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USTDA Turkey Smart Cities Briefing

October 12, 2016

Presented by: Tuatara Group, Smart Cities Council, and Novusens

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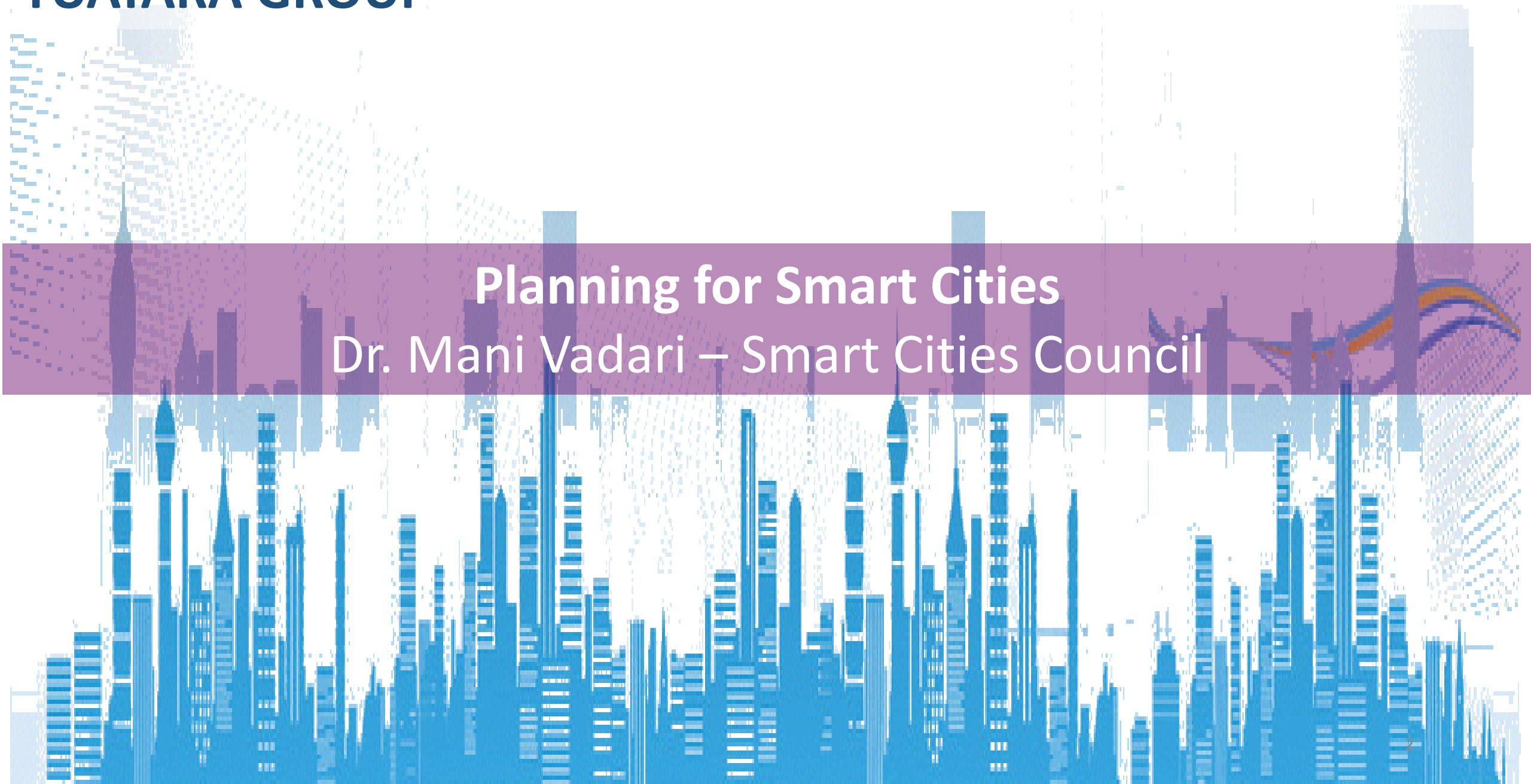
Planning for Smart Cities

Dr. Mani Vadari – Smart Cities Council



What is a Smart City?

Forrester Research emphasizes the use of computing to monitor infrastructure and improve services*: "The use of smart computing technologies to make the critical infrastructure components and services of a city … more intelligent, interconnected and efficient."*

U.S. Office of Scientific and Technical Information also stresses infrastructure: *"A city that monitors and integrates conditions of all of its critical infrastructures – can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens."*

The Smart Cities Council: *"A city that uses information and communications technology (ICT) to enhance its livability, workability and sustainability."*

How are Cities our Greatest Opportunity?

- 75% of GDP
- Access to jobs

- Innovation hubs
- Tokyo world's 15th largest economy, ahead of India and Mexico

- Mobility and mass transit
- International travel hubs

- Industrial and commercial hubs
- Culture and entertainment

- "The most significant shift in the earth's economic center of gravity in history." McKinsey & Company

Why are Cities our Greatest Challenge?

- 54% of world population already lives in cities
- 5 million people move to cities every month

- 70% of carbon emissions
- Growing pollution

- Increasing congestion
- New York loses $13 billion per year to traffic congestion

- Aging infrastructure
- Falling budgets

- Vulnerable to climate change
- Energy & water shortages

Smart City Responsibilities


Built Environment


Energy


Telecommunications


Transportation


Water and Wastewater


Health and Human Services


Public Safety


Payments and Finance

Waste Management

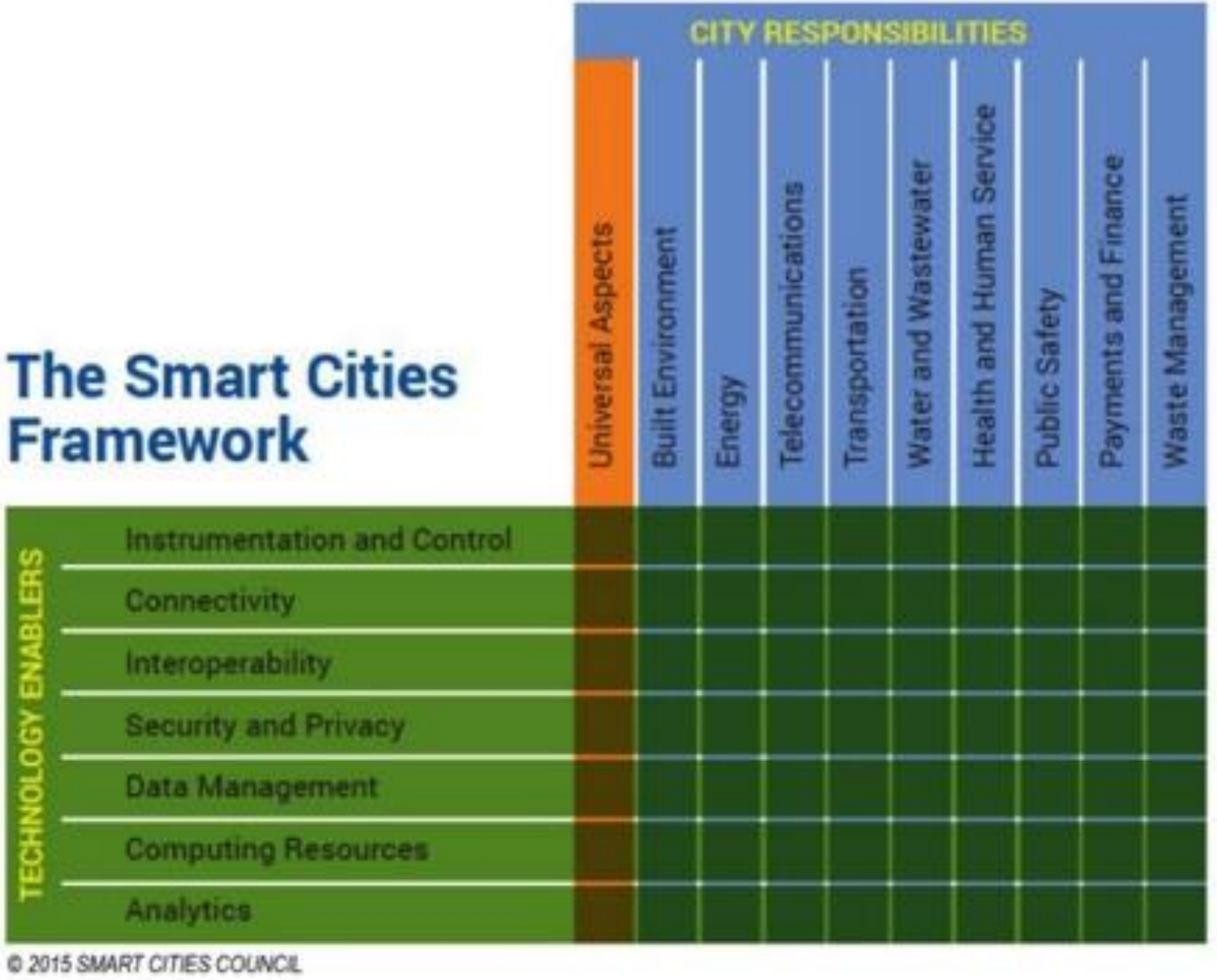
Traditional Cities vs. Smart Cities (1/2)

	Traditional City	Smart City
Planning	▪ Ad hoc and siloed ▪ Cost savings aren't realized ▪ Limited potential for investment scalability	▪ Coordinated and holistic ▪ Resources are shared ▪ Cost savings are fully realized ▪ Investments are scalable ▪ Improved city planning and forecasting
Infrastructure	▪ Runs inefficiently ▪ Costs more money and resources to run	▪ Optimized with cutting-edge technology ▪ Saves money and resources ▪ Improved service-level agreements
System operators	▪ Guess at infrastructure conditions ▪ React to problems ▪ Can't deploy resources efficiently to address problems	▪ Enjoy real-time reporting on infrastructure conditions ▪ Predict and prevent problems ▪ Deploy resources more efficiently ▪ Automate maintenance ▪ Save money

Traditional Cities vs. Smart Cities (2/2)

