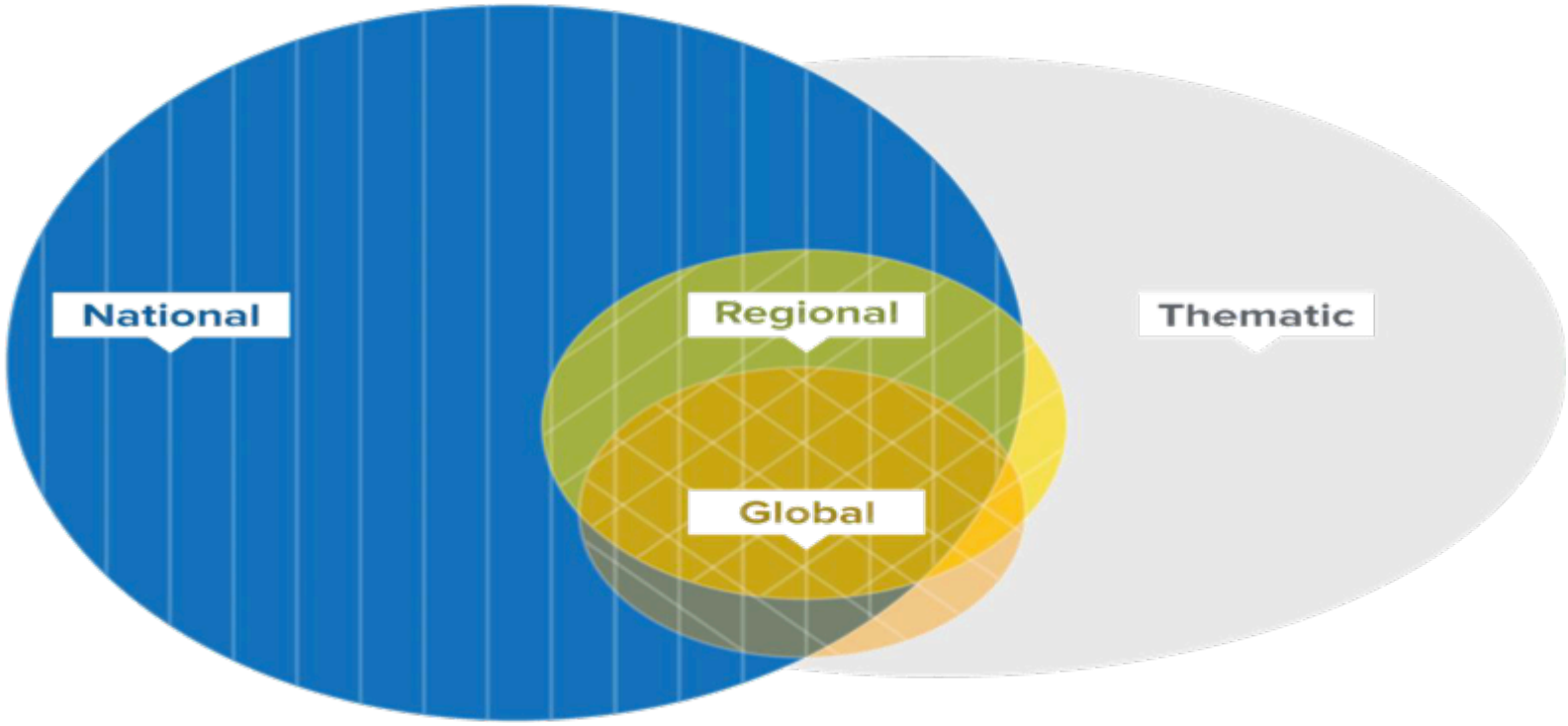
- **Emerging issues such as: Climate Change, Peace and Security, Disasters, etc.**

Smart Urban Observatories for the Monitoring and Reporting of Post 2015 Agendas and National Agendas

