

Skopje Smart City model

Research project

Sustainable, Green & Smart Programme

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What is a smart city?

ATTRACTIVE intelligent RESOURCEFUL effective
shrewd ADAPTABLE INTEGRATIVE BUSINESS-LIKE
across systems SOPHISTICATED
NETWORKED EFFICIENT

- " A Smart City is an urban ecosystem that places emphasis on the use of digital technology, shared knowledge and cohesive processes to underpin citizen benefits in vectors such as mobility, public safety, health and productivity."
- The term "smart city" was coined towards the end of the 20th century. It is rooted in the implementation of user-friendly information and communication technologies developed by major industries for urban spaces.
- Smart cities are forward-looking, progressive and resource-efficient while providing at the same time a high quality of life. They promote social and technological innovations and link existing infrastructures. They incorporate new energy, traffic and transport concepts that go easy on the environment.

What is a smart city?

"A city may be called 'Smart' 'when investments in human and social capital and traditional and modern communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance'.

Schaffers et al (2011)

'We take the particular perspective that cities are systems of systems, and that there are emerging opportunities to introduce digital nervous systems, intelligent responsiveness, and optimization at every level of system integration.'

MIT (2013)



Potential Hazards Threat to life, health, property, or environment



Climate change

Climate change is one of the most pressing issues we are currently faced with. ${\rm CO_2}$ emissions must be reduced in the decades to come while measures need to be taken to reign in global warming, floods and extended heat waves. Cities are responsible for approximately three quarters of greenhouse gases worldwide. Being major polluters they are also called upon to provide solutions.



Scarce resources

Resources such as fossil energy, clean water and disposable land are limited as most of us are aware of. We also know that cities consume the lion share of all energy produced worldwide. Food, housing, mobility and waste removal require raw materials and energy.

To maintain a high standard of living for the long term cities must reduce their ecological footprint and seek for alternatives to scarce fossil resources.



Urbanisation

More than half the world's population already occupies urban spaces. Estimates reckon that number to reach two thirds by 2050. This dramatic development is ultimately due to the many opportunities people are awarded to design their own lives in cities. Rising urbanisation, however, also means greater challenges: as cities grow people's needs and demands must be met in ways that go easy on the environment.

Smart Cities (Communities)



- 53% of world's population lives in urban areas and generate 70% of global GDP
- 70% of world's population will live in urban areas by 2050
- Smart Cities have an important role in creating safe, pleasant and sustainable environmeent

The 19th century was a century of empires,
The 20th century was a century of nation states.
The 21st century will be a century of cities



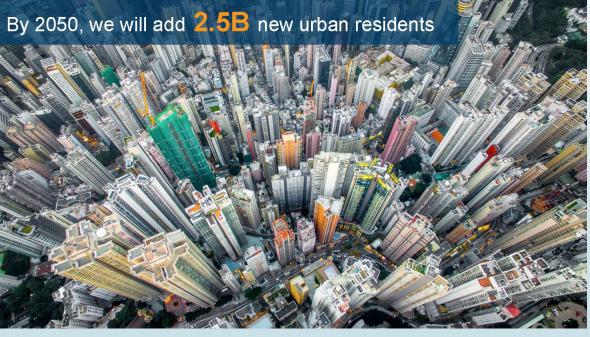


Smart Cities (Communities)





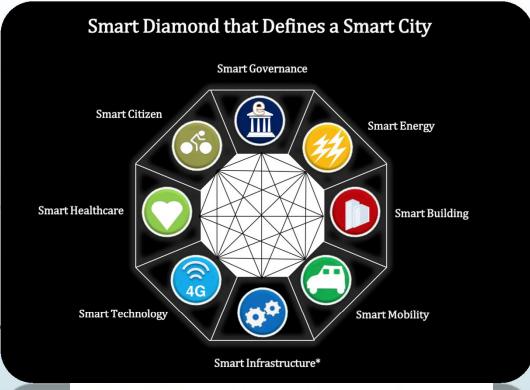




FIELDS OF ACTION Smart urban development?