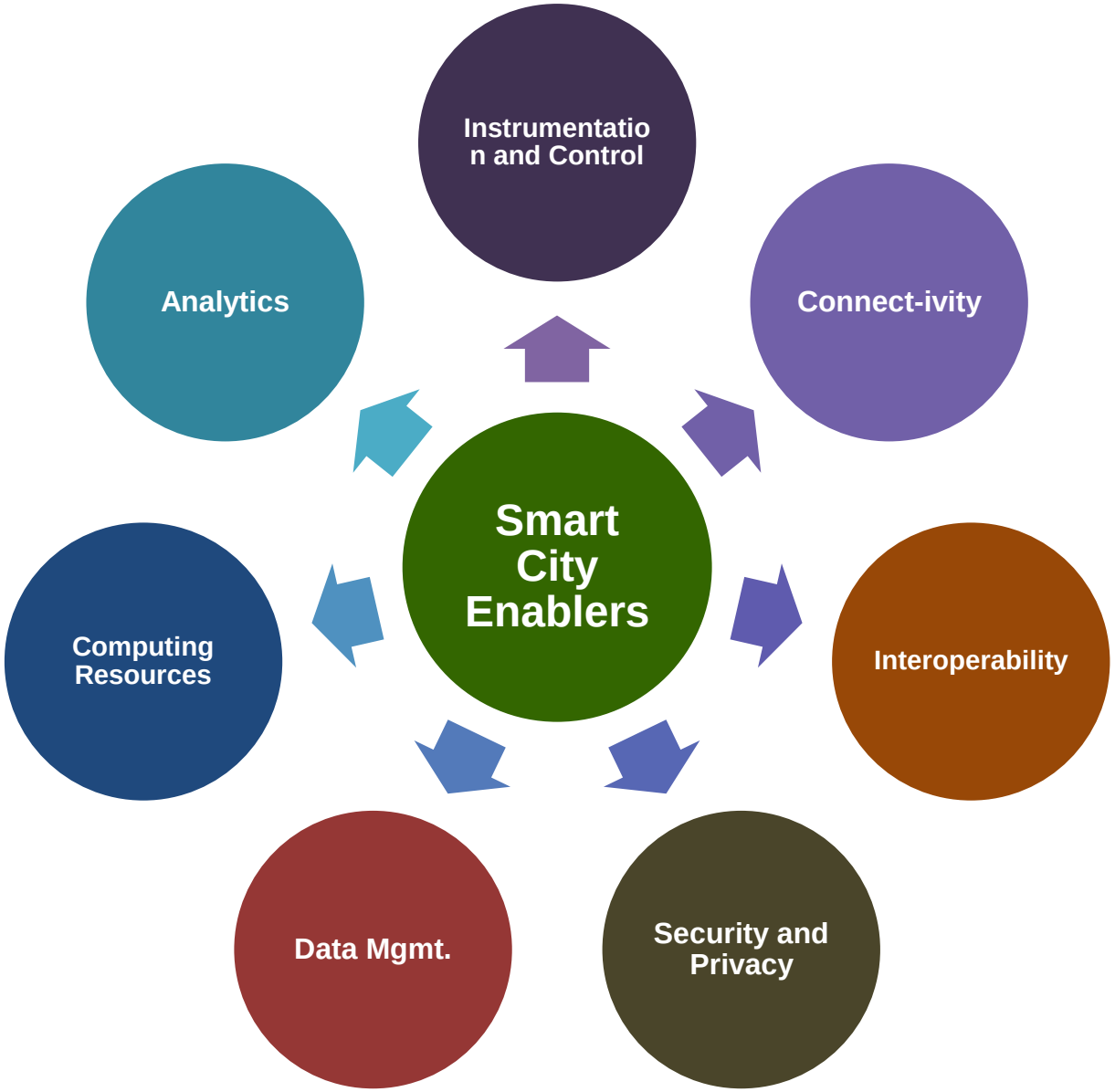
	Traditional City	Smart City
ICT investments	▪ Piecemeal and siloed ▪ Deliver suboptimal benefit ▪ Don't realize economies of scale	▪ Centrally planned ▪ Deployed across city departments and projects ▪ Deliver optimal benefit ▪ Provide maximum value and savings
Citizen engagement	▪ Limited, scattered online connection to citizens ▪ Citizens can't make optimal use of city services (or easily find them)	▪ Complete and singular online presence ▪ Citizens can easily find and use services ▪ Citizens can participate in smart city initiatives ▪ Two-way communications between government and people ▪ Specialized services focused on the individual citizen ▪ Citizens can both contribute to and access real-time intelligent city data
Sharing data	▪ Departments and functions are siloed ▪ Departments rarely share data and collaborate on initiatives	▪ Departments and functions are integrated and/or shared ▪ Data is shared between departments and better correlated with other data services ▪ Results are improved ▪ Costs are cut

The Smart City Framework



Source: Smart Cities Council

Smart City Enablers



What are Smart City Universal Principles/Targets? (1/2)

Technology Enabler	Universal Targets
Instrumentation and Control	1. Implement optimal instrumentation
Connectivity	2. Connect devices with citywide, multi-service communications
Interoperability	3. Adhere to open standards 4. Use open integration architectures and loosely coupled interfaces 5. Prioritize use of legacy investments
Security & Privacy	6. Publish privacy rules 7. Create a security framework 8. Implement cybersecurity

What are Smart City Universal Principles/Targets? (2/2)

Technology Enabler	Universal Targets
Data Management	9. Create a citywide data management, transparency and sharing policy
Computing Resources	10. Consider a cloud computing framework 11. Use an open innovation platform 12. Have access to a central GIS 13. Have access to comprehensive network and device management
Analytics	14. Achieve full situational awareness 15. Achieve operational optimization 16. Achieve asset optimization 17. Pursue predictive analytics

What are the Barriers to Smart Cities?

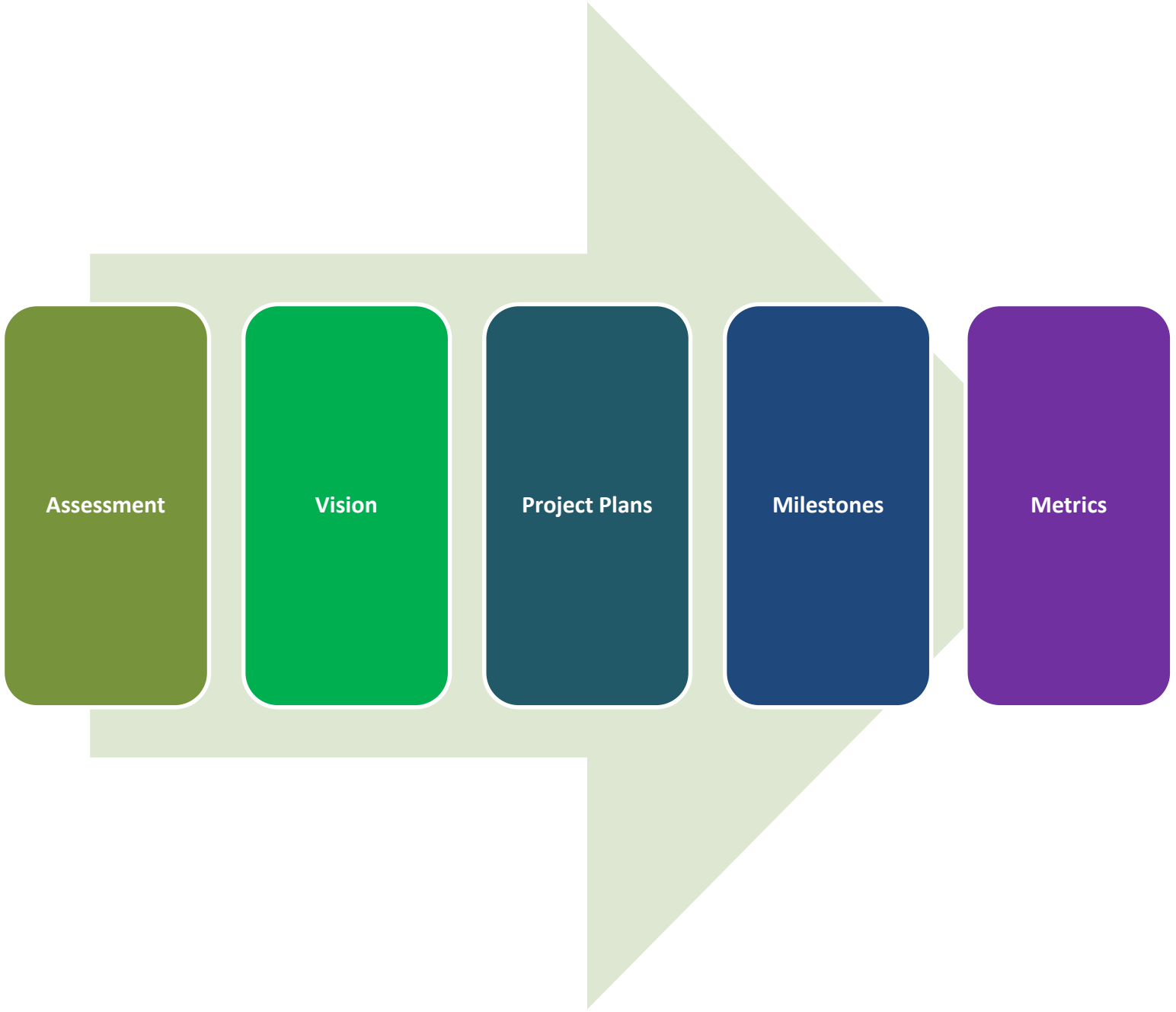
Complexity	▪ Multiple departments, stakeholders, processes
Leadership	▪ Elected official/business leader needed to champion smart city vision
Finance	▪ Shrinking tax revenues, budget cuts, austerity measures
Business	▪ Integrated services across departments, single citizen portal
Technology	▪ Public-private partnerships in infusing ICT

What is the need for a Smart City Roadmap?

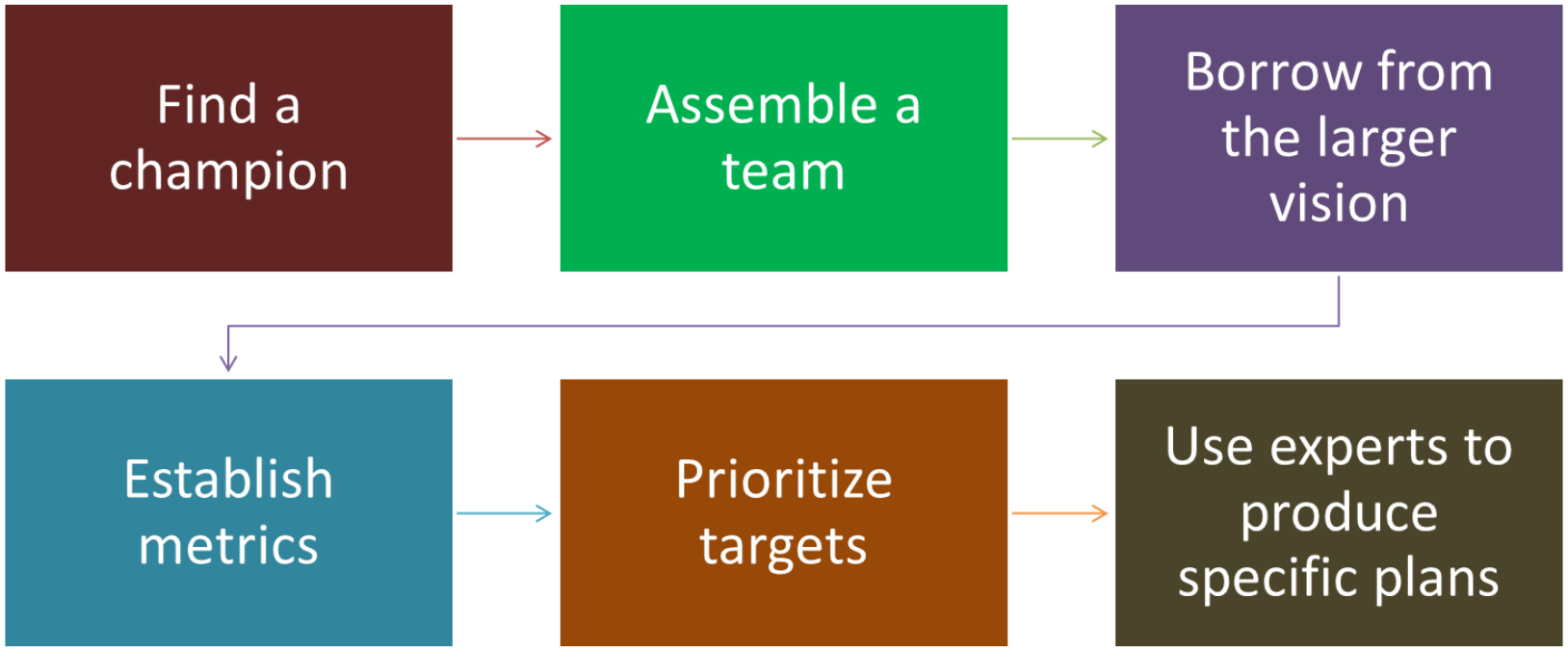
- ❑ The path to a smart city is a long one.
- ❑ Can take 5, 10, even 15 years to make smart technologies pervasive.

- ❑ Essential to have a clear, consensus goal to motivate citizens.
- ❑ Need clear targets to guide the course corrections that will be needed along the way.

