


What's "Smart City" really mean?

Forrester Research

June 28, 2012

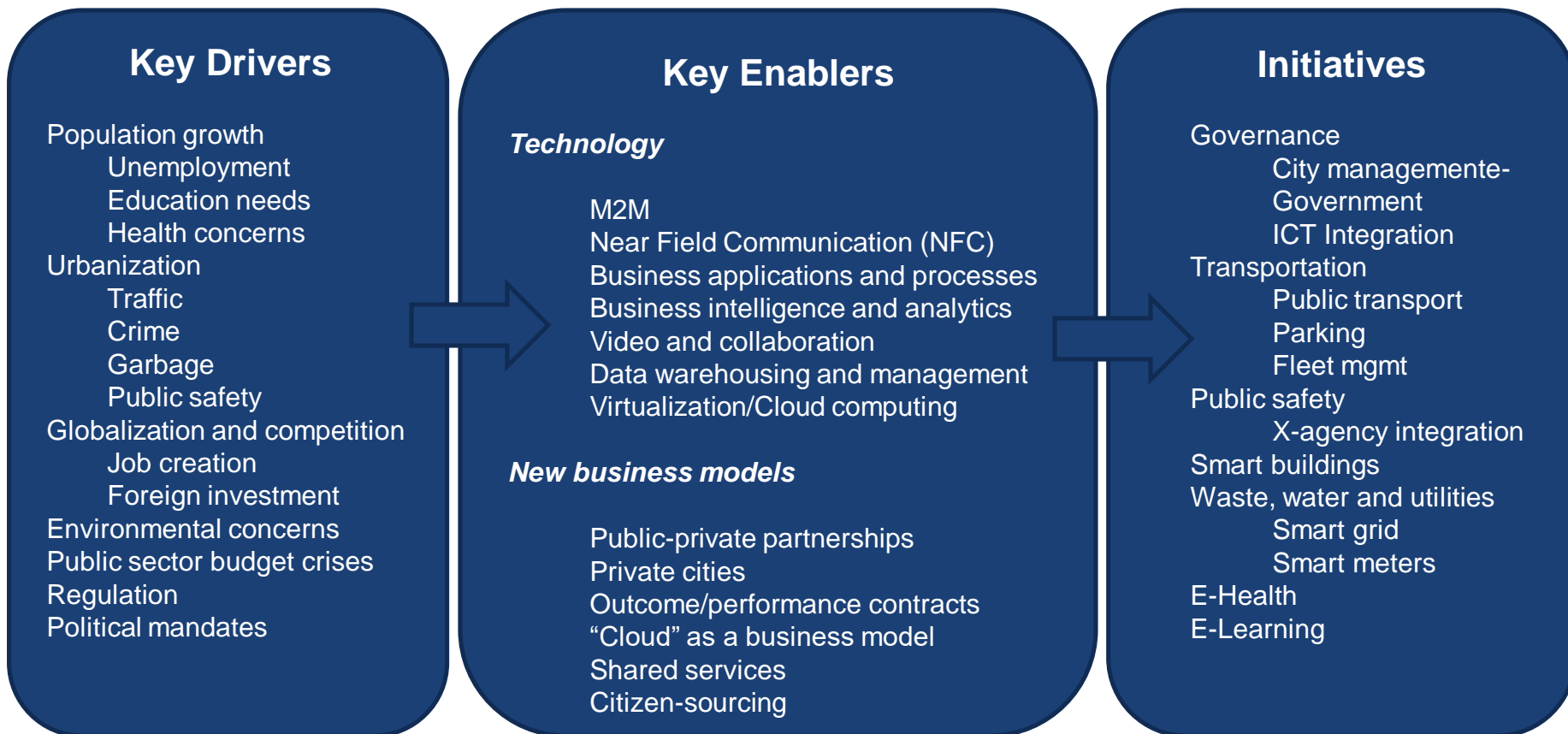
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An aerial photograph of the San Francisco skyline, featuring the Transamerica Pyramid as the central focal point. The city is densely packed with various skyscrapers and buildings, set against a clear blue sky. The text is overlaid on a dark, rounded rectangular box in the lower right quadrant of the image.

Cities worldwide begin to understand the value of IT – and hire CIOs to develop and deliver IT strategies to meet governance objectives.

The Smart City story in a nutshell

Drivers and initiatives are diverse and complex. But, enablers include more than technology.



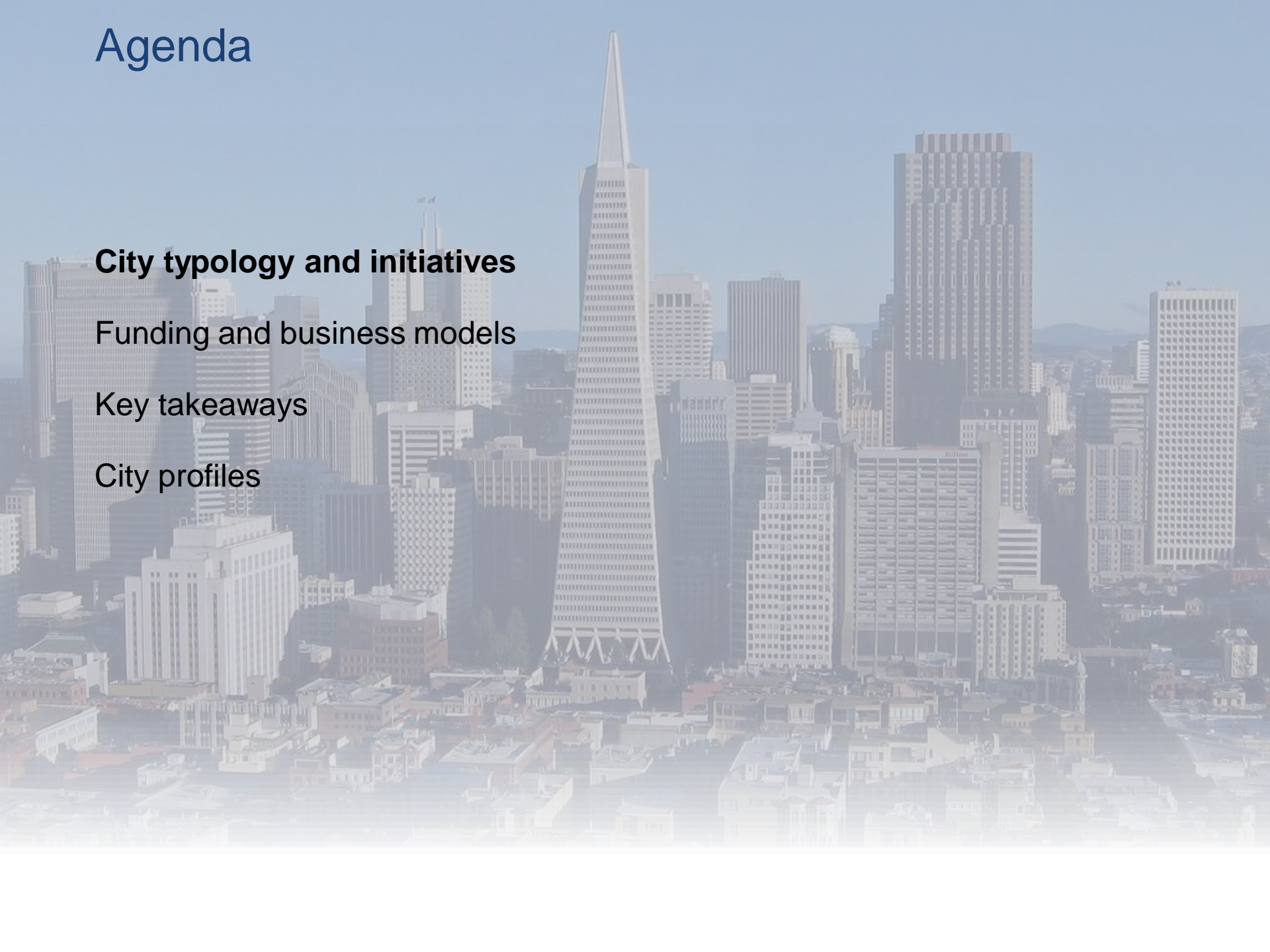
Agenda

City typology and initiatives

Funding and business models

Key takeaways

City profiles



Potential “Smart Cities” are diverse, and complex.