Commitment to Monitoring and Reporting in Development Agendas

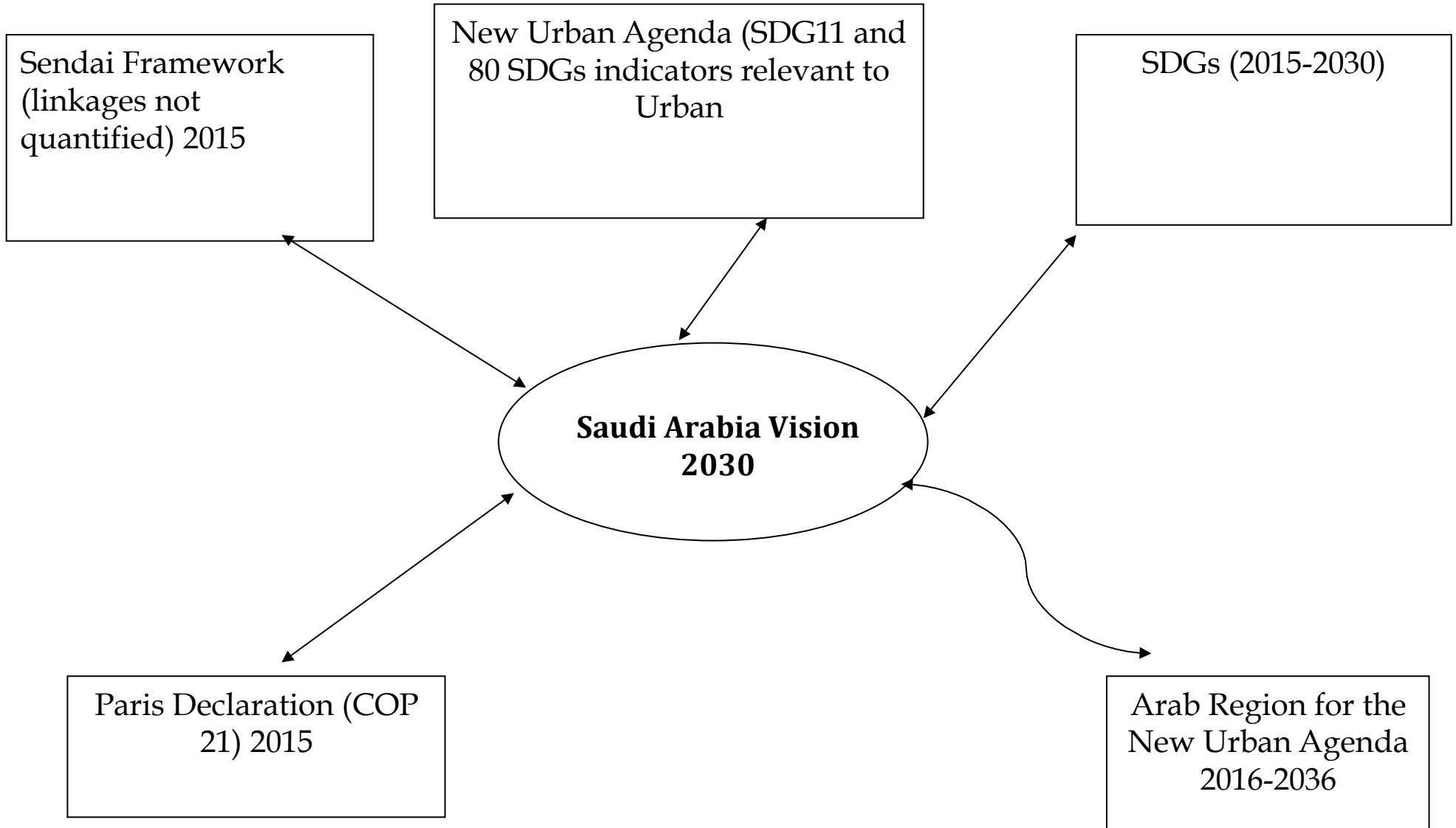
New Urban Agenda (2016)
SDGs (2015-2030)
Sendai Framework (2015)
COP 21 (2015)

National Agendas
(example Saudi Vision 2030)



Adapted from Sustainable Development Solutions Network (SDSN), 2015.

Building Synergies across Development Agendas to Streamline the National an Local Monitoring Framework: Example of Post-2015 Agendas and Saudi Arabia Vision 2030



2030 Agenda for Sustainable Development

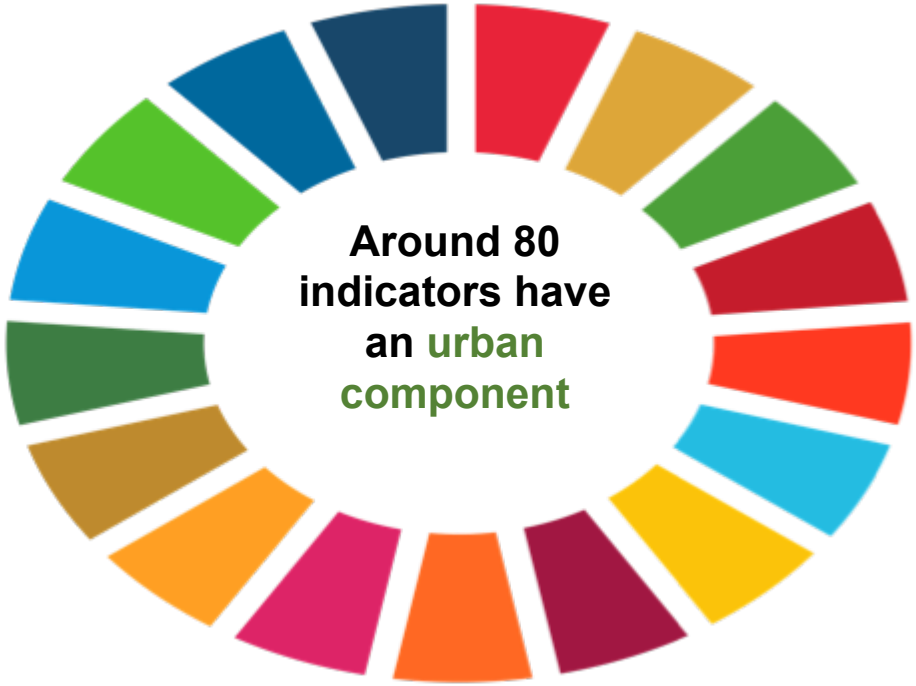
1 Agenda **5** Main Areas **17** Goals **169** Targets **240** Indicators