- The first step towards becoming a smart city is taken at the strategic level.
- Main fields of action in this context are energy, mobility, the environment, the economy, society, politics, administration and quality of life.
- Some of the above are intertwined and increasingly networked with the support of IT.
- Technical, economic and social innovations provide the foundation for such activities.
- Smart cities build on sustainability but also on resilience in the sense that cities as systems are made more resistant and adaptable to influences from inside and out.

Key components of Smart City are as follows:





Mobility: urban transport systems, including public and private transport. Also includes non-motorised transport solutions.



Healthcare: healthcare service delivery for citizens, including access to services and performance.



Public safety: city safety as measured by crime levels, mortality and law enforcement services' efforts to combat these challenges.



Productivity: city policies and technologies in use aimed at promoting citizen productivity, democratisation of services and wealth distribution.

- Smart Energy: Digital Management of Energy
- Smart Buildings: Automated Intelligent Buildings
- Smart Mobility: Intelligent Mobility
- Smart Technology: Seamless Connectivity
- Smart Infrastructure: Digital
 Management of Infrastructure
- Smart Healthcare: Intelligent Healthcare Technology
- Smart Governance: Governance onthe-go
- Smart Citizen: Civic Digital Natives

Energy and the environment Electricity is foundational for a smart city

■ Electric power is modernizing

- Energy and the environment Reducing energy and raw material consumption and forwardlooking resource management are among a city's major concerns.
- Smart supply and disposal systems are just as important as processdriven changes, technological developments and networks for energy, mobility, infrastructure and buildings.
- Smart grids, for that matter, are a step towards smart energy consumption: intelligent networks and rhonitoring systems are put in charge of energy generation, storage and consumption.
- Smart meters are installed to make actual energy consumption more transparen



- √ Smart meters
- √ Sensors
- √ Self-healing grid
- √ Solar power
- √ Wind power
- ✓ Communications networks
- ✓ EV charging
- √ Smart grids
- ✓ Digital management of energy
- ✓ Energy efficiency
- √ Smart street lights
- ✓ Big data analytics

Mobility

- Smart mobility means innovative traffic and transport infrastructure that saves resources and builds on new technologies for maximum efficiency.
- Accessibility, affordability and safety of transport systems, as well as compact urban development are essential factors in this context.
- New user-friendly facilities will make it easier for people to switch to integrated transport systems focussed on environmentally friendly transport modes.
- Joint utilisation, i.e. "car sharing", instead of private ownership is what counts these days when using motor vehicles.



Economy



- Smart economies actively support education, qualification, research and entrepreneurial spirit, innovation, productivity and flexibility.
- Continuous knowledge acquisition and transfer, as well as local and global networks are the main ingredients for creative output.
- Enterprises offering IT, environmental and energy services in particular are considered the driving force for smart economies.



Governance

- Smart Governance promotes both, changes in governance and coordination processes, and planning processes with public participation.
- The administration encourages cooperation among municipal organisation units and is opening itself up to a wide range of players from business, research, civil society and other local authorities.
- Projects in their implementation stage increasingly rely on cooperation among the above.
- Public digital data are widely accessible to allow for more transparency and enable people to participate in decision-making processes.





Society

- Increasing people's quality of life requires more than technical innovations.
- Also and above all it is the social dimension that needs to be taken into account.
- Civil society must be actively involved in making smart cities become reality.
- Main focus must be on education, lifelong learning, culture, health, safety of individuals, plurality of society and social cohesion.
- Urban everyday life provides sufficient leeway to promote people's creativity and competences.
- Networking and self-management are major pillars of society without which smart cities would be doomed to fail.