Type	Description	Examples
Existing cities	These either seek to attract and retain businesses and residents, or struggle to address population growth and pressures on city resources and systems. In both cases, they start with existing infrastructure. They have multiple stakeholders and charters but remain public sector entities. The initiatives are more policy-oriented than construction-oriented. Brownfield opportunities.	San Francisco (US) London (UK) Stockholm (SW) Chengdu (China) Columbus (US) Cologne (G) Nice (F)
New cities	These by definition start from scratch. Often they are purpose-built with a particular vision and objective for the city: a technology city, a cultural city, an industrial or logistics city. They are not necessarily traditional “municipalities” and are often PPPs or even independent corporations. Greenfield.	Songdo (Korea) Lavasa (India) Meixi (China) Masdar (UAE) Skolkovo (Russia)
Non-cities	Universities, company towns, and even industrial campuses also include multiple systems, and face similar concerns about utilities, transportation, public safety, buildings etc. Some start from scratch; others start from existing infrastructure. Non-cities often have corporate structures. Both Greenfield and Brownfield.	UNAM (Mexico) Aramco (Saudi) Schipol Airport (NL)

New Developments in Existing Cities – Hybrid Cities

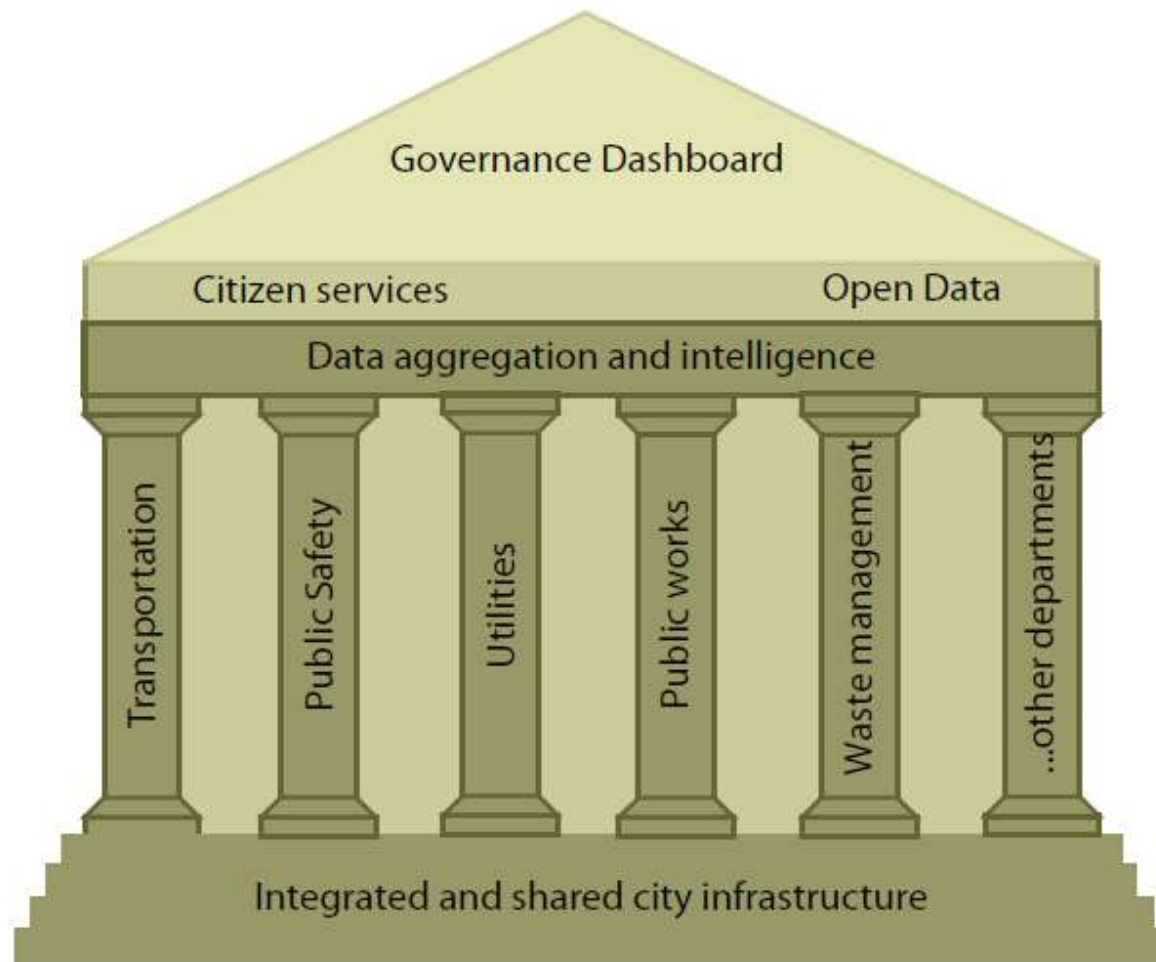
This type is a hybrid, starting from scratch but within the structure of an existing city. They provide opportunity to establish distinct objectives and a comprehensive ICT plan. Greenfield /Brownfield.

... as is the definition of “smart”.

Book smart v. Street smart



A holistic view of the city requires thinking about sectors but also about whole.



Enterprises have already moved to enterprise architectures and IT as a shared services center. Cities are just starting this move.