SDG Indicators with Urban Component

240 Indicators are part of the Global Monitoring Framework adopted by the Statistical Commission

Around one third of them can be measured at the local level

Direct connection to urban policies and clear impact on cities and human settlements



Need for Spatial data in the Monitoring of SDG11

	Target 1 Housing & slums	11.1 Proportion of urban population living in slums or informal settlements and inadequate housing	Spatial data
	Target 2 Transport	11.2 Proportion of the population that has a public transit stop (within 0.5 km ….)	Spatial data
	Target 3 Planning	11.3 Ratio of land consumption rate to population growth rate – Efficient land use	Spatial data
	Target 3 Planning	▪ Percentage of cities with a direct participation structure of civil society in urban planning and management which operate regularly and democratically	

Why Smart Urban Observatory for a smart real-time monitoring?

ICT has begun to turn some places into real-time cities. Social media itself is an example with billion of people using either Facebook, Linkedin, WhatsApp, Messenger or other digital platforms for social interactions as well as economic and financial transactions and services (E-Governance, E-Commerce, Online Banking, Online courses

This rapidly changing society calls for real-time assessment and anticipation of future needs of city dwellers

This cannot be captured with the classical urban observatory that provides information from household surveys, censuses, administrative report that often dated back two-five years.

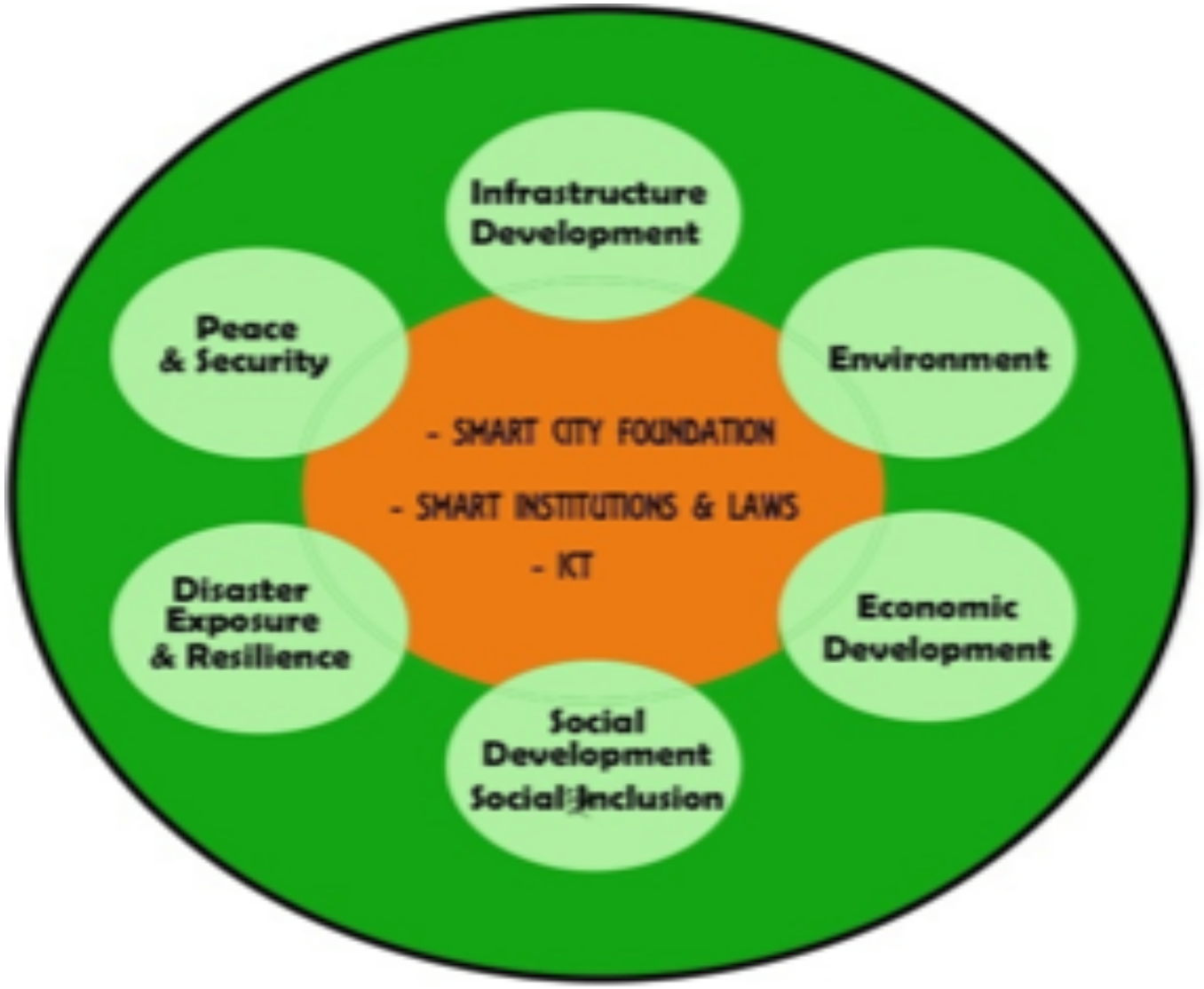
From Digital to Smart Cities

ICT and the Rise of Digitally served cities - Today it is recognized that ICTs have reached all corners of the world much faster than previous technological innovations. Cities are becoming digitally served. The question is how to turn digitally served cities to smart cities.