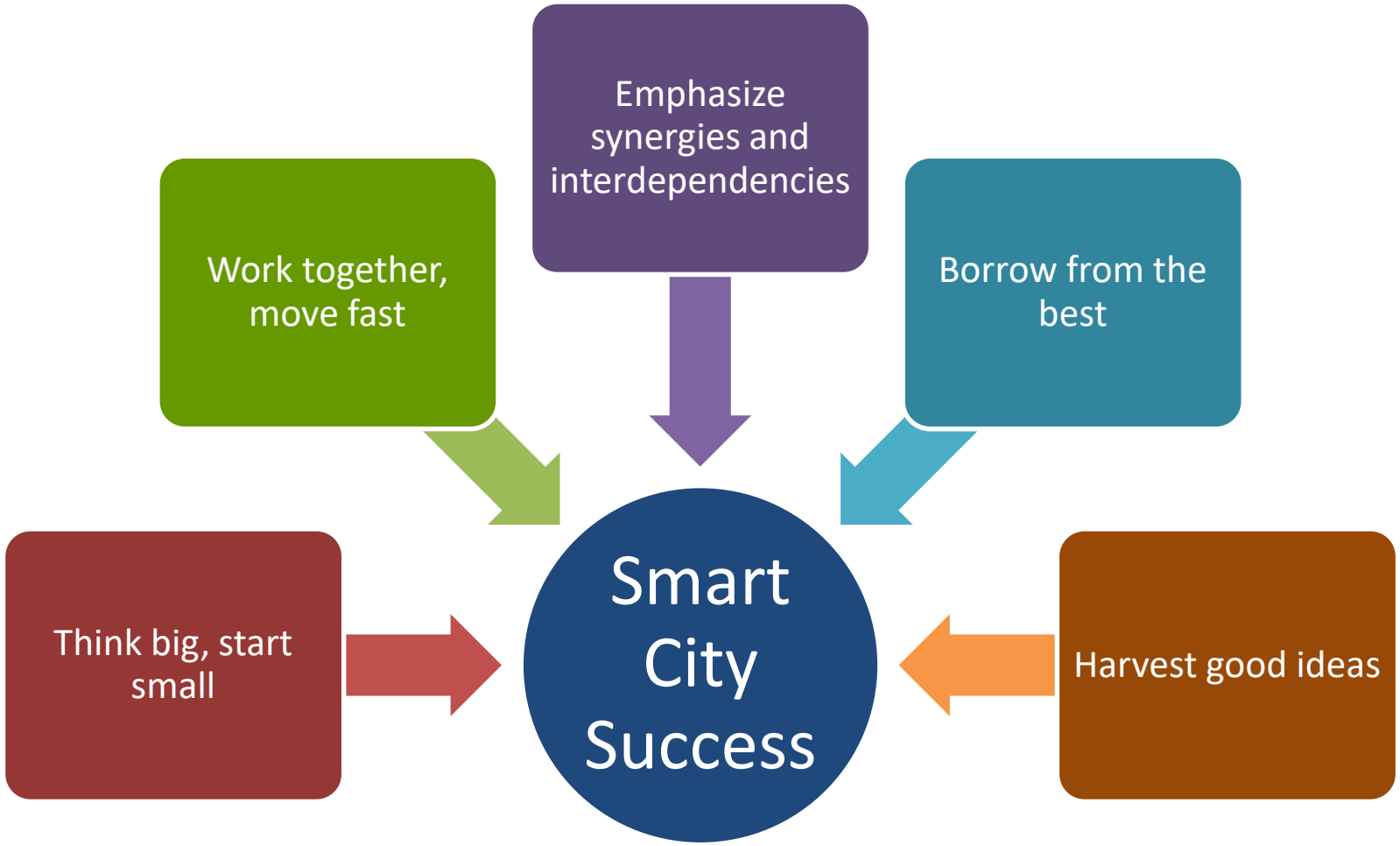
What are the Key Elements of a Smart City Roadmap?



What is the Process for Realizing Smart Cities?



What are some Smart City Success Strategies?



How Cities Benefit from Technology Enablers?

- Smart policing
  - 20-30% drop in crime
- Smart traffic
  - 20% drop in congestion
  - Predictable transportation
- Smart water
  - 30% drop in lost water
- Digital government
  - Spend less to make citizens happier, employees more efficient

- Smart buildings
  - 10-20% drop in energy use
- Smart grid
  - Renewables and resiliency
  - Distributed Generation
- Smart payments
  - Spend less while more inclusive of the poor and unbanked
- Open Data and hackathons
  - Citizens and entrepreneurs invent improvements

What are the Benefits of Realizing Universal Targets?


Source: gashahealthconnections.ca

- *Enhanced livability-* better quality of life for city residents

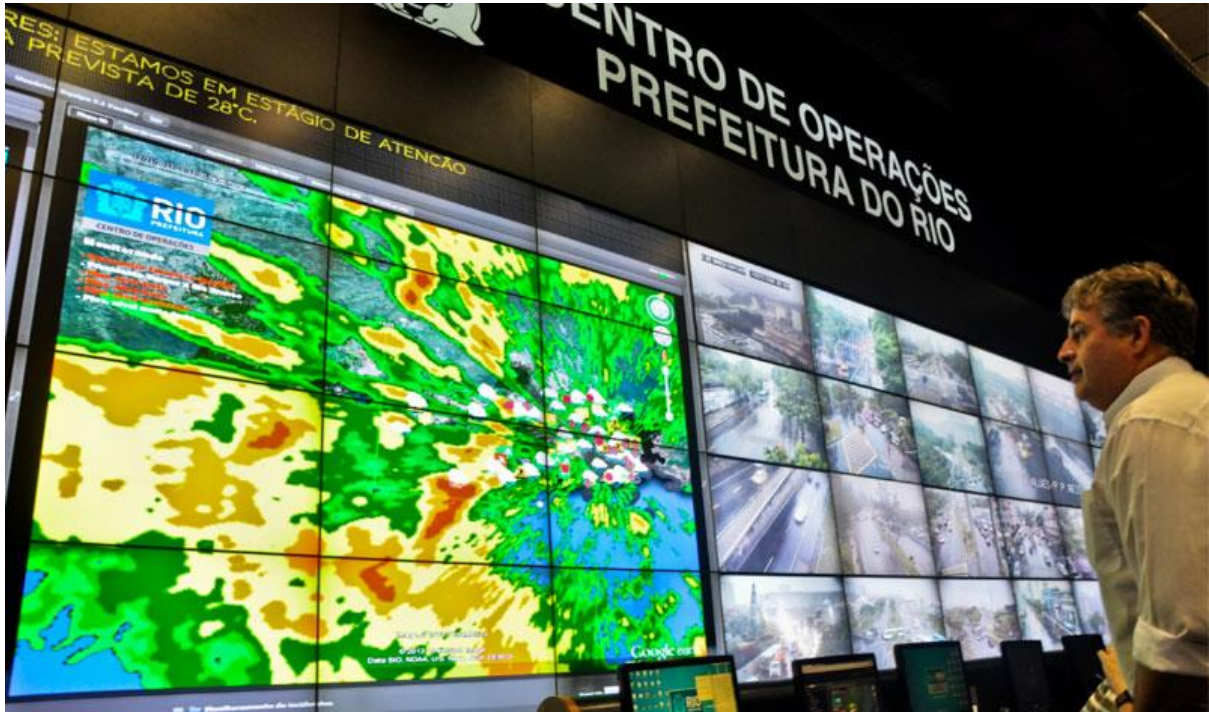

Source: tribune.com

- *Enhanced workability-* job opportunities, economic growth


Source: thinglink.com

- *Enhanced sustainability-* careful use of natural and economic resources

Smart City Global Case Study: Rio de Janeiro, Brazil



- Established 'center of operations' to better anticipate and respond to incidents
- Center integrates and houses officials from 30 city agencies
- Setup weather forecasting and hydrological modeling system for 48-hr advance rain prediction

- Citizen's Portal-Citizens play an active role in operations via Facebook, Twitter, Instagram, and YouTube
- Better traffic management, emergency response
- Data analytics and citizen-city collaboration

Picture Source: news-

Smart City Global Case Study: Amsterdam, Netherlands

- Started in 2009, focus is reducing CO2 emissions by saving energy
- Sustainable Mobility: Easy access to electric battery chargers in city
- Sustainable Living: Residents cooperatively own windmill park for energy

- Sustainable Working: Drop-in offices within 5 minutes biking creating flexibility and reducing car-traffic
- Sustainable Public Space: Integration of energy management, solar panels, water management, rubbish disposal

Pic Source: ict4green.wordpress.com,

Source: Smart Cities Council

Amsterdam, Netherlands – City-Wide Broadband Access

- Amsterdam has worked with Cisco and other companies to achieve broadband access throughout the city.
- As a result, it has a wide-open marketplace for innovative services and economic growth, as well as fast track for smarter and cheaper delivery of healthcare, education and other public services.

Florida's Sun Life Stadium – Use of Data Analytics

- Real time data from stadium point-of-sale systems, turnstile scans at gates, weather feeds, etc. fed to stadium's command center
- Data integrated with business rules and intelligent controls for optimized operations and traffic flow – resulting in reduced long lines

Source: Smart Cities Council

Long Beach, California Water Department – Achieves Operational Optimization

- Long Beach Water operators have a complete picture of the city's water system processes in real-time.
- System consists of 30,000 different data points; effectively monitors and manages more than 90 remote telemetry units, using visualization software

Source: Vactor.com

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USTDA Smart Cities Case Studies

Pam Peseux – Tuatara Group
Doug Shuster – Tuatara Group
Yaprak Cakilcioglu – US Commercial Service


AJMER

City Overview

History

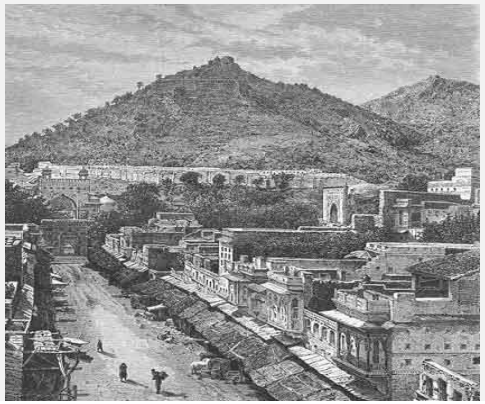
(Seventh Century)
- Ajaipal Chauhan founded Ajmer
- Commissioned the construction of a hill fort “Ajay meru” or the “invincible hill”

(Twelth Century)
- Last ruler of the Chauhan Dynasty, Prithviraj Chauhan, lost the city to Muhammad of Ghor
- Ajmer was handed back to Chauhan rulers upon heavy payments

(Fourteenth Century)
- Captured by the ruler of Mewar
- Ajmer became the source of major contention between Maharajas of Mewar and Marwar

(SixteenthCentury)
-Ajmer was conquered by the Marwar ruler in 1532
-In 1559 Ajmer was won over by Mughal emperor Akbar giving Ajmer the status of a full-fledged province.