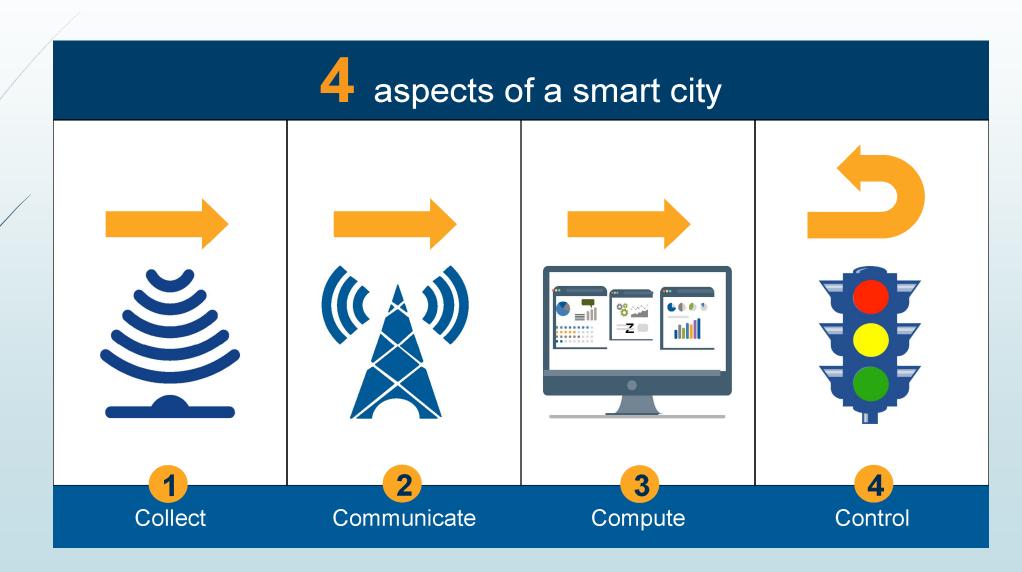


What we need?

Convergence: What we need at a price we can afford



4 aspects of a smart city concept



Benefits

Benefits of smart, sustainable communities



Livability, Workability, Sustainability

Smart Cities Will Deliver...

"If cities across the globe today were to universally adopt, and deploy, smart city technology and services, what would the benefits be for citizens?"

How will This Time be Created?



Mobility Saves 60 Hours

Smart Traffic Systems Including dynamic traffic light phasing and smart parking reduce time in traffic. Open Data Platforms enable citizens to choose the fastest metro/bus lines.



Public Safety Saves 35 Hours

Machine learning enabled software such as PredPol used to predict crime spots on a given day. ITS here is used to prioritise emergency service vehicles through traffic light phasing & driver re-routing.



Healthcare Saves 9 Hours

Healthcare preventative apps & telehealth aim to reduce average physician visits by promoting better overall wellbeing. While improved administration and preliminary diagnosis reduce wait times.



Productivity Saves 21 Hours

Apps or digital services will simplify administrative processes when citizens interact with city agencies.

Benefits to Smart City Inhabitants



More Time for Family and Friends

Enough time to enjoy a meal with friends or family twice a week.



Get Active

Exercise for 45 minutes 3 times a week every week of the year.



Take a Long Vacation

An additional 50% to the average annual US vacation allowance.



Improved Recovery

Studies have indicated that wounds take up to 25% longer to heal when individuals are chronically stressed. 110 million people die every year as a direct result of stress.



Decreased Risk of Depression

Lost productivity and medical expenses from depression costs over \$83 billion annually: \$11.30 for every person on the planet, every year.