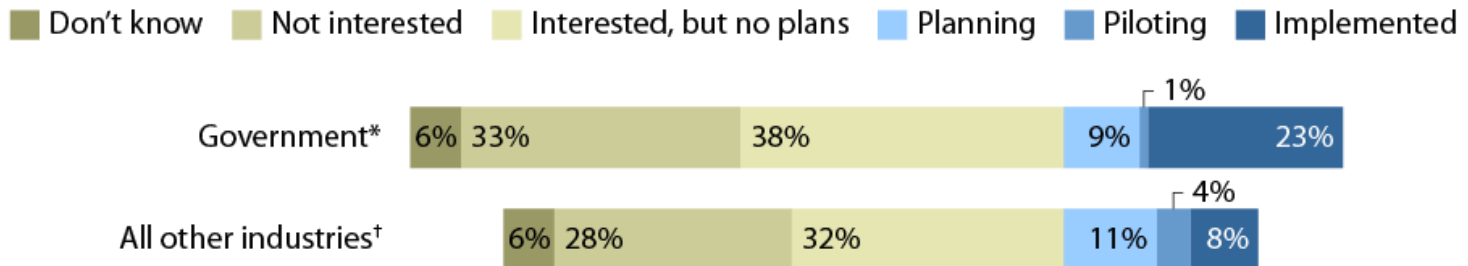
Smart city initiatives defined

City system	Example Smart Solutions
City Governance	Governance and administration solutions facilitate automation of city processes from reporting of complaints to registration of a business or renewal of a driver's license, and the monitoring of programs and processes. Rules engines, automated work flow, and business analytics help streamline processes , improve performance management and facilitate policy development. Operations centers and 311 initiatives integrate city systems. Open data initiatives and application platforms facilitate citizen engagement , improve services and extend e-Government .
Transportation	Smart transportation solutions integrate modes of transportation to improve ease of use and transportation management. They use sensors and analytics to predict the arrival of a bus or train, and notify passengers via SMS or through information boards at city bus and train stations. Similarly, parking initiatives improve access to information and facilitate payment. Bike rental programs, car sharing and electric car charging stations provide alternative modes of transportation. Municipal fleet management uses onboard sensors to detect and notify drivers or fleet owners of maintenance needs or if an accident occurs.
Public safety and security	Smart public safety solutions use sensor activated video surveillance cameras, video analytics , and workflow to identify and route suspicious or anomalous observations to the appropriate authorities. Enhanced 911 systems automatically identify a caller's location either through the fixed telephone location, or via cell triangulation or GPS in the case of mobile calls.
Building management	Smart building management solutions use smart meters , monitoring devices, and sensors to connect heating, air conditioning, lighting, security systems, and other appliances in homes and businesses, enabling users to better track and control use of electricity and water.
Utilities	Smart utilities can include smart grid programs with sensor-enhanced transmission and distribution and smart meters in homes and commercial buildings. Alternative energy generation and distribution diversify sources and mitigate risks from price shocks and shortages of a single source. Smart waste management solutions use sensors (e.g. capacity sensors to trigger waste removal, electronic noses to detect toxicity in landfills), automatic notification, and collaboration among local authorities to improve the efficiency of waste collection and treatment. Water management equally benefits from technology enhancements.

Governments embrace “street smarts”...

Gov't Leaders Report Higher M2M Adoption Than In Other Industries

“What are your firm’s plans to adopt M2M solutions or applications?”



Almost one-fourth of governments have implemented M2M technologies — three times those in other industries. Another 47% currently have plans or are interested.

Base:

*78 IT executives and technology decision-makers in government

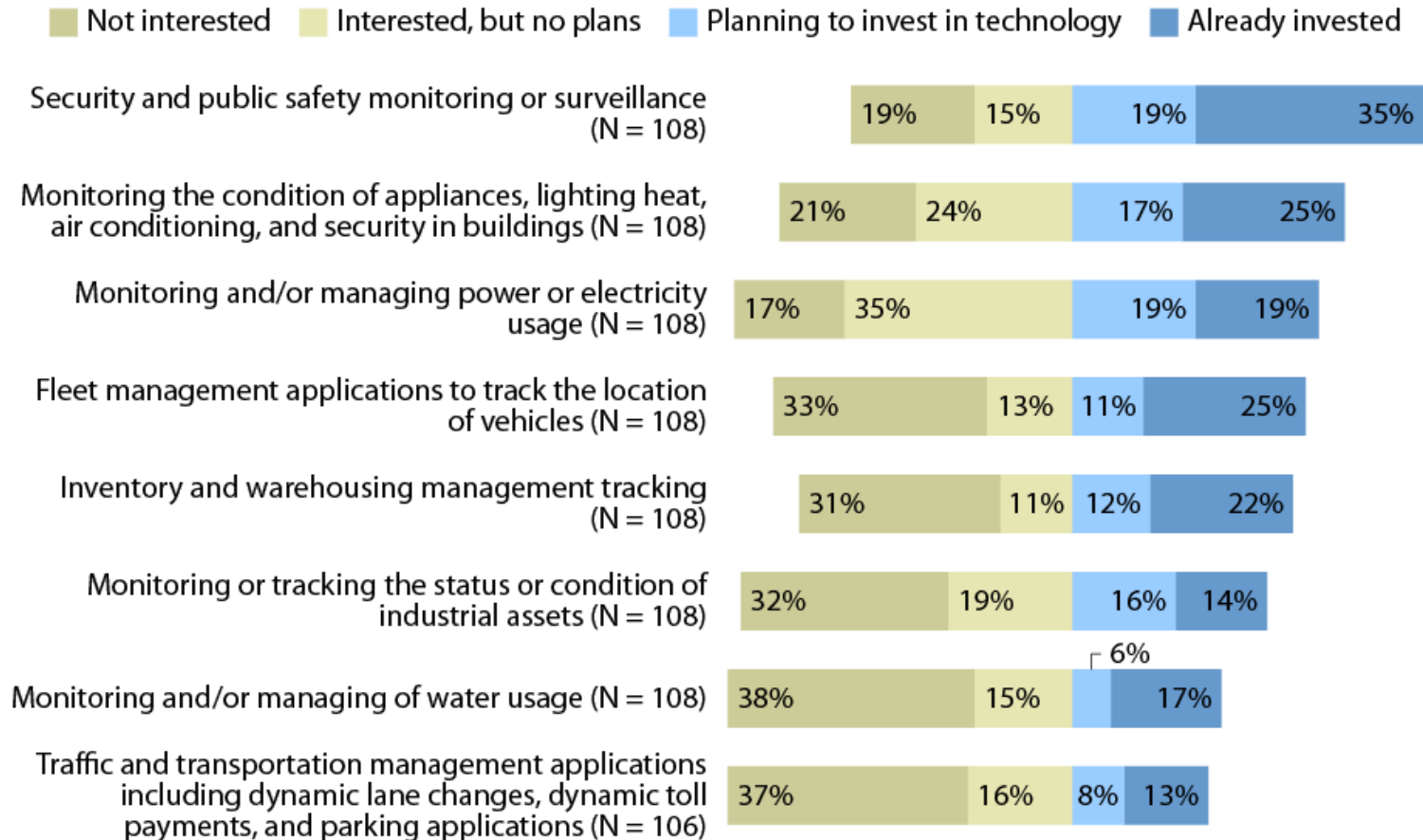
†1,964 IT executives and technology decision-makers in all other industries

Source: Forrsights Networks And Telecommunications Survey, Q1 2011

Public sector is ahead of industry in M2M adoption.

Public Safety And Smart Buildings Top Smart Initiatives

“What are your firm’s plans to invest in new technologies for the following initiatives?”



Base: IT executives and technology budget decision-makers in government

Source: Forrsights Budgets And Priorities Tracker Survey, Q4 2010

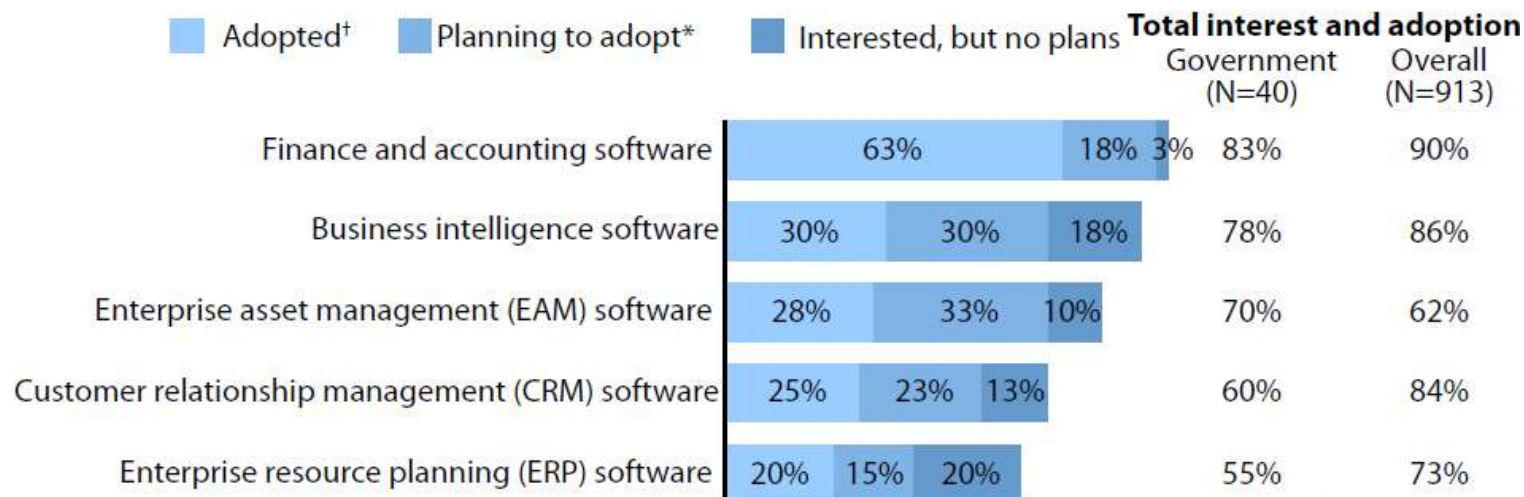
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September 2011 “Not Business As Usual: ICT Opportunities In The Government Sector”

Many address “book smarts” in the front and back office.