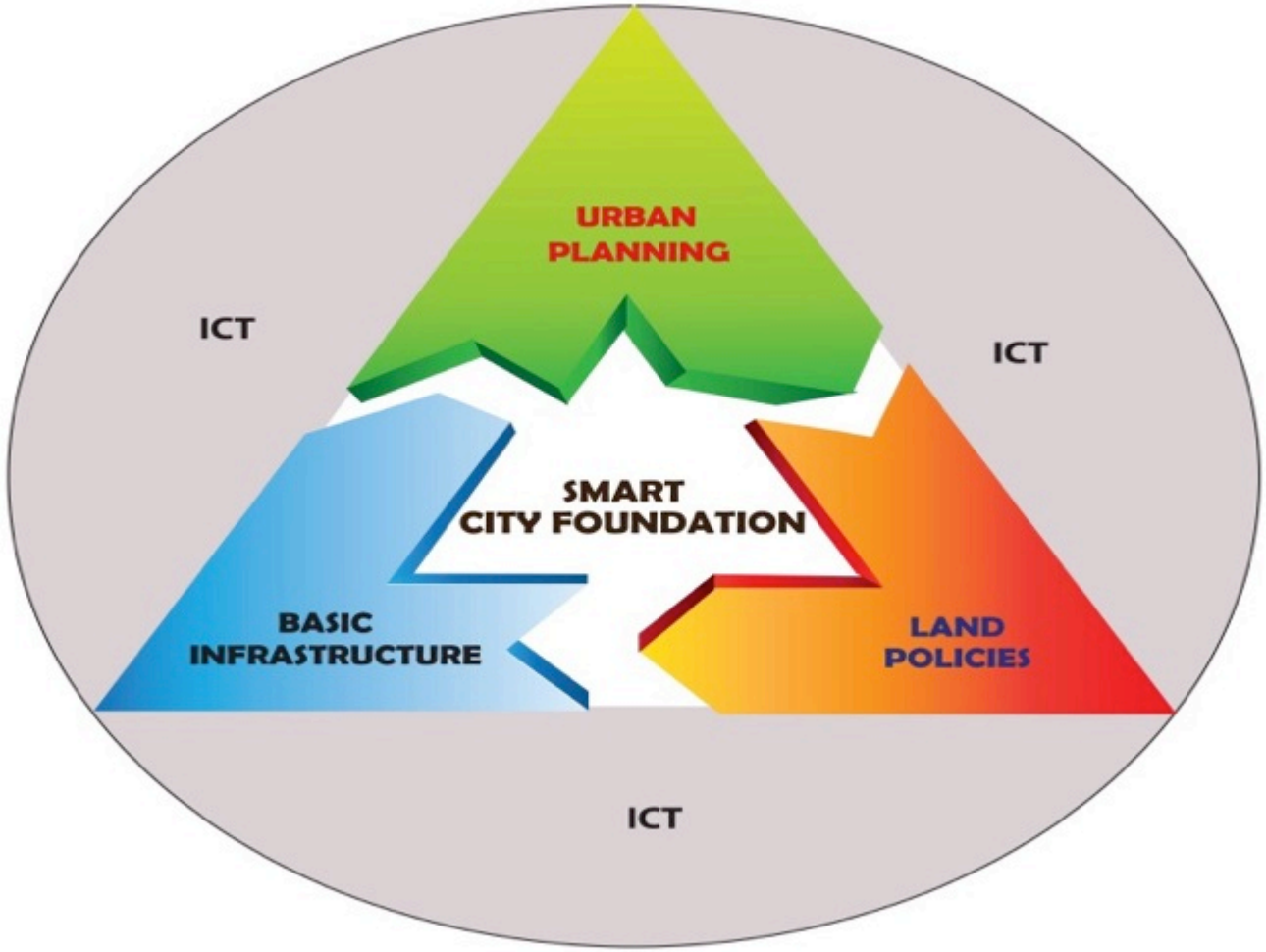
From Digitally Served Cities to Smart Cities - Use of ICT is a mean to make city smart, but ICT alone cannot make cities smart; other analog ingredients must be considered. 'Smart ' is not an end in itself. It is the way ICT is integrated in the city planning, design and management that will determine the city smartness.