(18th, 19th and 20th Century)
- The Mughals lost the city to Marathas in 1770
- In 1818, Marathas sold Ajmer to the East India Company for50,000rs
- After 1947, Ajmer retained its position as a centrally administered state



Heritage/ City Features

Natural Heritage
Lakes

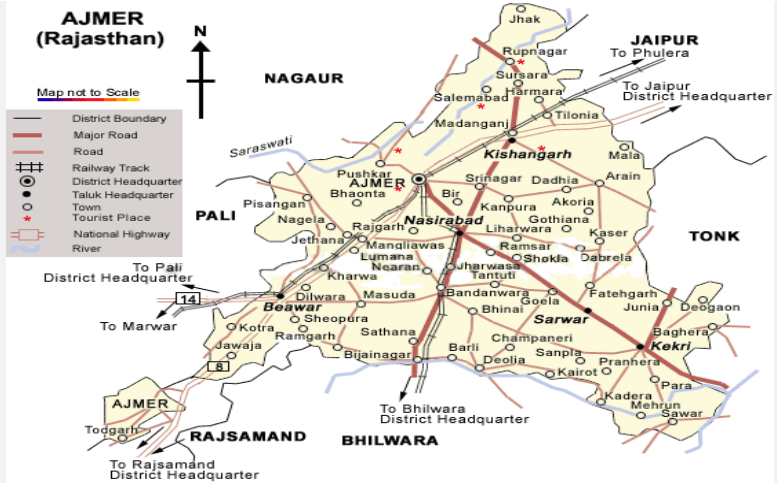
Built Heritage

Context/Connectivity

Air
The nearest airport to arrive at Ajmer is Jaipur, at a distance of 138 kms. (86 miles).

Road
A dense network of bus service operates from Ajmer to key destinations around.

Rail
Ajmer is connected to Delhi, Agra, Jaipur, Ahmedabad, Udaipur, Abu Road and Jodhpur by regular trains.



Smart City Challenges and Opportunities

Storm water drainage

Encroachment leads to pollution and choking of the drains and often leads to change in the course of the drain which affects the inflow into the lake.

Water supply

Water supply system as a whole is not adequate. The poor and deficient system leads to poor level of supply despite good production. No metering

Housing and Infrastructure

Haphazard growth in the city clearly shows lack of implementation of development controls. New multi-story buildings are being constructed in the inner city area further adding to the congestion of the inner city

Traffic and Transportation

Central city traffic is congested but generally free of congestion. Excellent connectivity – road, rail, airport.

Wastewater

Sewage treatment well developed but poor conveyance. Private septic systems need to be eliminated.

Solid Waste Management

The city of Ajmer lacks a planned solid waste management system, or at least the implementation of such a system. High Priority.

Consultative Workshops Ajmer

Vision

AJMER: A MELTING POT OF CULTURES AND CIVILIZATION VISION

Develop Ajmer as a global religious and heritage destination offering high quality living to citizens using technology-based solutions

Major Themes :

Heritage, Art and Culture
Pilgrimage and Leisure
Pristine environment and ecofriendly living
World class infrastructure and public convenience
A hot spot for technology, innovation, and start-ups

Recommended Smart City Solutions

Urban Planning and Transportation

- Railway Station Transit Oriented Development
- Dargah non motorized mobility corridors
- Integrate Lake Anasagar with Eco-Corridors
- GIS and smart card bus system

Water & Wastewater

- Remediate Lake Anasagar
- Water Metering and Revenue Collection
- GIS Based System Mapping
- SCADA
- Decentralized Wastewater Treatment

Cross Sector

- Shared GIS, CIS, Billing
- Smart Controlled LED Street Lighting Pilot

ICT, IOT, and eGovernance

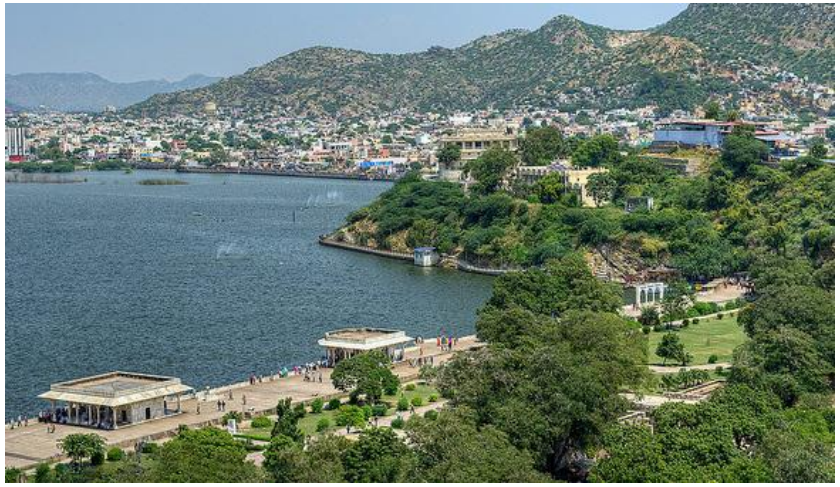
- Public WiFi Hotspots
- Improve ICT infrastructure
- Move to Data Center/Cloud with Control Center
- ICT enabled Tourism (apps and services)

Energy

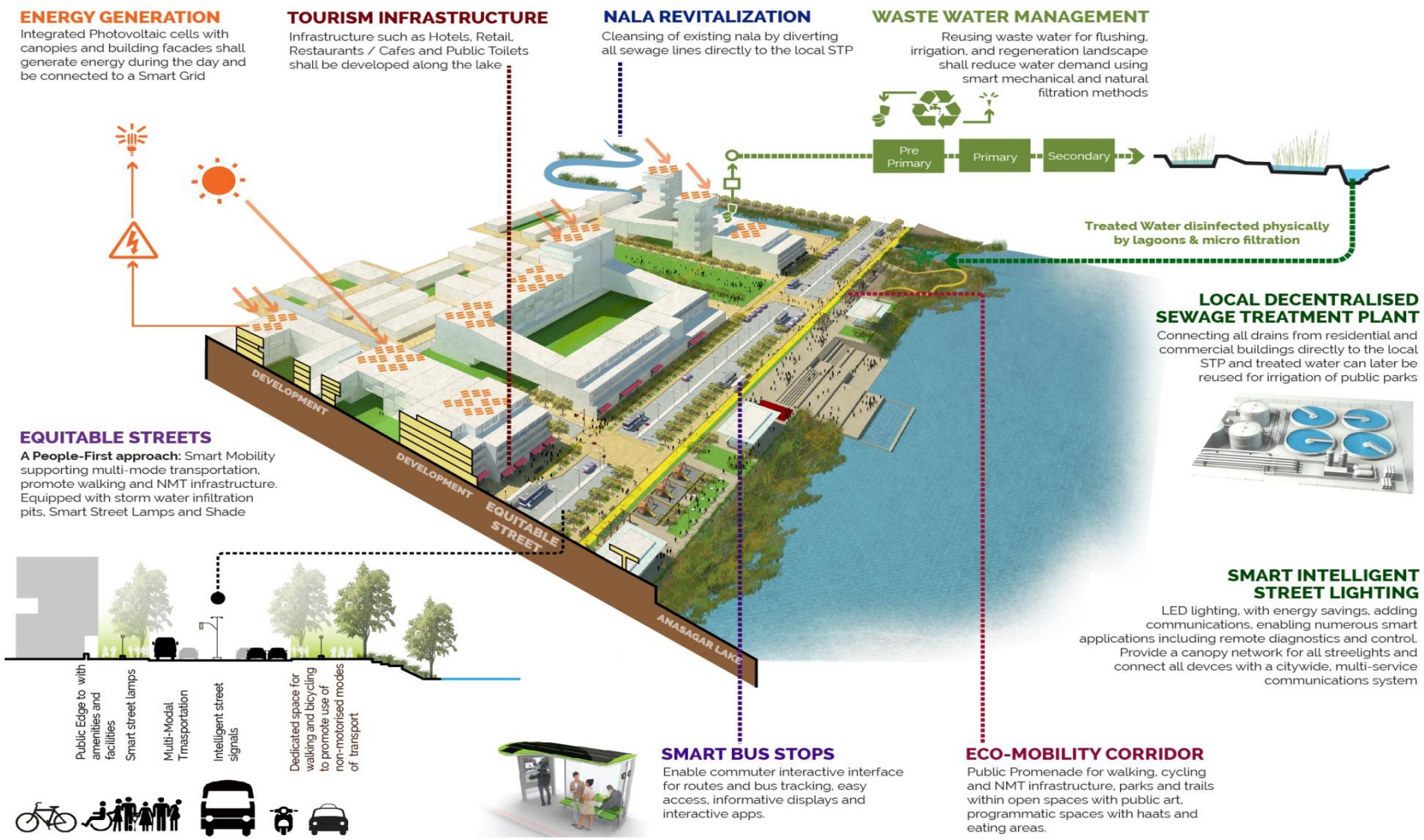
- Invest in distribution grid (e.g. SCADA, GIS, OMS)
- Solar PV Rooftop for government buildings
- Solar industrial park

Solid Waste Management

- Integrated solid waste management with waste to energy, ICT enabled



Recommended Smart City Solutions



Turkey

Istanbul Metropolitan Municipality

- The U.S. Trade & Development Agency (USTDA) has awarded a grant to the Istanbul Metropolitan Municipality (IMM), the administrative body responsible for the general management of Istanbul.
- The grant provides technical assistance to
  - improve city operations,
  - enhance crisis and disaster management
  - provide efficient and reliable public services for the citizens of Istanbul.
- The project will focus on:
  - procuring advanced IT solutions
  - developing a cloud-based environment capable of aggregating data from existing municipal databases.

With the help of the USTDA grant, Istanbul Metropolitan Municipality (IMM) seeks to:

- Improve its operations through procuring enhanced IT solutions and developing a cloud based environment capable of aggregating data from existing municipal databases and information inputs.
- This Big Data infrastructure would allow the IMM to retrieve data from a variety of domains that would generate comprehensive analytics to support citizens and improve decision making and planning within the municipality.
- IMM seeks to integrate the data that currently exists in a number of unconnected systems and databases to improve municipal planning.

Geographic Information System (GIS) Geospatial Analytics

IMM seeks to better utilize existing and planned GIS technology to reduce costs, improve city services, and support disaster and crisis awareness, management and mitigation.

Browse, Search and Discovery Portal System

- IMM seeks to further develop an online portal to provide government and citizen access to the comprehensive data stored in the planned cloud based environment.

Disaster Management

- IMM seeks to implement data collection and analysis tools that would enable first responders to efficiently communicate and respond to crisis situations that may arise in Istanbul.

Citizen 360

- Due to the increased citizen engagement, IMM seeks to develop improved systems for understanding citizen needs and, in turn, developing additional citizen IT services. A Citizen 360 Initiative will enhance citizen digital interaction with municipal services.

Big Data

IMM seeks to combine and centralize systems and data bases that are not connected to each other into a Big Data pool.

- These data can come from sensors, satellite, social media, mobile communication systems, e-mails, radio frequency identification systems and present institutional applications. What other kinds of new data is needed will be found out.
- This system will be used in emergency planning and decision making process.