But not all have adopted the necessary tools.

“What are your firm's plans to adopt the following business applications?”



(“Not interested” and “Don’t know” responses have been removed from this analysis)

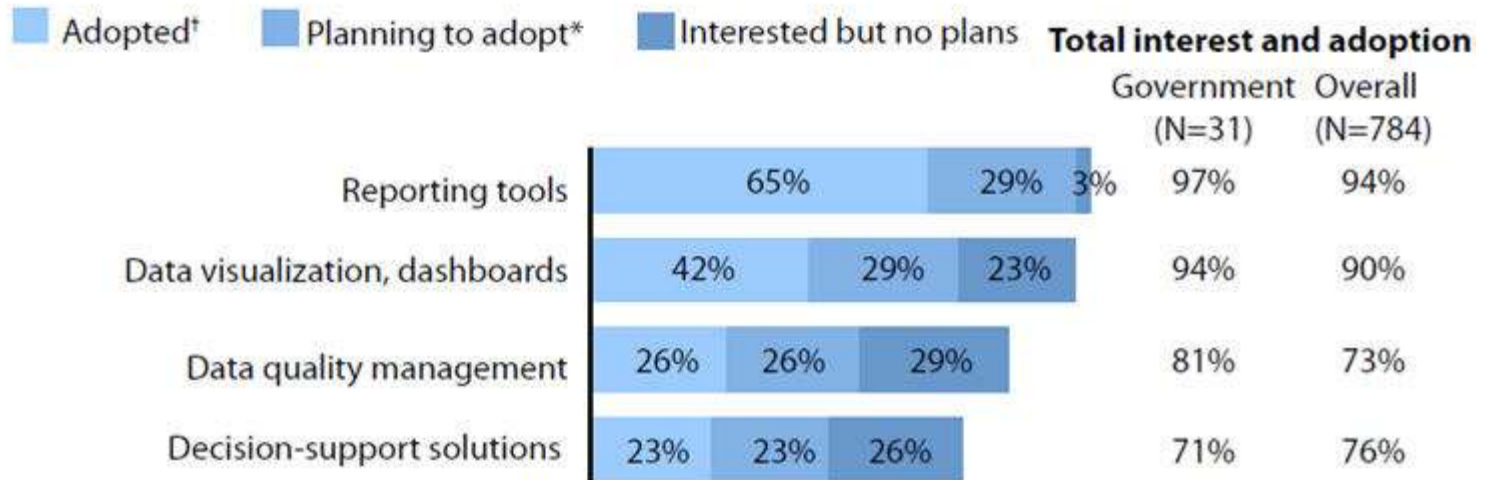
Base: 40 North-American and European IT Decision-Makers in Government and 913 North-American and European IT Decision-Makers Overall

Governments are behind enterprises in adoption of business tools, but are very interested.

And, performance management tools as well.

Pressures for efficiency and transparency drive adoption.

“What are your firm's plans to adopt the following business intelligence technologies?”



("Not interested" and "Don't know" responses have been removed from this analysis)
 Base: 31 North-American and European IT Decision-Makers in Government and
 784 North-American and European IT Decision-Makers Overall

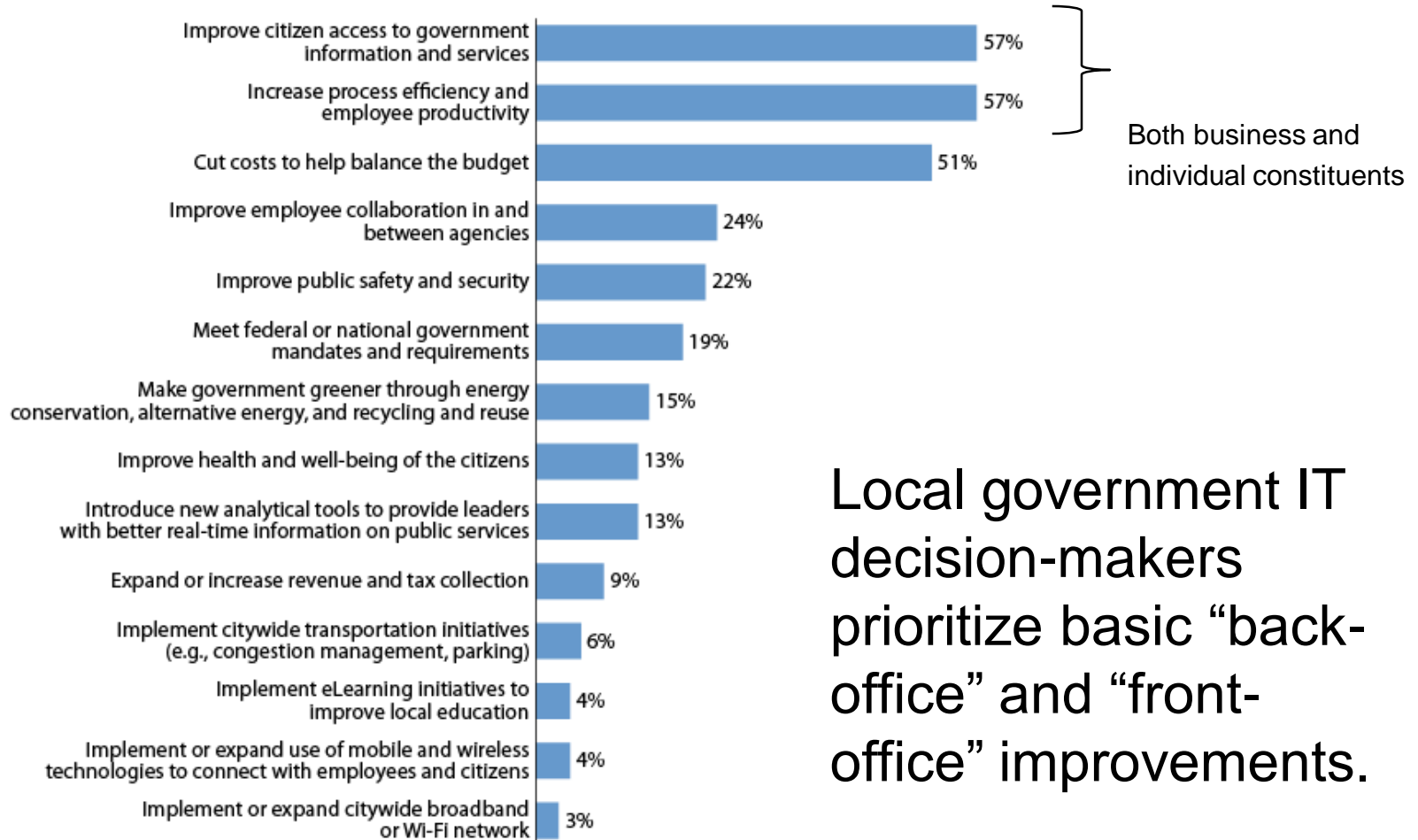
^{*}Responses "Planning to implement in a year or more" and "Planning to implement in the next 12 months"

[†]Responses "Implemented, not expanding" and "Expanding/ upgrading implementation"

Source: Forrester Software Survey, Q4 2010

Adoption reflects local government priorities.