Smart Urban Observatory for Smart Cities

Conceptual Framework



Smart Urban Observatory for Smart City Foundation: e-Planning, e-Land Tenure, e-Infrastructure



Connecting the land registration system to personal mobile phones
Use mobile services (GPS) to locate land and property and profile
Digitized land administration records, cadastres and land registries in an open and transparent platform

Smart Urban Observatory for Smart Urban Planning and Smart Land Tenure: From conventional planning to inclusive e-planning

Smart Urban Planning	Smart Land Tenure
Urban growth Unemployment Economic revitalization Transportation Public spaces Biodiversity Climate Change ---------	**land registration system to personal mobile phones** **Use mobile services (GPS) to locate land and property and profile** **Digitized land administration records, cadastres and land registries in an open and transparent platform**

Smart Observatory for Smart Water and Smart Waste **Management and** Monitoring

Smart Water management & Monitoring	Smart Waste Management & Monitoring
Advanced metering technologies allow for real-time communication of consumption patterns Water efficiency water quality Recycling and water reuse processes	ICT-based Solid Waste (SW) exchange reduction, reuse, and recycling, Monitoring illegal dumping using GPS Design of a planning system for autonomous landfill compaction Triangulated irregular network (TIN) for waste estimation

Smart Urban Observatory for Smart Monitoring and Management of energy

Smart Monitoring and Management of Energy

Emerging solutions in computing that are in themselves energy efficient, such as thin clients, grid computing and virtualization technologies

Smart meters show individual consumers how much electricity they use, creating incentives for behavioural change

Address energy saving potential in the energy end-use sectors that are not covered by the Emissions.

Smart Monitoring and Management of Mobility

SUO data analysis enable to develop less costly and more powerful “intelligent transport systems” (ITS)

There are various ITS initiatives taken by national and local authorities particularly along with the adoption of (Bus Rapid Transit) BRT and the metro line

High degree of institutional capacity, to construct, operate and maintain the system, as well as guaranteed revenue streams, to ensure the system continues to be financially viable.

Smart Urban Observatory for Smart Social Capital, Smart Education and Smart Cultural Heritage

Social Media: Connecting People to People and Enhancing Social Capital

Through social media people, within families and communities, engage on various social issues ranging from family matters to community and political issues (marriage, funeral, and religious ceremonies; Awareness s about the organization of their communities including connections to basic services such as water, electricity, solid management, flooding, etc.

Smart Education

education has been for a long time obtained in a classroom with a teacher and students. Today, the ICT has transformed the learning environment and methods and calls for a paradigm shift in assessing level of education and knowledge in a country or globally

Smart Urban Observatory for Smart Cultural Heritage

ICTs' use for Cultural Heritage has been growing very fast as part of the explosion in digital arts and humanities research driven by both public interest in heritage and the opportunity to enhance intellectual enquiry for Arts and Humanities researchers.

Cultural historical research requires knowledge of "possible pasts" –facts, events, material, social and psychological influences and motivations. This is impossible to achieve without ICT support and sophisticated search tools.

Smart Urban Observatory for Smart Peace & Security, Smart Disaster Prevention and Smart Governance

Smart Peace & Security

Conflict Early Warning (CEWARN) system as well as a Conflict Early Response Unit (CEWARU)

Mapping Urban Space through CCTV is also a powerful tool to monitor, manage and prevent crimes in cities.

Smart Disaster Prevention and Resilience

Smart Governance

SUO can enhance people participation, accountability, good governance and transparency
SUO can provide information for greater participation of citizens in public programme planning, management and monitoring
SUO can support the involvement of citizens in several administrative processes: from policy development to budget planning and programme implementation

Smart Urban Observatory for the monitoring, reporting of Smart Economy

ICT promotes innovation and efficiency through substitution and catalytic factors. E-commerce platforms are making their way in progressively digitized societies. Digital payment systems, e-books, streaming music, and social media are expanding trade and economic transaction with minimum costs.

Thorough increased efficiency and innovation, ICT increases economies of scale and agglomeration, and promote diffusion of knowledge, even at the smaller human settlements. Small settlements as small firms are benefiting from ICT in making their goods and services beyond their territories.

Better Planning, Management and Monitoring through of ICTs - ICT increases teamwork, communication, planning and coordination in all sectors. It makes production of goods and services precise. It increases human capital utilization and efficiency across all sectors.

Guide on Setting Up Smart Urban Observatories by AUDI and GORA Corp

- Stakeholder Consultations
- Plan of Sustainability
- Level of Smart Urban Observatories
- Baseline and Benchmarking
- **Integration of several data sources: Big data**

Smart Observatory starts with Stakeholders consultation on sharing information and assessing needs

Plan of Sustainability

Institutional support means government commitment to:

i) endorse the observatory;

ii) establish horizontal linkages;

iii) ensure the use of information to strengthen decision-making and policy formulation.

Financial support is the provision of funds for the day-to-day functioning of the observatory by one or different stakeholders.