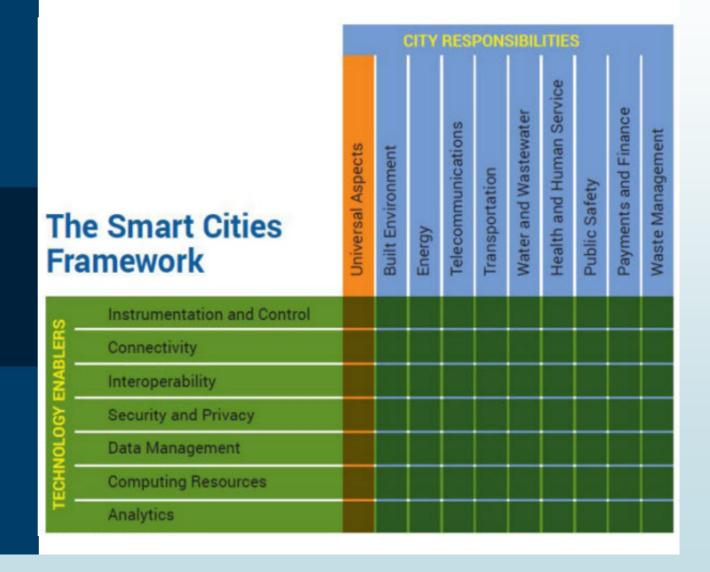


Improved Earning Potential

The cost of stress can be high: If left unaddressed, it could mean that individuals' potential earnings fall by \$10,000

Happier for Less.....

Transforming every aspect of urban life



3 common on-ramps

3 common on-ramps



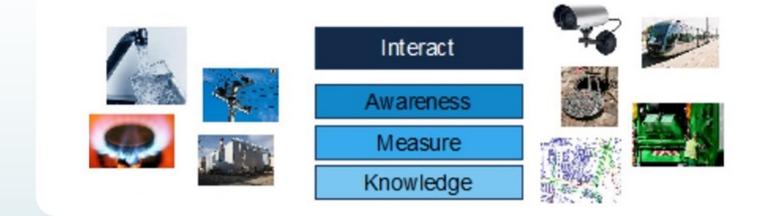
The Role of Data in Smart City

■ The development of digital technologies in the different domains in which cities operate, either directly or indirectly, is going to alter expectations among those in charge of the local administration.

■ Today local administrations want:

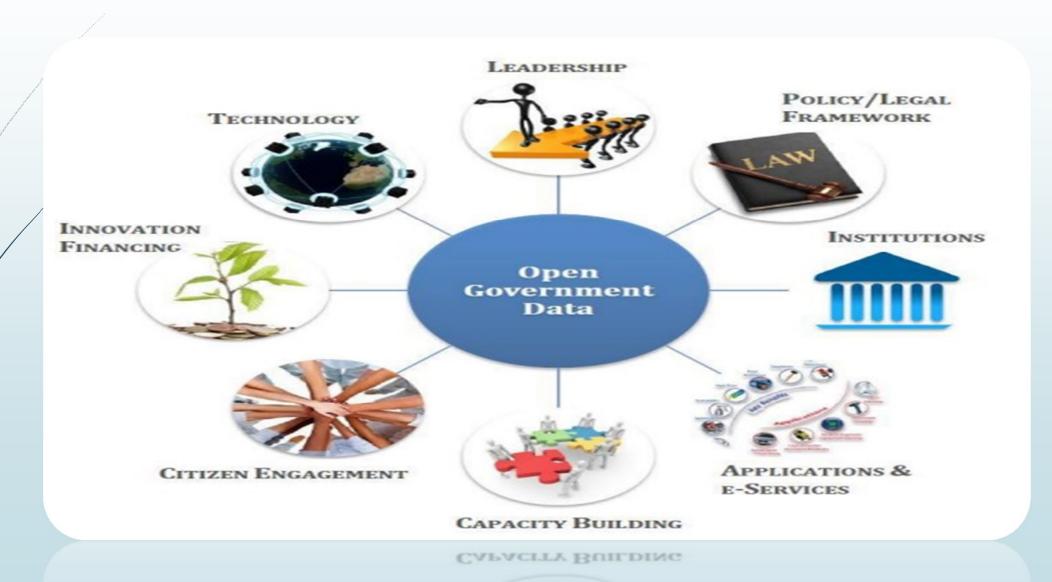
- > to know the existing infrastructures in their city: water, telecom, transport, energy...
- > to measure the usages, the traffics and their evolution, the quality of services ...
- > to be informed of what happens (not to be informed by the press today after that the water have been cut, or that a bus line was stopped ...),
- > to interact with third party operators.