“What are your company’s three (3) priorities over the next 12 months?”



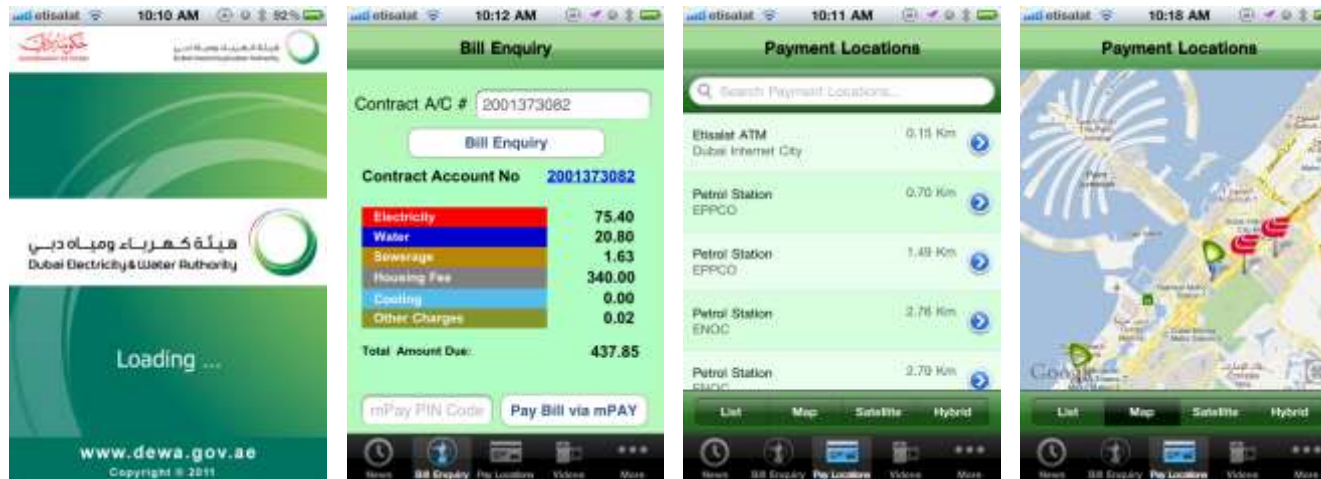
Base: 68 global IT decision-makers that work in local government (multiple responses accepted)

Local government IT decision-makers prioritize basic “back-office” and “front-office” improvements.

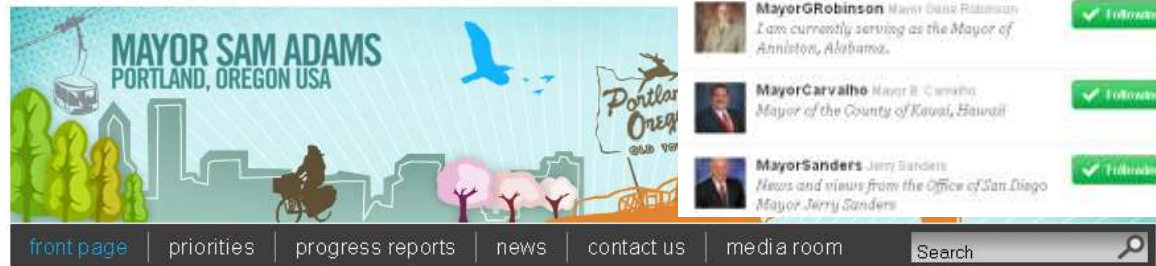
Source: Forrsights Budgets And Priorities Tracker Survey, Q4 2010

Cities transform eGov't from "electronic" to "engaged."

By making city services and information easier to access.



Dubai Electricity and Water Authority's application provides news and payment information.



And, better communicating with constituents.

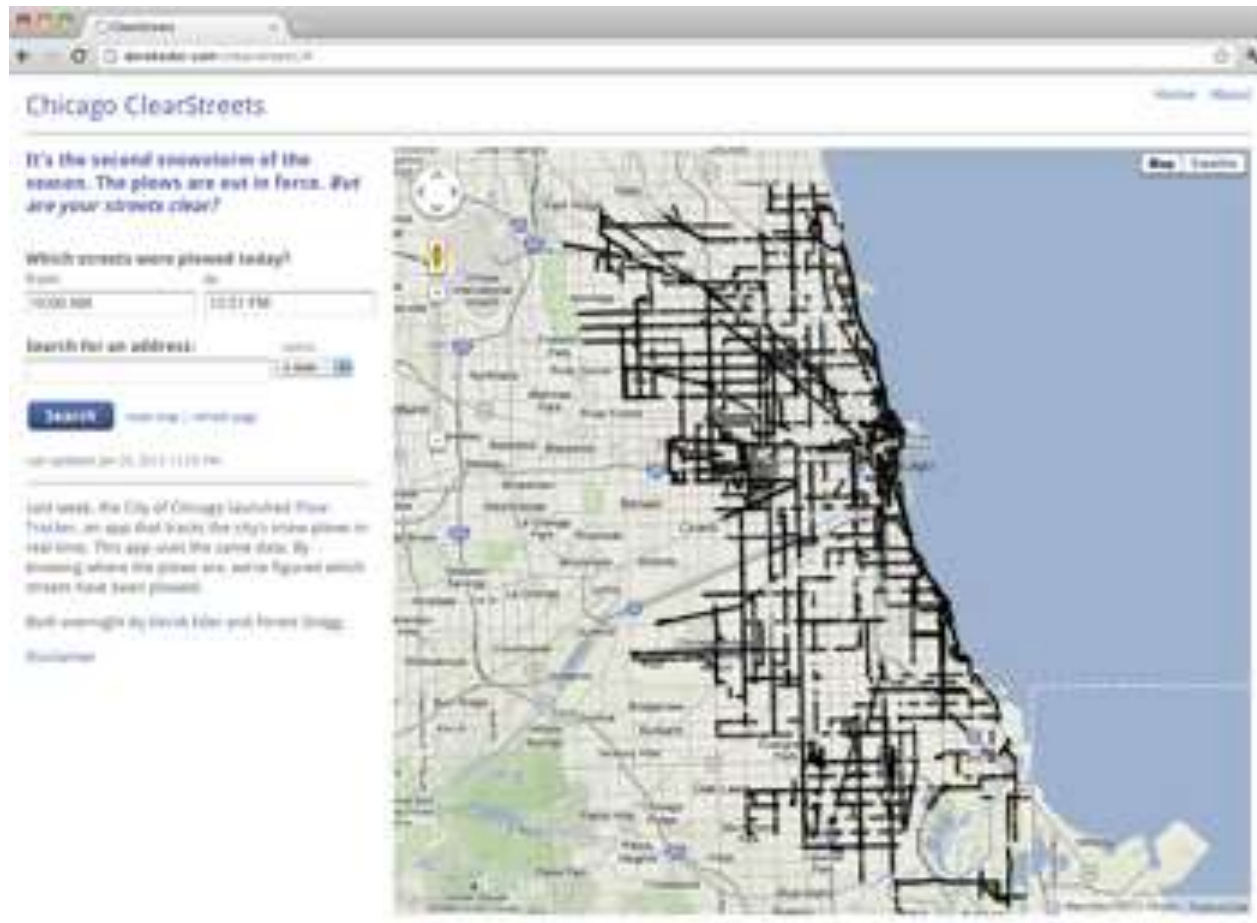
And Vilnius' mayor uses video to make his point!