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Industry Trends and US Competitiveness

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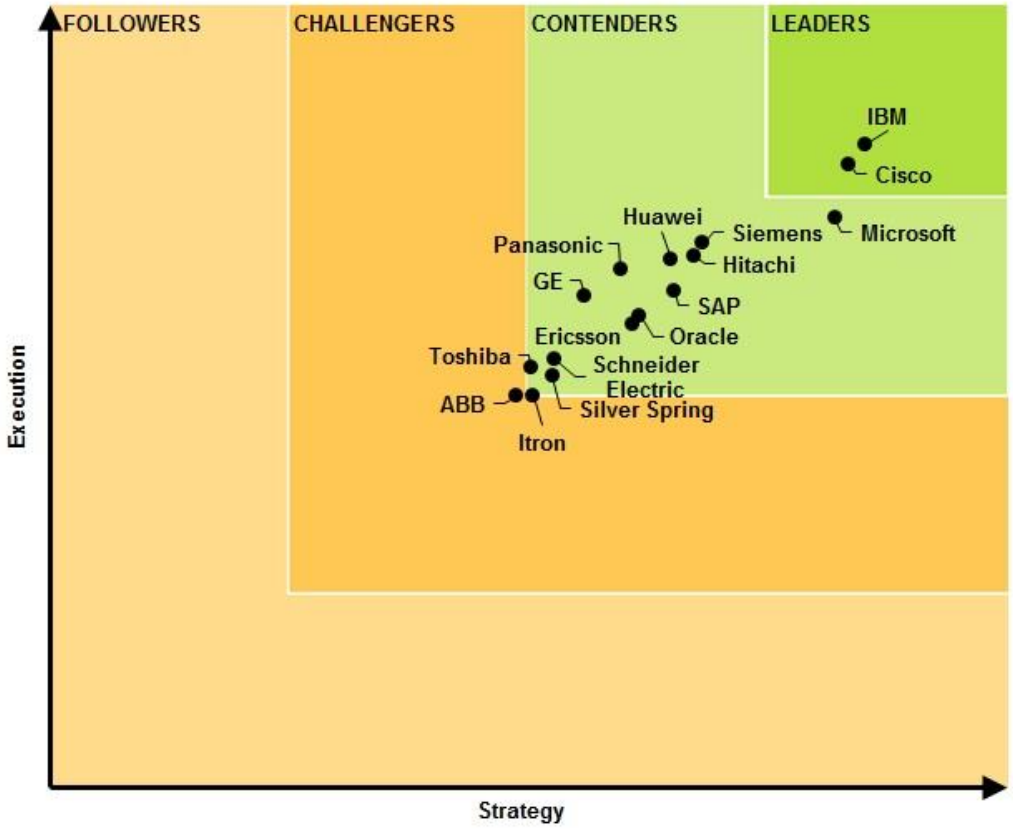
Competitiveness of U.S. Smart City Firms

Navigant Research Leaderboard Report: Smart City Suppliers



Top 10 Vendors

1. IBM
2. Cisco
3. Microsoft
4. Siemens
5. Hitachi
6. Huawei
7. SAP
8. Panasonic
9. Oracle
10. Ericsson

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Smart Cities Projects and Initiatives in Turkey

Berrin Benli – Novusens

Turkey Smart Cities Outlook

USTDA Round Table Meeting
12th of October 2016
Kivilcim
TTGV

INTRO

Mission

Depict Turkey's Smart City Road Map and Strategy Report

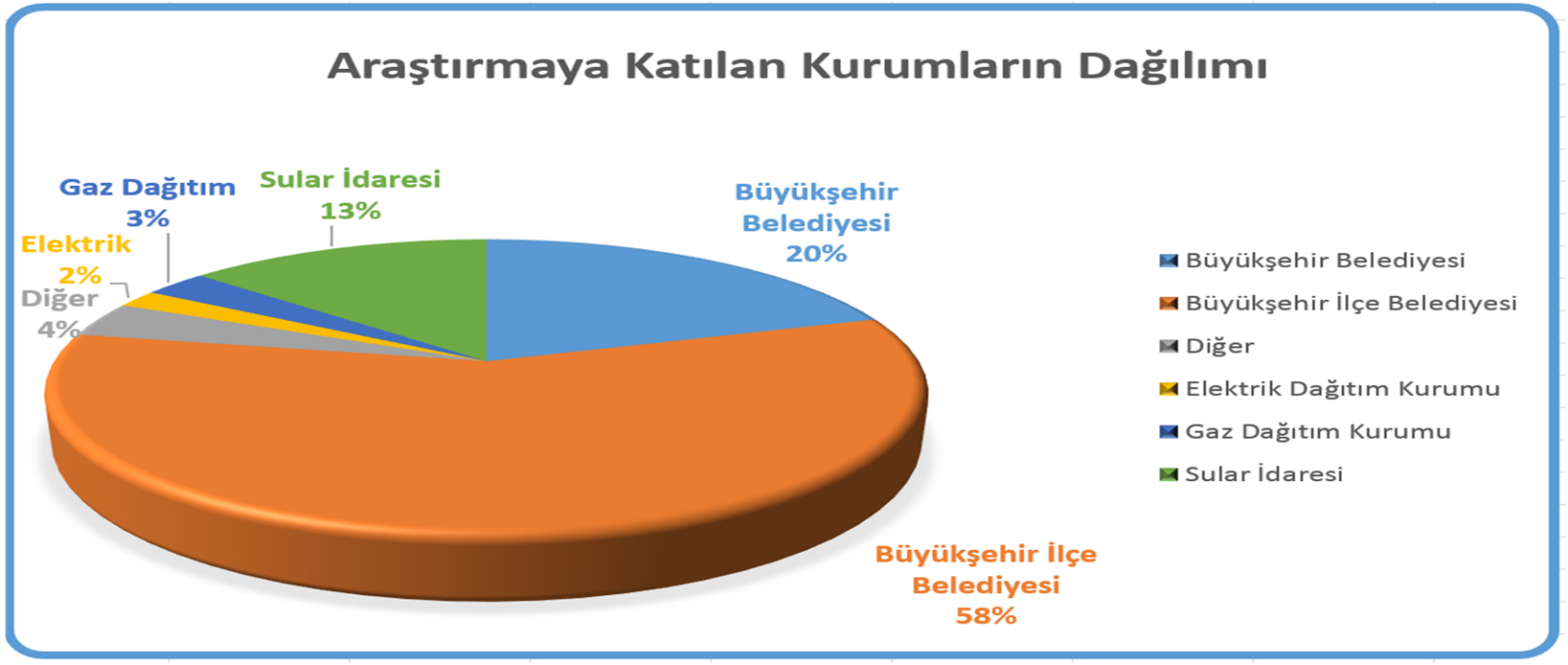
1st Report on Smart Cities Assessment In Turkey

PRESS LAUNCH EVENT, 1st of March 2016

Şehrin Akıllı Hali

OVUS MasterCard intel vodafone TBV

SCOPE



Covered

.Transportation

. Energy

. Water

Conducted between

June 2015 and January 2016.

Included 30 Metropolitan Municipalities and its subsidiaries (representing 77% of total population), energy and distribution organizations.

105 organizations participated in total.

SMART CITY DEFINITION

A city of the main center of economic and social growth. A Smart City consists of quantitative and human systems efficiently integrated to provide people with a sustainable future at high welfare level and participatory levels *(British Standards Institution BSI, 2014)*.

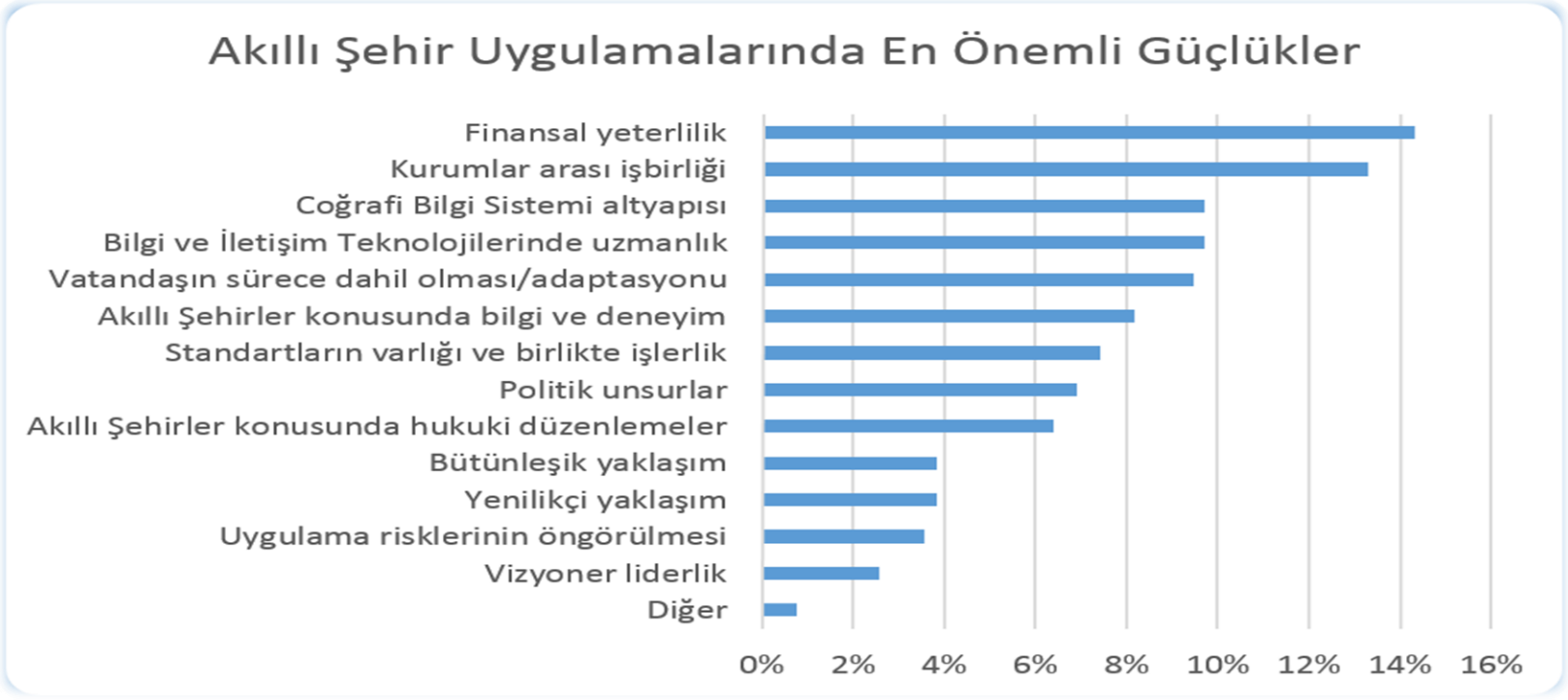
A Smart City is where ICT is used to maintain inhabitability, interoperability and sustainability *(Smart City Council, 2015)*.

The EU defines a Smart City as a place where conventional services and networks are used in a more productive manner so that residents and businesses may get more benefit, using digital and telecommunication technologies.

A Smart City is defined a city that is able to use the data from the smart devices connected to each other for measurement purposes for its real time or prospective decision processes.