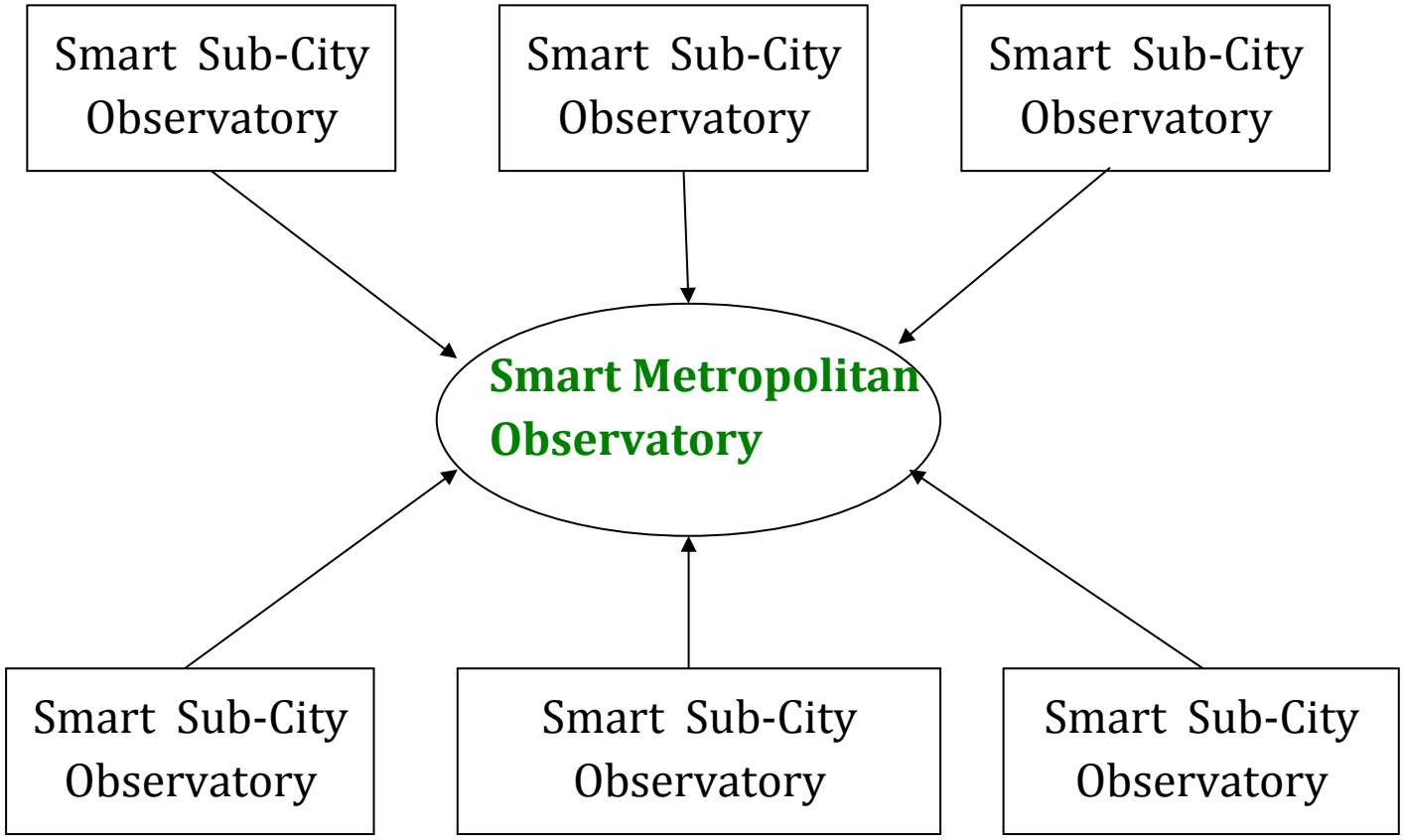
- Observatories would be sustainable if:

a) there is a clear political commitment from the national government and the local authorities;