The image shows a YouTube video player interface. At the top left is the YouTube logo. To its right is a search bar with the text "Search" and "Browse" next to it. Below the search bar is the channel name "Vilniaus meras Artūras Zuokas" with a "Subscribe" button and a small profile picture. The main video frame shows a green tank on a city street, crushing a blue car. The video player controls at the bottom show a progress bar at 0:04 / 1:44, a volume icon, and a resolution of 360p. Below the video frame are buttons for "Info", "Favorite", "Share", and "Flag". The video title is "Vilnius Mayor A.Zuokas Fights Illegally Parked Cars with Tank". Below the title are "Like" and "Dislike" buttons. At the bottom of the video frame, it says "From: MerasZuokas | Aug 2, 2011 | 3,486,452 views" and "Vilnius Mayor A.Zuokas Fights Illegally Parked Cars with Tank".

Chicago's government uses data to dispel criticism.

The City of Chicago launched Plow Tracker, an app that tracks the city's snow plows in real time.



Source: <http://marketplace.civiccommons.org/apps/chicago-clearstreets>

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New York includes constituents in the decision-making process.

 [Suggest Location](#) [News](#) [Timeline](#) [FAQ](#) [Bike Smart!](#) [Documents](#) [Contact Us](#)

New York City Bike Share

Help shape NYC's new transit option



 Rachel B wants a Herald Square station. [Check it out →](#)



Tell us where you'd like to see a bike share station

Click "Suggest Station", then drag the map pin to make adjustments.

Click "Confirm Station" when you're done, and tell us why it's a good location.

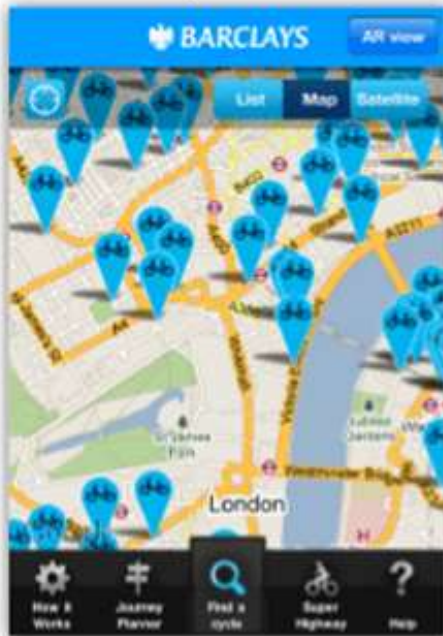
SUGGEST STATION 

- separated cycle path
- striped route
- on-street signed route

Map data ©2011 Google, Sanborn [Terms of Use](#)

Many cities provide city data and interfaces to city systems to encourage citizen-developers.

Transportation



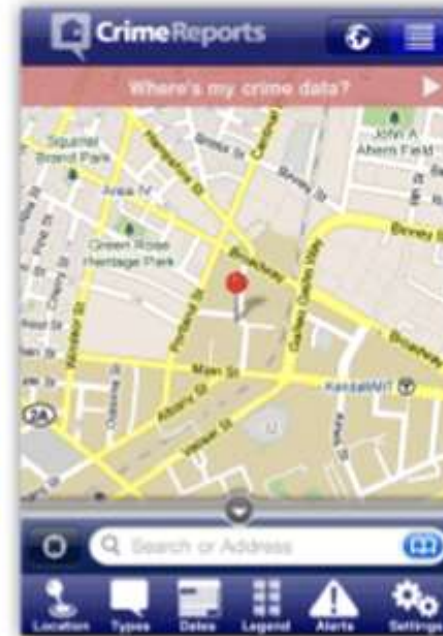
Barclays Cycle Hire* provides the number of bikes and bike spaces available at each docking station in London plus the distance from the nearest train or tube station based on data from Transport for London.

Leisure



SFTrees¹ lets users determine what tree they are looking at in San Francisco by using data from the San Francisco Department of Public Works.

Crime



CrimeReports¹ allows users to view crime data at street level in San Francisco based on data from the San Francisco Police Department.

*Source: Barclays Cycle Hire mobile application;
¹Source: city of San Francisco SF Trees mobile application;
¹Source: city of San Francisco CrimeReports mobile application

Citizen-sourcing through open data and app development competitions expands government reach and resources.

And encourage new services innovation and development.



Application development challenges have proliferated worldwide, increasing tech awareness in cities and producing innovative new services for cities.

Source: Upcoming Forrester Report, "New Modes Of Constituent Engagement: Social Media, Mobility And Open Data Transform e-Government From Electronic to Engaged"
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Moving Toward Truly “Smart”

Comprehensive approaches versus piecemeal initiatives



New York City rationalizes services delivery...

- **“Government service” – an oxymoron?**
 - City government covered 400 different entries on 14 pages of the phone book, with 40 call centers across the city.
 - 50% of citizens made 2-10 calls; and 37% spent 20 + minutes on hold or with an agency.
 - 60% thought that level of service was to be expected of the government.
- **Smart City Government and Governance – NYC311, 311Online and NYC Stat**
 - Launched call center in 2003 as a single point of access for citizens
 - Added online portal access in 2009, as well as Twitter, Skype and an iPhone app
 - Launched NYC Stat, an internal performance reporting and management dashboard for city administration, in 2007 (public access to performance in 2010)
- **Smart NYC Results**
 - Improved customer service – 18.7 million calls in 2009 (over 50,000 day); average answer speed of 15 seconds, and 75% of calls resolved w/o transfer.
 - Improved data integration, reporting and analysis
 - Improved performance management and decision-support
 - Improved city governance and transparency

And, delivers better governance.

Agenda

An aerial view of the San Francisco skyline, featuring the Transamerica Pyramid as the central focus. The image is semi-transparent, allowing the text to be overlaid on it.