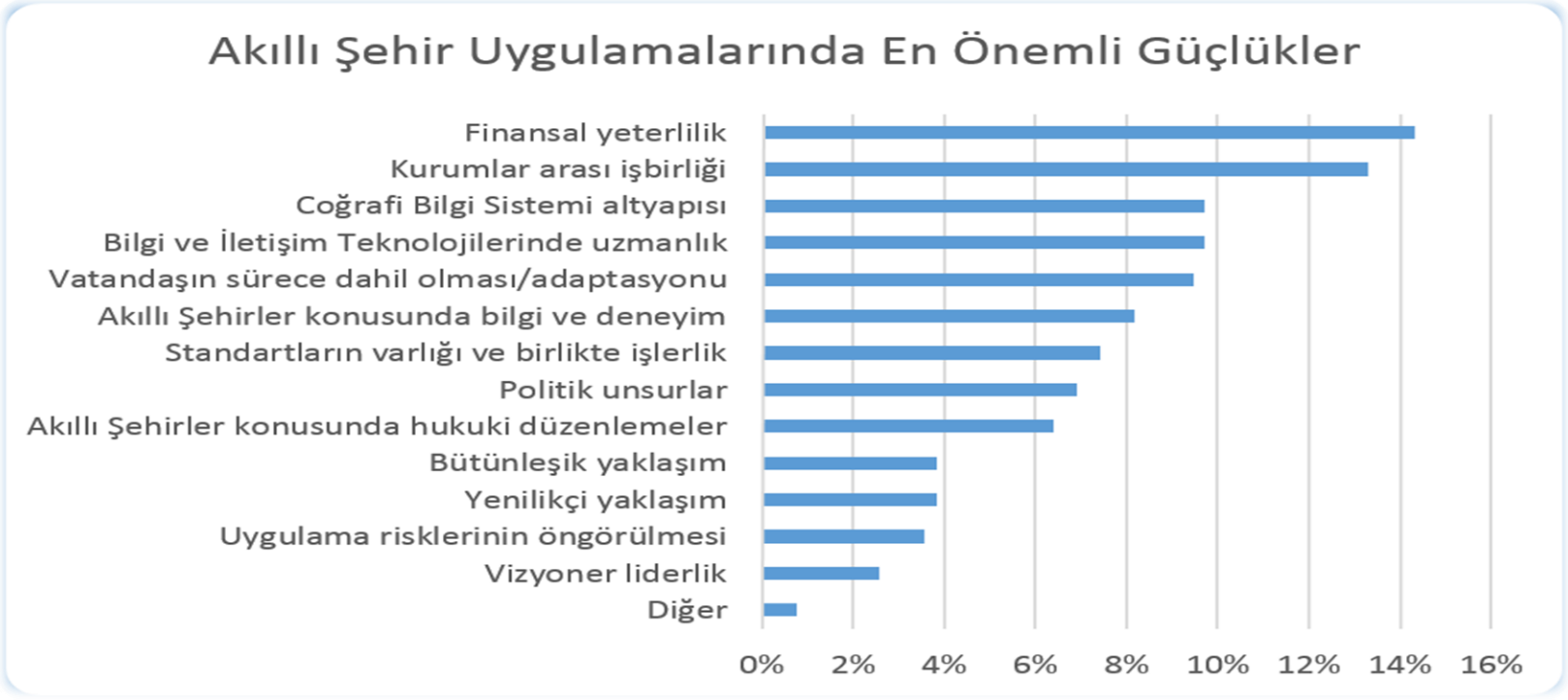
MAIN FINDINGS

FINANCIAL CAPABILITY



The most important challenge in smart city applications was reported as financial capability where 60% of the respondents indicated use of Municipality resources.

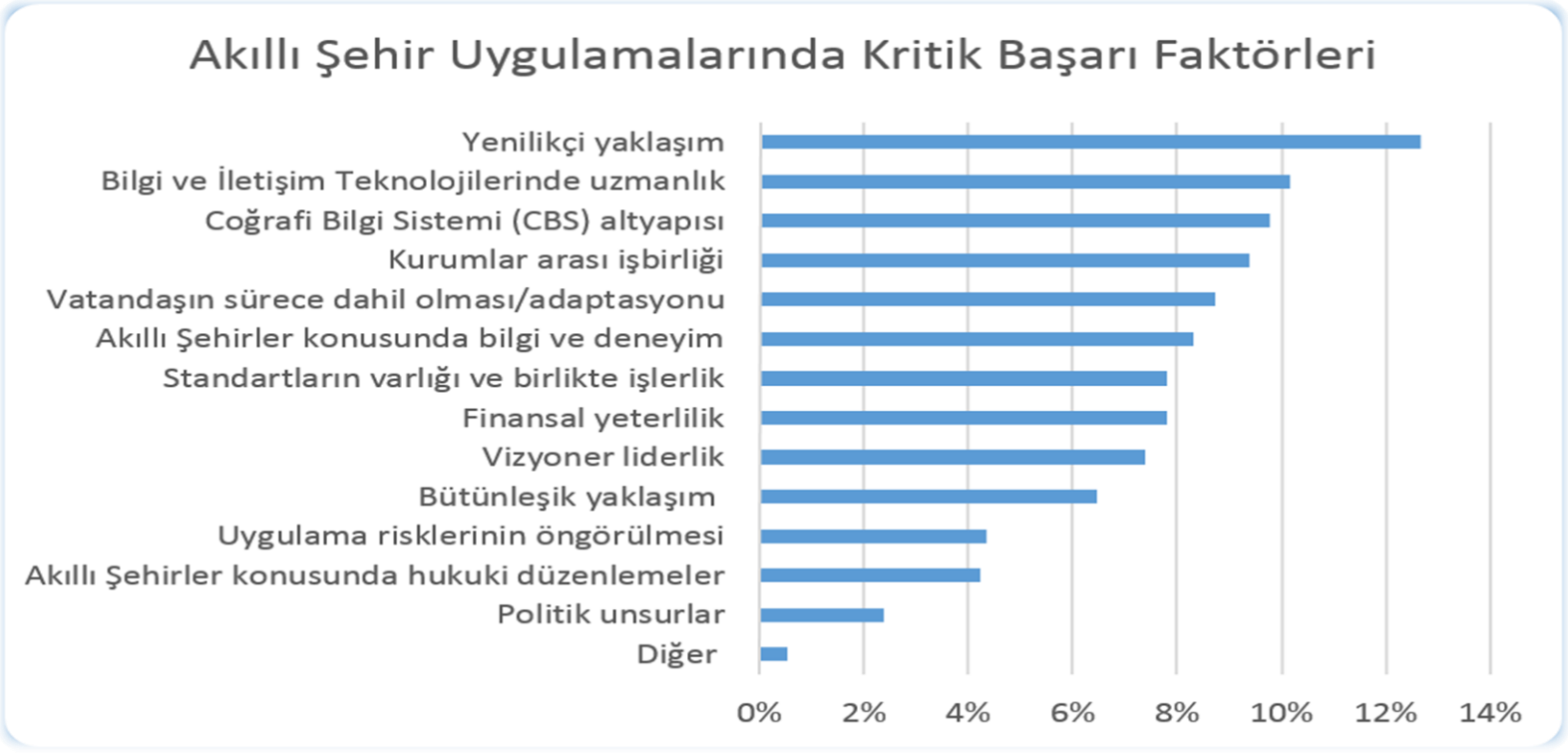
LACK of COLLABORATION



It was also among the most important success factors for such applications.

Especially the collaboration among NGOs, universities and other municipalities were in need of improvement.

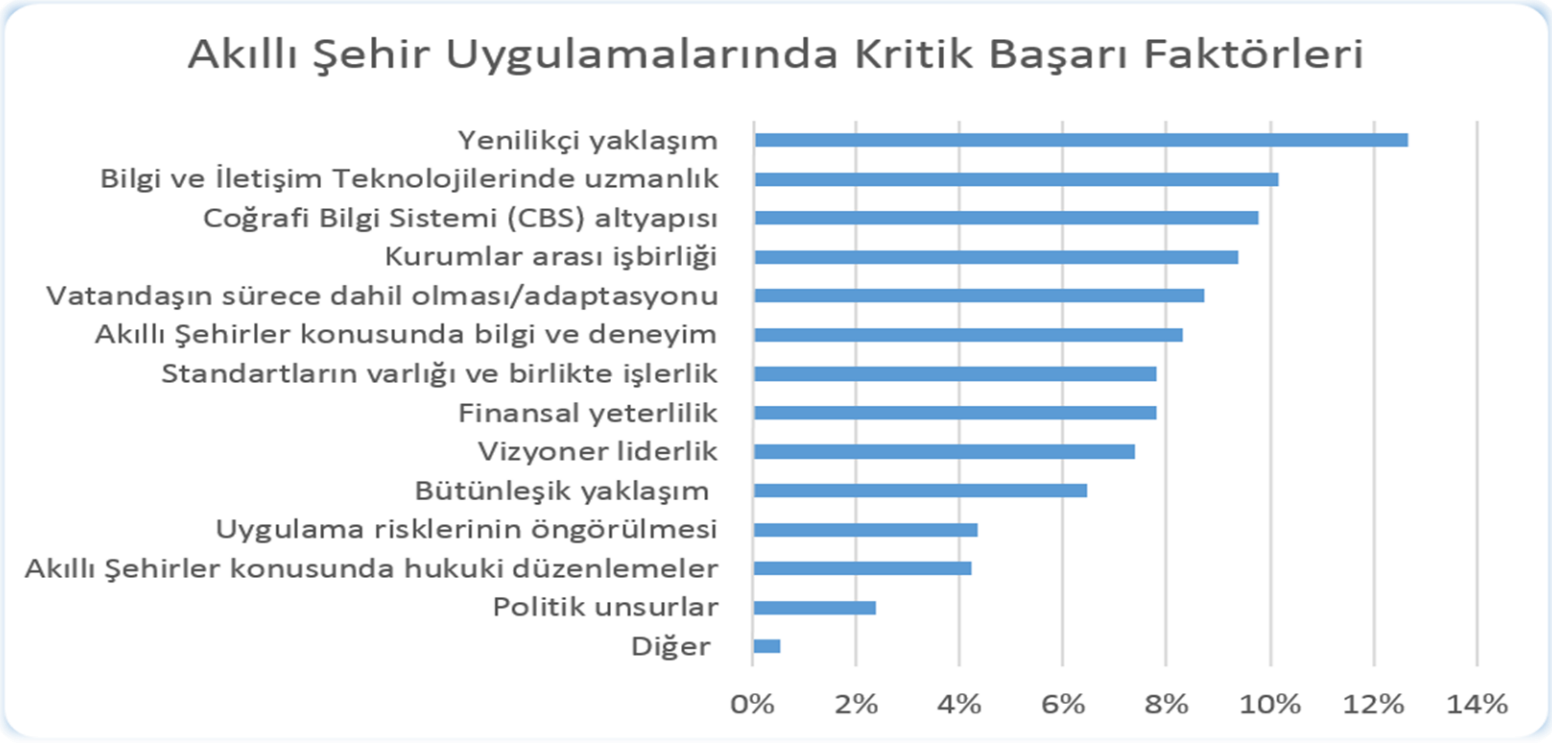
INNOVATIVE APPROACHES



Innovative approaches in smart city applications was reported to be the most important critical success factor for such applications.

The institutions need to follow technological developments in smart cities closely and internalize them in order to adapt them quickly to the needs of the city, while caring for change and innovation management.

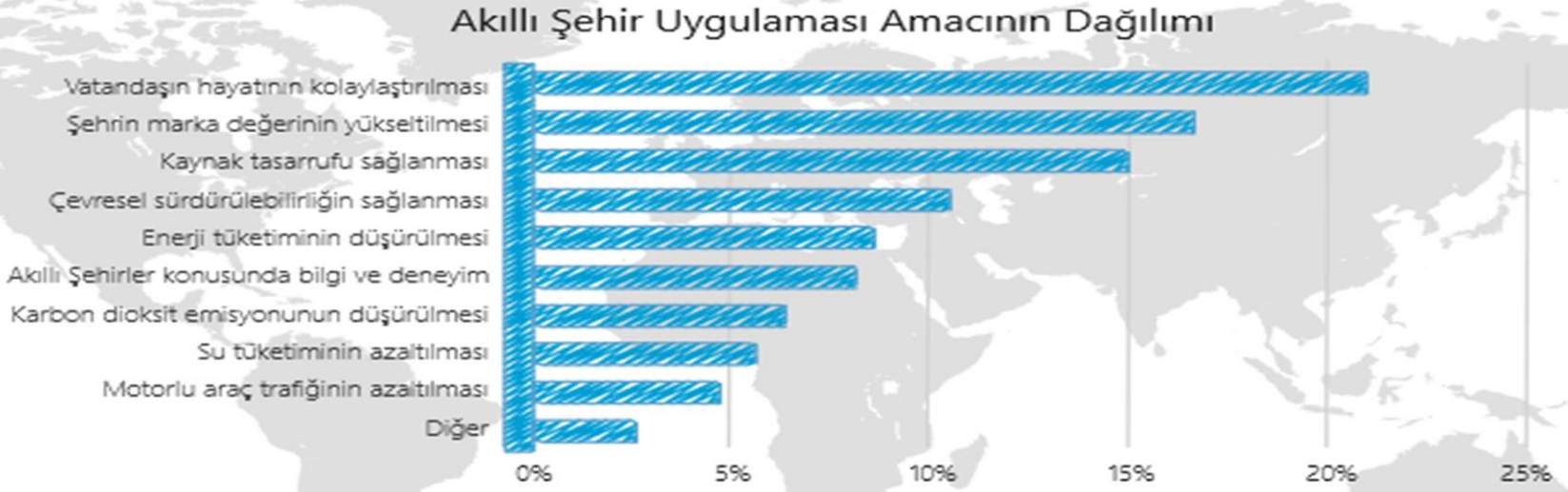
LACK of SKILLS and INFORMATION



Experience in ICT was another critical success factor for smart city applications.