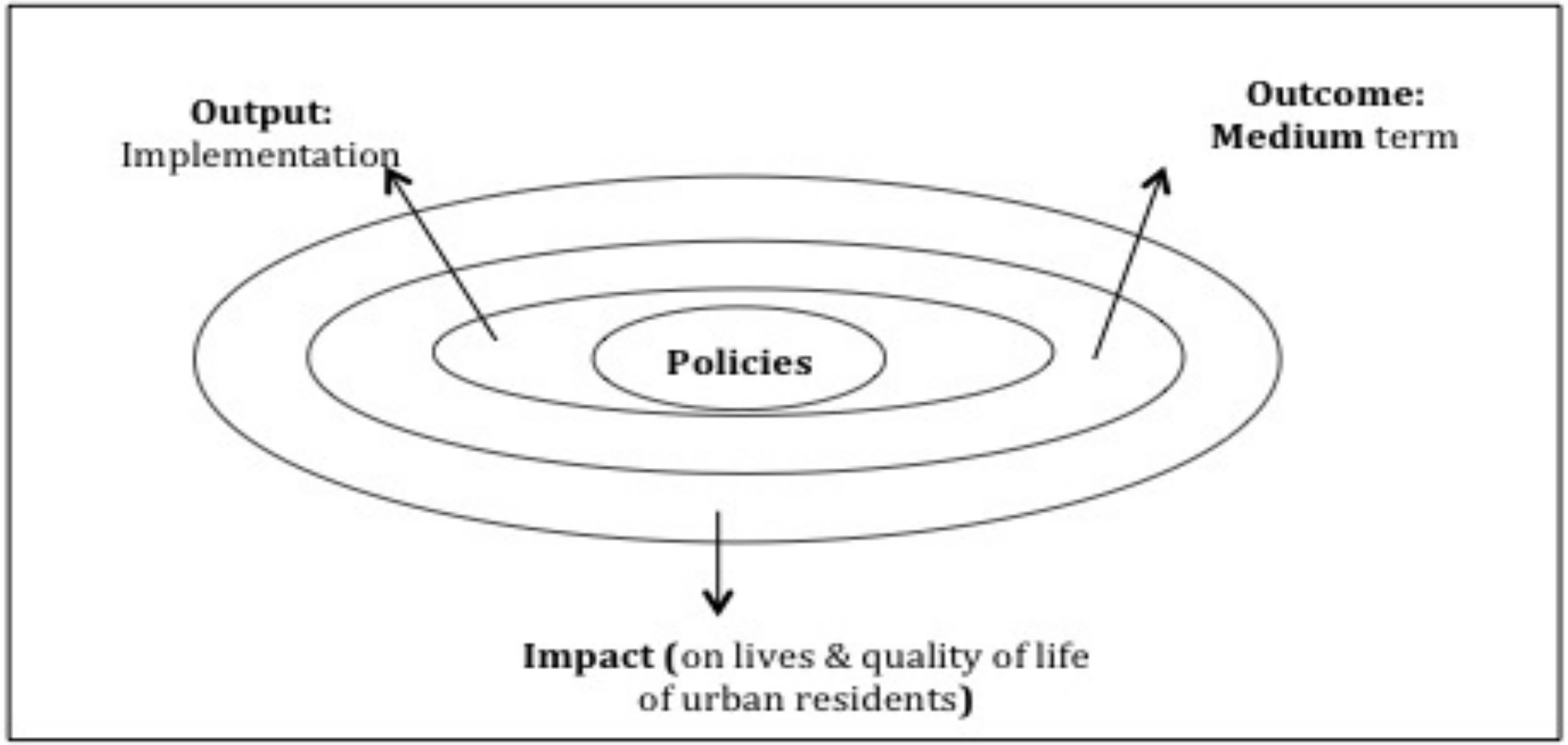
b) they are conceived through participatory process involving local stakeholders (private sector, NGOs, community organizations,);

It is recommended to enlist the institutions that may provide financial support in terms of funding for data collection and analysis and experts.

Geographical Level smart urban observatories - Illustration



Policy level of monitoring and reporting



Guiding Principles of Data for Smart Urban Observatories

The principle of *"integrity"* is about maintaining the letter and the spirit of each Agenda, Goals and Targets.

The principle of *"integration"* is about connecting Agenda, Goals and Targets to with inter-linkages.

The principle of *"disaggregation"* with special attention to women, children, elderly, people with disabilities, indigenous and others in vulnerable situations.

The principle of *"flexibility"* recognizes the diversity of countries, cities, etc.: urban development priorities, legislation, rules and regulations, urban policies, cultural environments

The Principle of "Relevant to the Urban Context": indicators must be relevant for cities and human settlements.

Integration of several data sources: Big data

- Development of Big Data for development of indicators from classical sources of information (population and housing censuses and household surveys) as well as GIS and social media to promote the development of smart cities and human settlements

- **Strengthening the Urban Observatory on the production of analysis of geo-referenced data, and preparation of index and indices of smart cities component:**

Real time information for Making Smart Cities– Smart Urban Observatory for Smart Cities

Global Working Group (GWG) on Big Data United Nations Statistical Division (UNSD)

A Global Working Group (GWG) on Big Data for Official Statistics has been tasked to investigate benefits and challenges of Big Data, including the potential for monitoring and reporting on the sustainable development goals. In this context, the GWG and the greater official statistical community recognize the need to adequately address issues pertaining to methodology, quality, technology, data access, legislation, privacy, management and finance, and provide adequate cost-benefit analyses on the use of Big Data.

Emerging development use of big data for monitoring and reporting

“Big data”– the deluge of new forms of information from mobile phones, satellite imagery, social media, call logs, online transactions, and so on – has great potential for the establishment of smart urban observatories

By leveraging the expertise of telecommunications companies and software developers, for instance, smart urban observatories could potentially reduce costs and improve the availability of data to monitor development goals

"Strengthening urban observatories to use mobile technologies to collect and disseminate data for effective policy and decision making”

In the absence of the use of big date, urban observatories risk obsolescence, since big data will become increasingly attractive to data users. Moreover, without coordination, big data may add to the cacophony of data discrepancies

Selected Projects of the use of big data for

- **Capacity Building in using Big Data as sources for public statistics**
- **Monitoring SDG 16 on peace and justice through Big Data (Tunisia)**
- **Big Data for Financial Inclusion and Poverty Mapping**
- **Real Time Assessments of How Markets Are Working for the Poor**
- **The Sensors are Here! A High-Resolution Application on Understanding Individual Travel Patterns in Cities**
- **Big Data and the Cloud – Piloting "eHealth" for Community Reporting of Community Performance-Based Financing**
- ***Big Data for Transport Project*** **(Morocco)**