Typology and initiatives

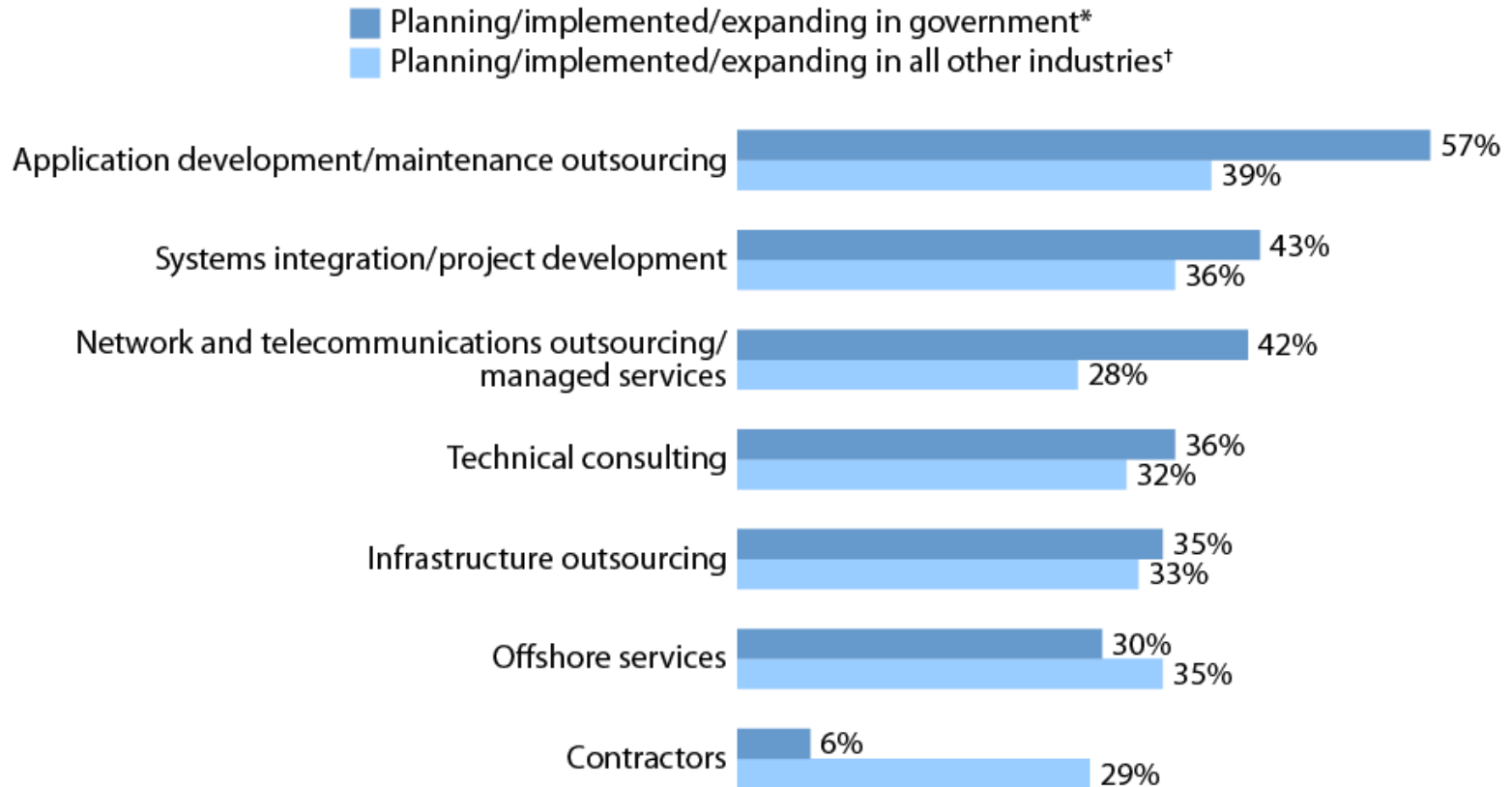
Funding and business models

Key takeaways

City profiles

Governments Lead The Adoption Of Outcome-Based Business Models

“What are your firm’s plans to adopt outcome-based models?”



Base: *55 global IT executives and technology decision-makers in government
†952 IT executives and technology decision-makers in all other industries

Source: Forrsights Services Survey, Q3 2010

Shared services – both an internal, cross-department model and cross-jurisdictional models – gain momentum.

- Within cities, as cities move to an enterprise architecture IT departments act as a service bureau.
 - Miami-Dade County
- Across cities, through consortia of agencies or cities
 - Public Sector Broadband Network in Wales
 - Southwest One
 - NHS Business Services
 - Cleveland Police
- With larger cities acting as hubs for neighboring municipalities.
 - Capetown, SA has built cloud capability beyond its own needs, got approval to act as a service provider, and plans to provide services to surrounding municipalities. Uptake has been slow but interest is growing.

Cities launch cloud initiatives: both internal and external.

This remains early days for city clouds but not too early...

- **Singapore** launched an extensive G-cloud tender to create a platform for delivering IT infrastructure and applications to government departments through an app-store like portal.
- **Recife, Brazil** and NEC signed an MOU to develop cloud-based eGovernment services.
- **Shanghai** wants to be the "Asia-Pacific Cloud Computing Center" to promote business development in areas such as urban management, e-government and SME services.
- **New York** Mayor Michael Bloomberg announced an [executive order](#) in October 2010 to consolidate its Microsoft software licenses and start moving toward cloud computing, saying that it would save the city more than \$50 million.
- **Miami, FL**, is using a cloud system to record, track and report nonemergency incidents tied into its 311 call-in system. The cloud system provides cost savings but also enables sophisticated mapping capabilities and disaster recovery.
- **Orlando** migrated 3,000 city workers to Google email to address budget and human resource challenges. The city says it is saving \$262,500 per year, centralizing document storage and collaboration, increasing mail storage, and enhancing mobile device support.
- **Vernon Hills, Ill** moved its public safety video camera system to the cloud as a means of increasing officer safety and productivity.

Strong Barriers To Cloud Adoption In Government Remain

“How strongly do you rate the following concerns and/or barriers to cloud adoption within your organization?”

(4 and 5 on a scale of 1 [lowest] to 5 [highest])

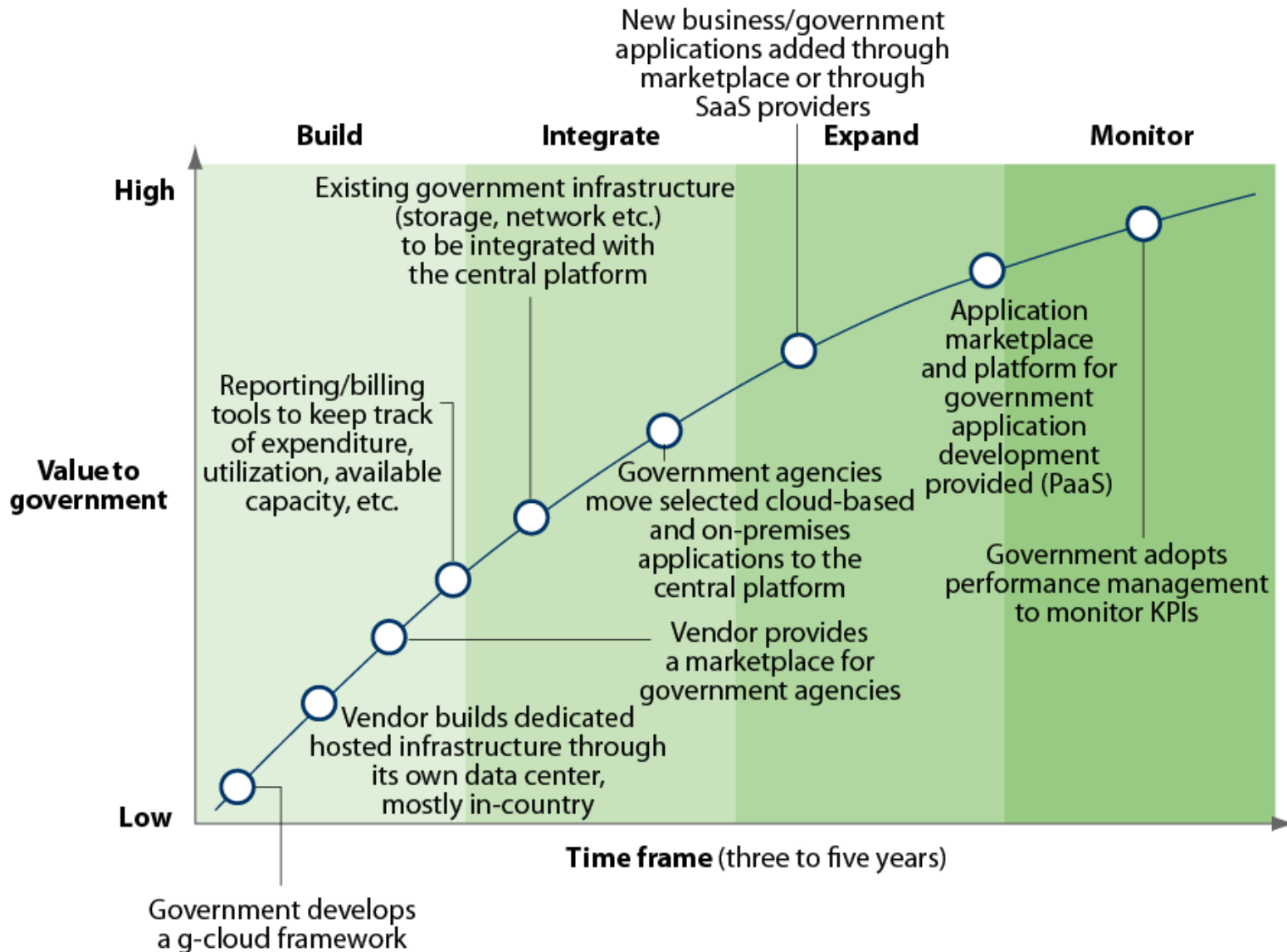


Base: 30 IT executives and technology budget decision-makers located in Australia, Singapore, China, India, Malaysia, and Hong Kong across all organization sizes in government

Source: Forrsights Strategy Spotlight: Cloud In Asia Pacific Excluding Japan, Q3 2011

78% report a strategy to centralize the procurement and management of cloud services through IT.