Combined with lack of skills and information in smart cities, the importance of skilled human resources becomes evident.

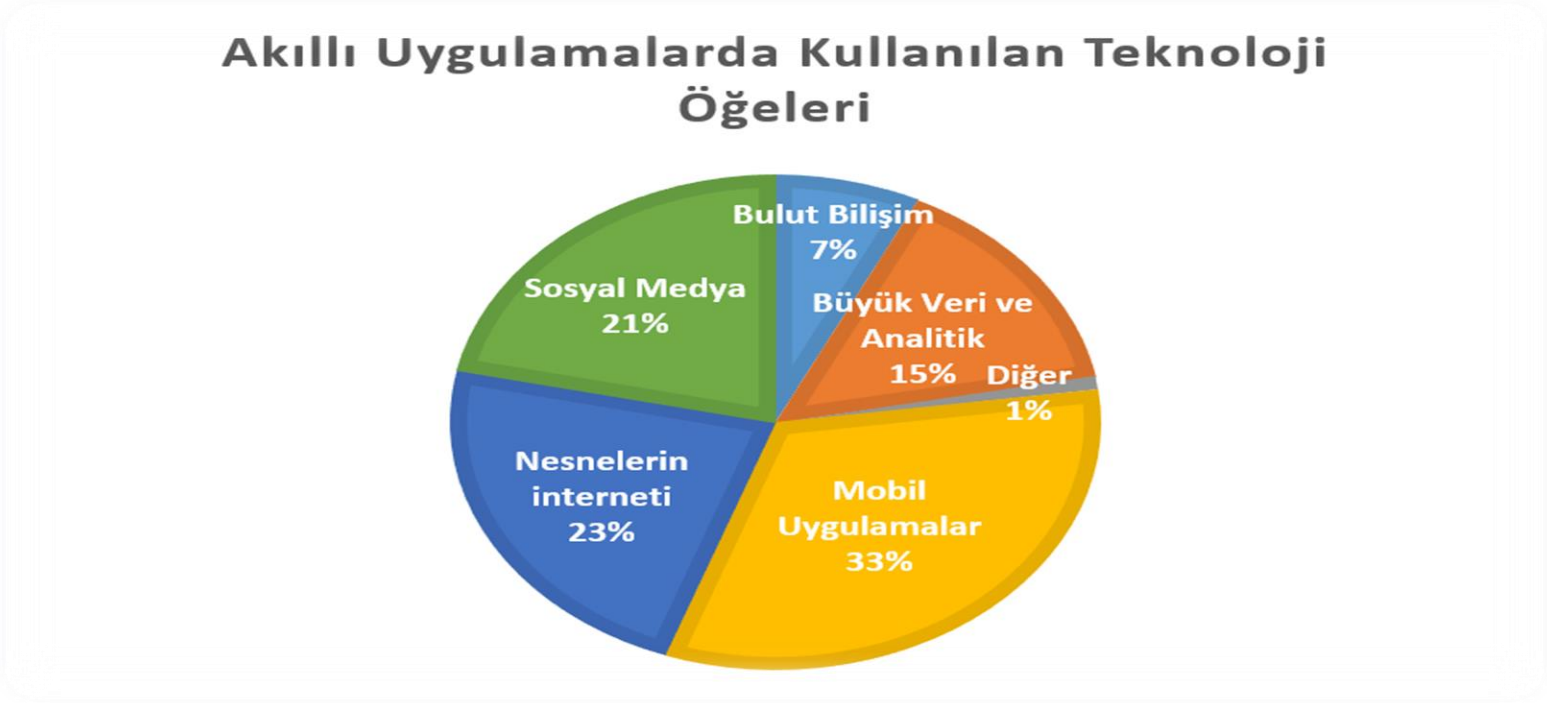
CITIZEN INCLUSION



Şekil 10. Akıllı Şehir Uygulaması Amacının Dağılımı

The inclusion of citizens into smart city implementation processes is considered very important in realization of such projects.

Meanwhile, the improvement of citizen's life and increase of living standards was reported as the top choice among smart city application objectives.



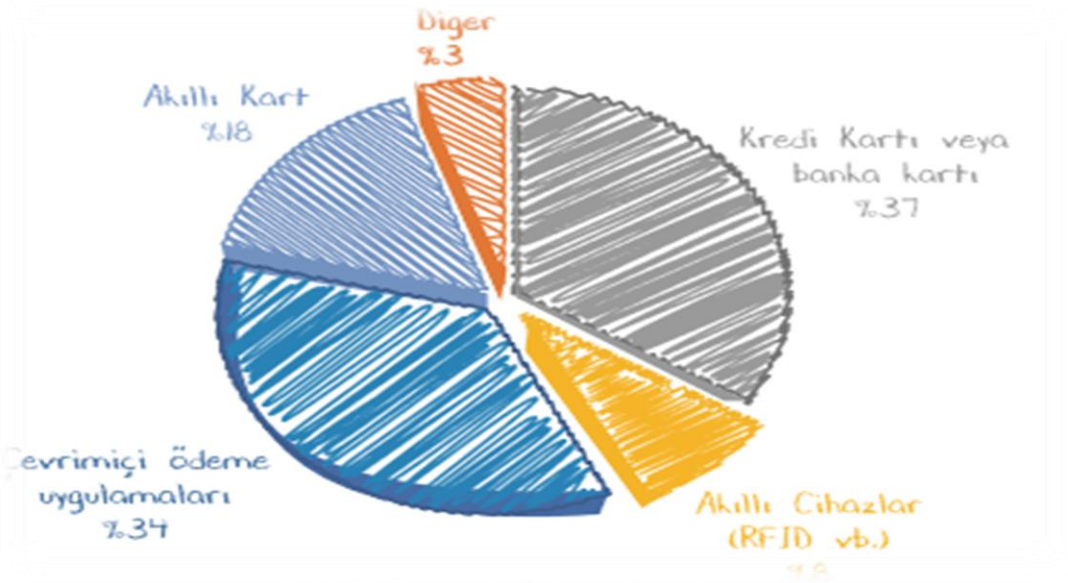
It was observed that the current smart city applications did not make use cloud technologies and big data analytics as much as one would expect especially compared to other technologies.

On the other hand, mobile applications are used widely.

INFRASTRUCTURE for GIS

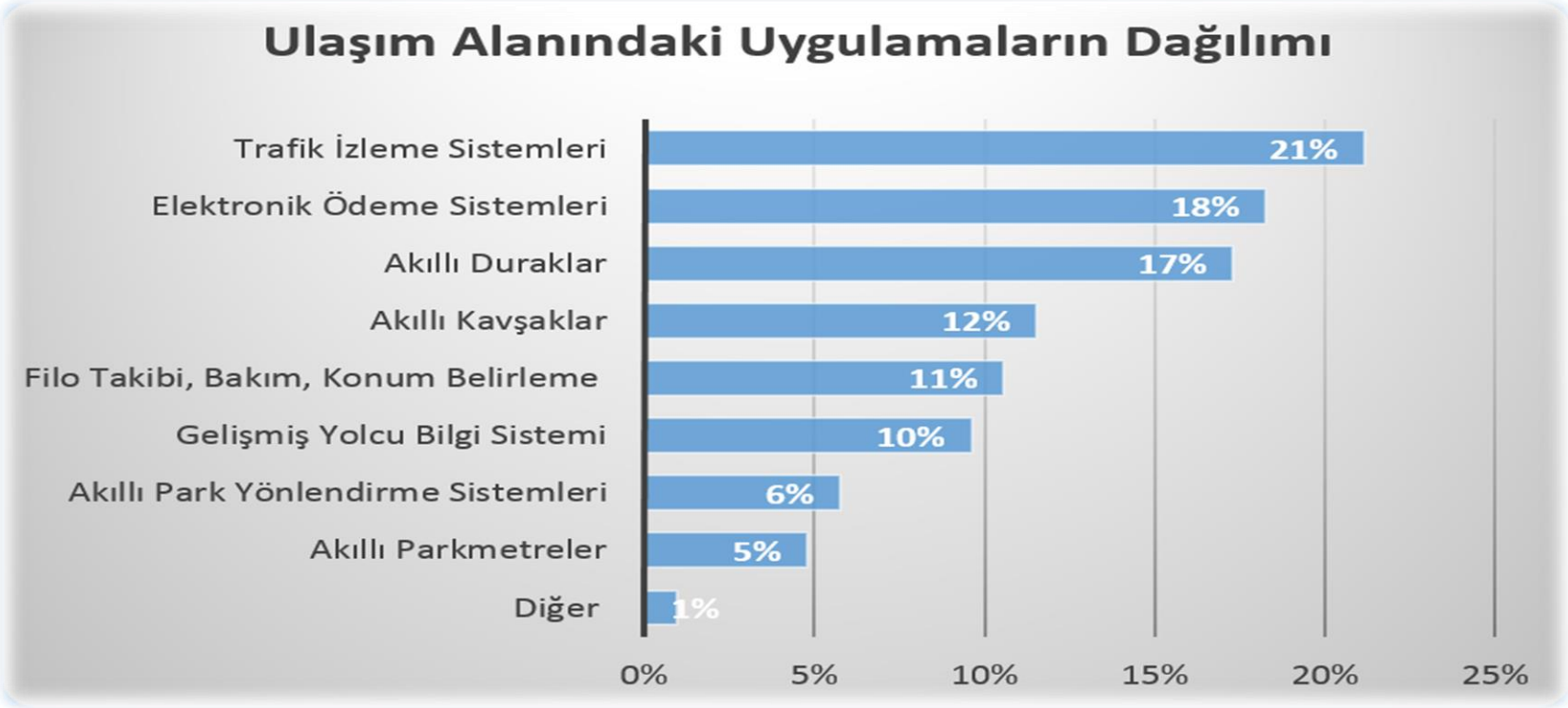
Infrastructure for Geographic Information Systems (GIS) was reported both as one of the most critical success factors and also one of the most important barriers for smart city applications.

SMART CARD and DEVICES in PAYMENT



Smart cards and smart devices are used by a quarter of the respondents for payment purposes and the majority of such applications are in the area of transportation.