- Data Visualization & Interactive Mapping to Support Response to Disease Outbreak
- use of smart meters: using electricity, gas and water smart meter data for energy and environmental statistics
- Analyzing Social Media Conversations to Understand Public Perceptions of Sanitation (Global)
- Using Twitter to Measure Global Engagement on Climate Change (Global);
- Using Mobile Phone Activity For Disaster Management During Floods (Global)
- Analyzing Large-scale News Media Content for Early Warning of Conflict (Global)
- Halting biodiversity loss making spatial data accessible to policy makers with Big Data tool (Global)
- Mining Citizen Feedback Data for Enhanced Local Government Decision-making
- Big Data solutions for enhancing tax compliance

Source: UNSD/ Global Working Group (GWG)

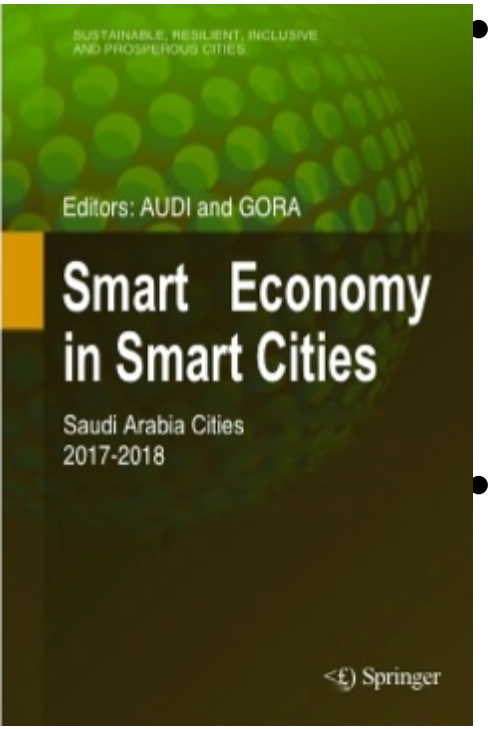
Baselines and Benchmarking

Starting the monitoring and the reporting early as possible will help to set baselines and to gauge later progress, to support Arab countries at a critical time of their development, and to jointly monitor all. Baselines and target values have a significant impact on whether a country is seen to have made progress.

Development of key indices to set up policies and track progress

- **Smart City Index**
- **Sustainable, resilient, inclusive and prosperous city index**
- **Sustainable city foundation**
- **Multiple Shelter deprivation index; etc.**

Advocacy & Communication
Knowledge Sharing



- Promotion of Open data through data visualization and revolution technology including social media, open portal, workshops and conferences forming a user-friendly open platform of advocacy and communication.

- State of Smart Cities Report: Sustainability, Resilience, Inclusion and Prosperity

Training & Capacity Development for Smart Cities

Training in the use and development of the “Smart Cities and Human Settlements”. A major weak link between research and policy is in the difficulty of people, government employees and other stakeholders to access and use indicators for policy formulation. AUDI and GORA's training and capacity development tools link research to action with the development policies relevant for smart cities and human settlements.

Smart Observatory for Smart Policies for Smart Cities

- The concept “Smart Cities and Human Settlements” will be integrated in urban policies. AUDI and GORA Corp will support the development of policy toolkits that integrate research analysis, impact assessment and learning practices and policies to assist for policy formulation and action plan development for the development of smart cities and human settlements.

ICT Infrastructure sharing

Infrastructure sharing by regulation in most countries Different approaches are adopted, depending on the case

Economic benefits

No wasteful duplication of hardware; Economies of scale; Reduced investment costs for operators and expected lower prices paid by consumers; Easier access to costly resources for new or "small operators"; Lower barriers to free competition

Social benefits

Reduced public health risks (linked to radio emissions); Preservation of open spaces.

Benefits in terms of competition

Fewer interconnection disputes between operators because they are forced to cooperate; Access to scarce resources for new or small operators; Lower barriers to competition; Improved offers of services.

Environmental benefits

Reduction in nuisance factors associated with civil engineering work (noise, degradation of public roads, obstacles to road traffic, accidents, etc.); Fewer health risks associated with the many different radio emissions; Fewer risks of damage caused by falling masts and towers; Preservation of open spaces.

Legislation on Sharing Information

- Confidentiality
- Protecting personal information
- Cyber-criminality

Cybersecurity Pillars (ITU)

- **Legal:** Measured based on the existence of legal institutions and frameworks dealing with cybersecurity and cybercrime.
- **Technical:** Measured based on the existence of technical institutions and frameworks dealing with cybersecurity.
- **Organizational:** Measured based on the existence of policy coordination institutions and strategies for cybersecurity development at the national level.
- **Capacity Building:** Measured based on the existence of research and development, education and training programmes; certified professionals and public sector agencies fostering capacity building.
- **Cooperation:** Measured based on the existence of partnerships, cooperative frameworks and information sharing networks.

Working together to Strengthen Urban Observatories towards Smart Urban Observatories for

Sustainable, Resilient, Inclusive and Prosperous Cities