The Role of Data in Smart City - Open Data



- As a consequence, a lot of data are today generated by different IT systems, which can depend on the city administration or depend on
- systems, which can depend on the city administration or depend on utilities third party operators.
- Historically these data have been considered as internal to the systems, as a property of the administration or of utility operators. In the recent years, however, two major issues have emerged.
- They are going to strongly impact the way the city interacts with its citizens.
- Open Data for Smart Cities is about increased transparency, sharing the information and building useful applications.

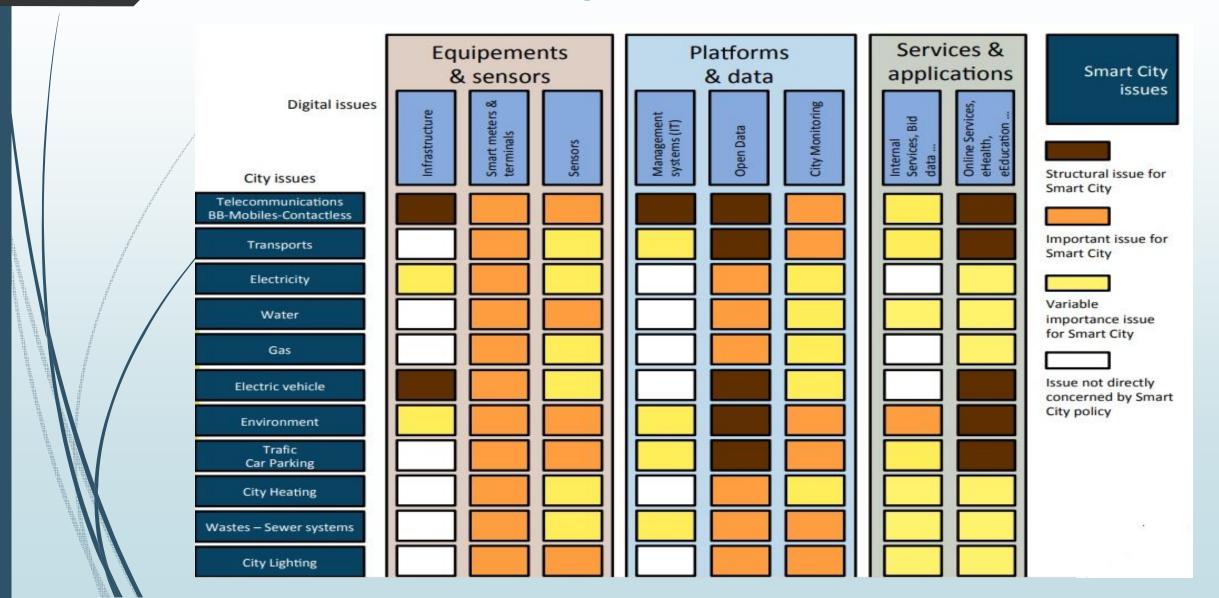
Economic Value of Open Data



Open Data & Big Data, a must for Smart Cities

- Big Data & Open data are the way to master information and turn challenges into opportunities.
 - 1. Allow for better decisions.
 - 2. Stimulate innovation.
 - 3. Foster greater collaboration.
 - 4. Promote predictive analytics.
 - 5. Conserve financial resources.
 - 6. Become more effective, efficient, and equitable.

Combination of Thematics that refer to city public services & Digital issues



Cities Challenges.....

- Training
- Staffing
- **■** Budget
- Cooperation
- Coordination
- System capacity
- Knowledge management
- Predictive analytics

Conclusion.... Cities around the world

Some cities are already pulling ahead...







Singapore "Smart nation"



New York "OneNYC"