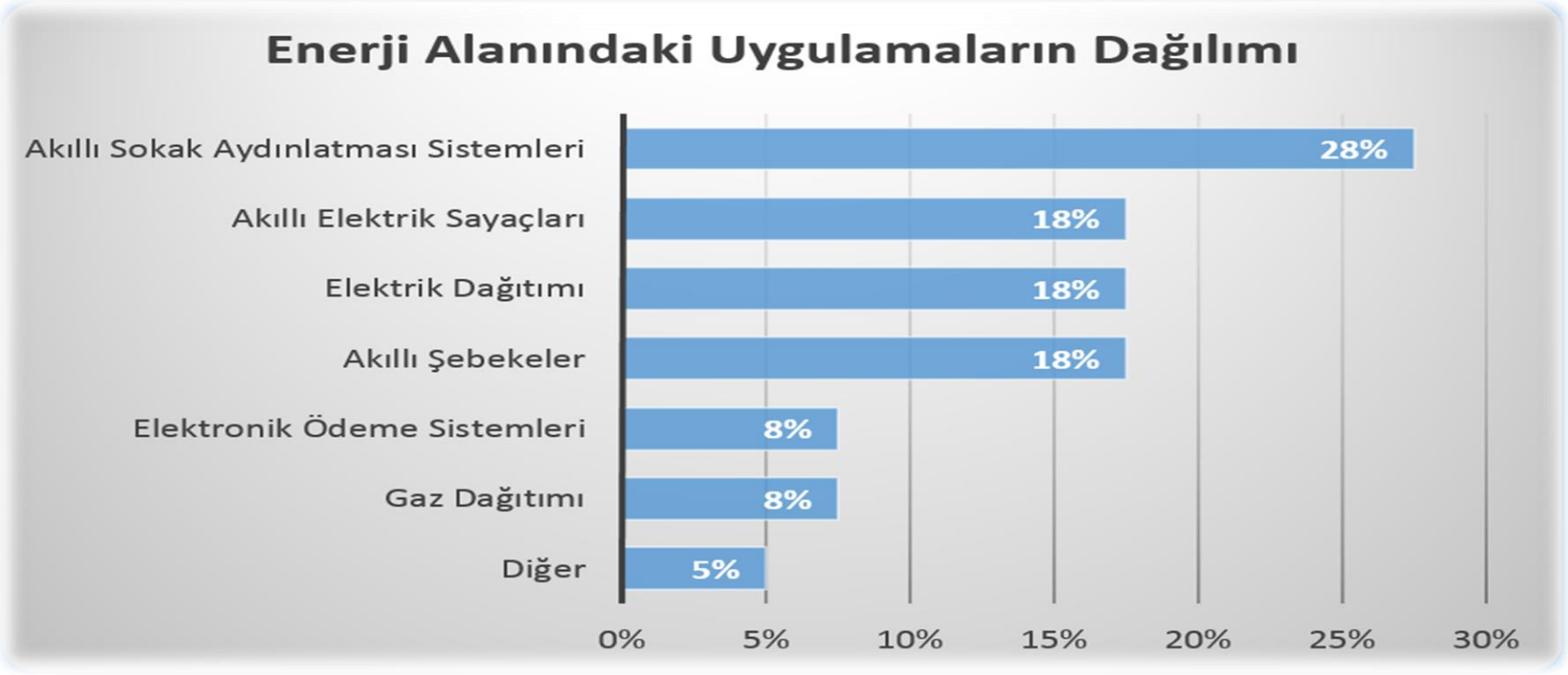
MOST COMMON SMART APPLICATIONS TRANSPORTATION



The most common smart applications in transportation area are

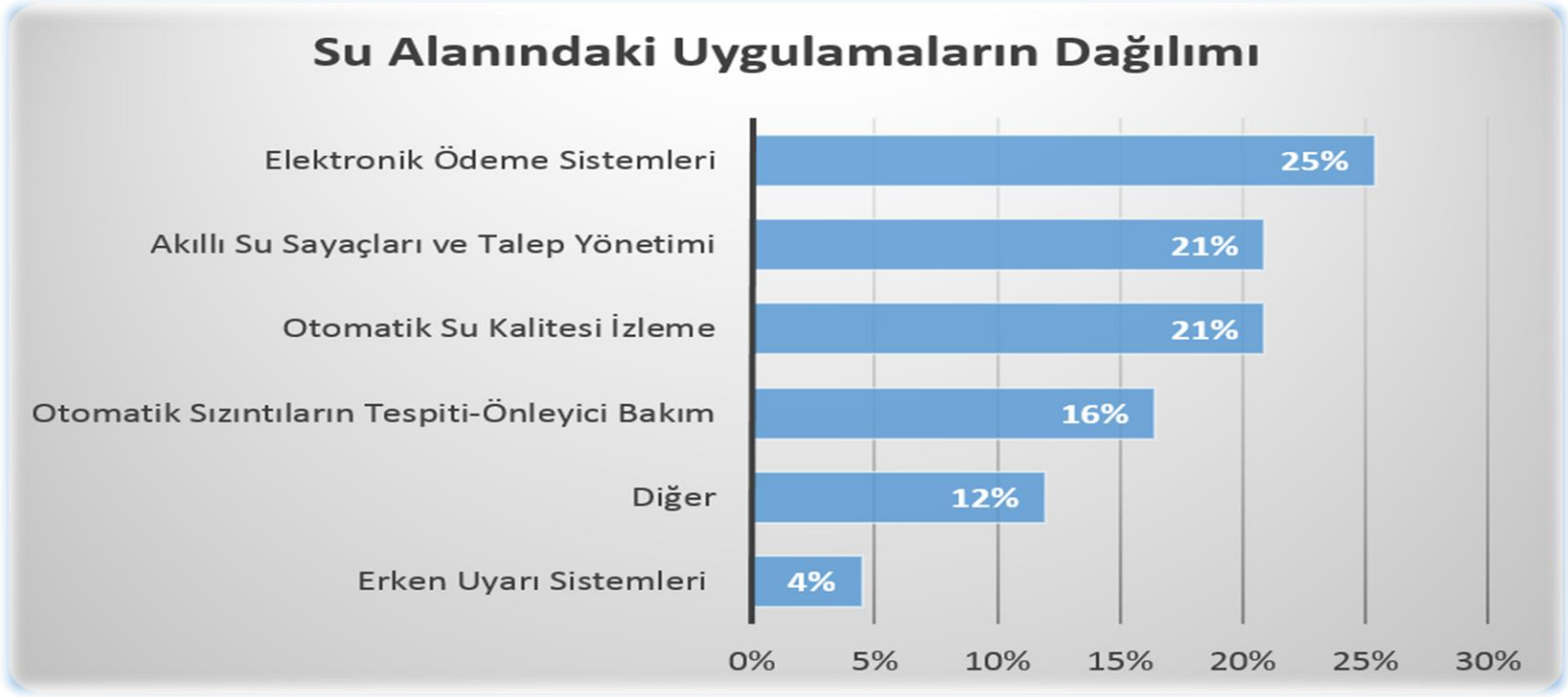
Traffic Monitoring Systems, Electronic Payment Systems and Smart Bus Stops.

SMART APPLICATIONS in ENERGY



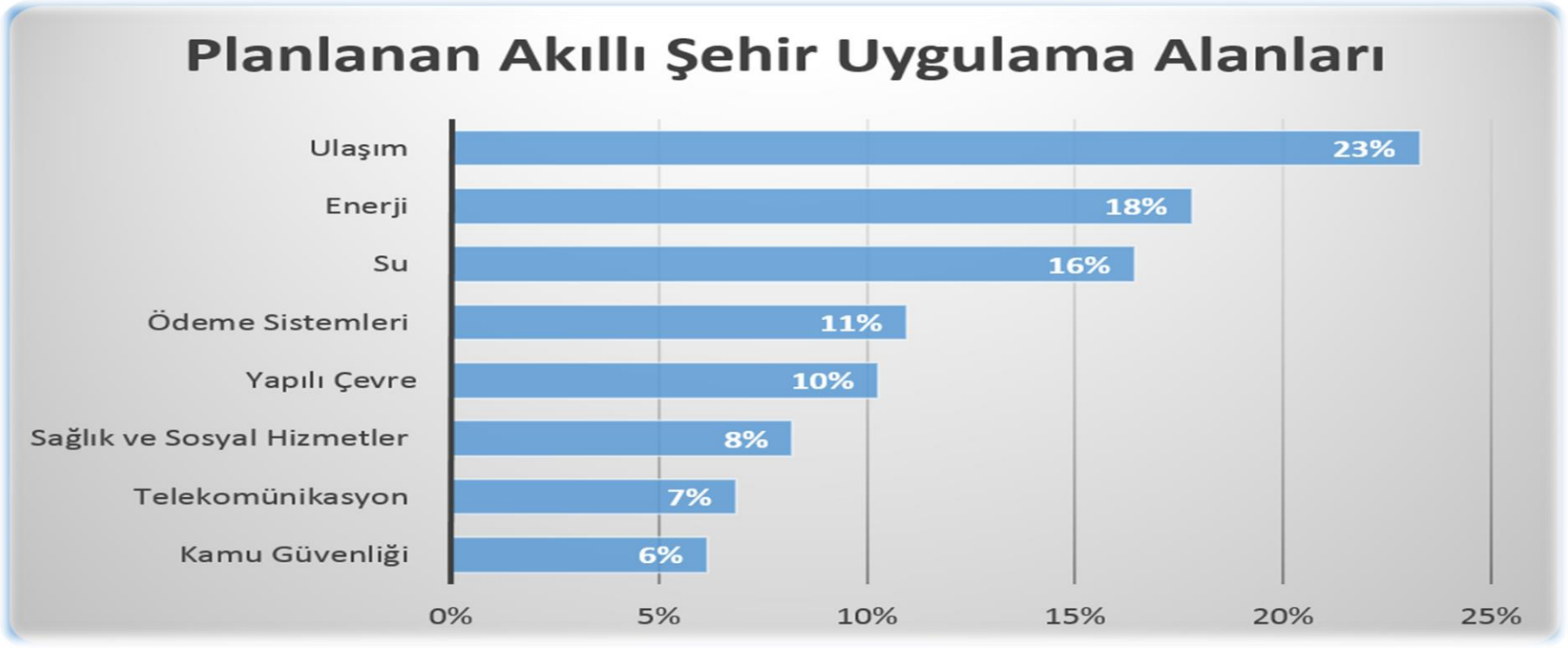
Smart street lighting, electricity distribution, smart grids and smart electric meters are the commonly observed smart applications.

SMART APPLICATIONS in WATER



Electronic payment systems is reported as the top smart application in the water area followed by smart water meters, and smart demand management.

PLANNED APPLICATIONS



Every 2 metropolitan municipalities out of 3, plan smart applications in the transportation area, followed by energy and water.

Establishment of **“Smart City Coordination Mechanisms”** that

. Bring into action a national mechanism that advises both the local administrations and organizations in respect of national strategies, urban transformation plans, current standards, collaboration, interoperability of systems, data exchange between organizations for smart cities

. At province level coordinate smart city investment decisions, local strategies and implementations to regarding to harmonize such actions

Increase the efficiency of investment decisions, reduce recurring investments and provide savings on resources.

Create a **Central Smart City Fund**

Ensure that the fund is used to encourage

. The use of standards, proof of concept projects and meeting of various conditions.

. The PPP models, multi-partner structures to increase collaboration and synergy

Engage the citizens in the decision making mechanisms of the city

through smart city platforms and ensure that they are part of the solution by means of citizen oriented environments aiming for innovation of products and services designed and developed by the users and manufacturers

Open your Data to Public

Ensure that the respective organizations bring into service the already available public data in such a manner
it is **machine readable**
by other information systems as well as opening up
other data sets which is believed to provide social benefits through structures such as
Living labs, ‘hackathon’ etc…
considering privacy concerns

Provide f-f or online trainings

In order to overcome the lack of required skills and capacity for smart city projects, provide face to face and/or online trainings throughout the country and especially in developing regions on information and communication technologies and smart cities.

Examine successful smart city models

Examine successful smart city models carried out in various regions of the world to develop implementation models for existing or new cities and prepare separate road maps for cities at of different scales.

Initiate collaboration efforts

so that the successful smart city projects carried out in may be applied by other provinces, districts and organizations.

Validate concepts and application models

by means of small scale implementations, and in case they are found to be successful, increase the scale and extend the scope.

What's NEXT?

As a follow-up of the first phase of the initiative,

the 2nd phase of the initiative

has been started to depict Turkey's Smart City Road Map and Strategy

followed by a final report.

THANK YOU…

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INNOVATION & ENTREPRENEURSHIP INSTITUTE

TUATARA GROUP

USTDA Turkey Smart Cities Briefing

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Presented by: Tuatara Group, Smart Cities Council, and Novusens

Teşekkür ederim!