Forrester Predicts G-Clouds Will Evolve Through Four Stages: The Evolution Curve



Agenda

An aerial photograph of the San Francisco skyline, featuring the Transamerica Pyramid as the central focus. The image is semi-transparent, allowing text to be overlaid on the left side.

Typology and initiatives

Funding and business models

Key takeaways

City profiles

Key Takeaways

- Smart cities are about more than “sustainable development.”
 - Few initiatives are driven solely by “green” or environmental sustainability concerns, nor by population growth and urbanization.
 - Most initiatives are driven by competition for job growth and investment, budget constraints and political mandates.
 - Often catalyzing events determine the immediacy of initiatives (floods, blackouts, riots).
- Cities embrace “book smarts” – application rationalization, data center consolidation, performance management and transparency – more than “street smarts” – M2M or video based public safety, transportation etc.
 - “Back to the basics” is a better strategy for many SMCs.
 - The “basics” optimize IT budgets and enable new initiatives.
- Leadership is the key enabler of “smart” strategy. Mayors have political agendas and “smart” projects deliver political capital.
- Cities don’t get smart on their own: real estate developers and architects design new developments; system integrators deliver IT; banks finance projects; and many other sectors participate (automotive, retail).
- City leaders must enlist all constituents, business and individuals.

Thank you!

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Agenda

An aerial view of the San Francisco skyline, featuring the Transamerica Pyramid as the central focus. The image is overlaid with a semi-transparent white box containing the agenda items.

Typology and initiatives

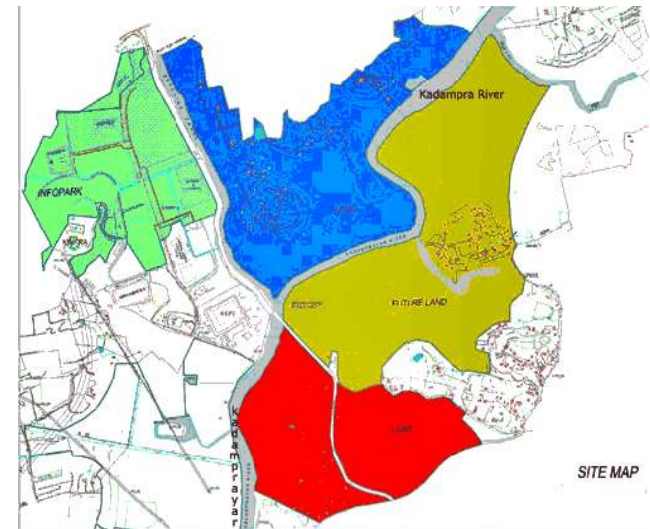
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Smart Kochi – An IT Township for Knowledge-based Companies

- **Location:** Kakkanadu (Kochi), India
- **Type:** New construction in Greenfield area
- **Area:** 8.8 million square feet
- **Chief Minister:** Oommen Chandy
- **Actors:**
 - Government of Kerala,
 - TECOM,
 - Sama Dubai Holdings,
 - Smart City (Kochi) Infrastructure Pvt. Ltd,
 - Davis Langdon (Construction Consultants)
- **Drivers:**
 - Political drivers: Political mandates, agendas and visibility
 - Economic drivers: Creating jobs, Attracting investments, Diversifying economies (70% of space allocated for the project is set aside for IT/ITeS/allied services)
- **Goals:**
 - Self-sustained industry township (IT township) for knowledge-based companies,
 - state-of-the-art business-community infrastructure,
 - offer a host of business support services as well as residential, hospitality, retail and recreational facilities.
- **Status:**
 - SmartCity pavilion will be completed in January 2012 and construction of first building is expected to commence in January 2012.
 - First phase is expected to be completed within 2 years approximately generating 3000 jobs.
 - Expected completion of project by 2017.



Dongtan – A Prototypical Eco-city Project

- **Location:** Hwaseong, China
- **Type:** New construction in Brownfield area
- **Area:** 86 square kilometer of delicate wetland
- **Actors:**
 - Shanghai Municipal Govt.
 - Shanghai Industrial Investment Corporation
 - ARUP
- **Drivers:**
 - Economic drivers: Creating jobs, Attracting investments,
 - Environmental drivers: Low carbon development, self sufficient energy system
 - Social drivers: Lifestyle improvement, Eco-friendly hydrogen fuel cells for public transport
- **Goals:**
 - Energy-efficient buildings would be clustered together to encourage residents to travel on foot;
 - only battery- or hydrogen-powered cars would be permitted in the development.
 - Surrounding organic farms would supply food;
 - sea breezes and the burning of husks of China's staple crop, rice, would furnish power.
 - Canals and ponds would incorporate the local wetlands,
 - providing restful views for humans and continued respite for migrating birds
- **Status:**
 - It was originally slated for completion in 2010 but has failed to proceed beyond the construction in 2009 of a tunnel and bridge linking Chongming to the mainland.
 - It is one of numerous planned eco-cities around the world that have fizzled, many because of cost



Closer look at new cities

Long on vision; shorter on reality

- **Dongtan** – “Yet for all its grand goals, this island city-to-be remains un-built. Whether China has abandoned the project totally is unclear. (Scientific American, 8/22/2011)
- **Lavasa** – ““India’s first planned hill city” is almost a ghost town. No families live in the over 500 half-constructed villas on the hilltops around Dasve, while silence surrounds the restaurants and pubs that were meant to be bustling with customers.” (*India Express*, “A City Halted,” 11/25/2011)
- **Masdar** – “Masdar [sic] cut 9 percent of its workforce after an annual business review. ... After conducting an earlier strategic review, Masdar said last year it would build the city in stages and delayed the first phase by two years to 2015,” (Bloomberg, 11/22/2011).

Disputes and delays characterize many new cities.
Yet the value as living labs remain.

Hammarby Sjoestad – Project based on the Hammarby Model

- **Location:** Stockholm, Sweden
- **Type:** New construction in Brownfield/former industrial area
- **Total Area:** 200 hectares
- **Smart city initiatives:** Maximize recycling of rubbish and sewage to generate renewable energy
- **Actors:**
 - City of Stockholm,
 - Stockholm Water Company,
 - Fortum and the Stockholm Waste Management Administration,
 - different developers
- **Drivers and Goals:**
 - emissions to be 50 % lower than the corresponding level,
 - sanitary redevelopment,
 - reuse and transformation of old brownfield sites into attractive residential areas with parks and green public spaces,
 - renewable fuels,
 - biogas products and reuse of waste heat coupled with efficient energy consumption in buildings, as clean and efficient as possible – with the aid of new technology for water saving and sewage treatment
 - Waste thoroughly sorted in practical systems.
 - Transportation to be fast, attractive public transport, combined with car pools and cycle paths.
 - Building materials: healthy, dry and environmentally sound.
- **Status:** Development ongoing, due to finish in 2017



New York – Shining up the Big Apple.

- **Location:** United States
- **Type:** Existing city
- **Population:** 8 million (city); 22 million (metro area)
- **Actors:**
 - Mayor Michael Bloomberg, DoITT, Accenture, Oracle, Dell, IBM
- **Drivers:**
 - High crime rates,
 - Poorly perceived government service,
 - Highly visible and political mayor
- **Goals:**
 - Improve access to government services and information
 - Improve performance management and governance
 - Reduce crime rates
- **Initiatives:**
 - **Governance**
 - **NYC311**
 - Single Non-Emergency Number for 50 city departments launched in 2003;
 - Online portal in 2009 as well as Twitter, Skype and mobile apps
 - **NYCStat**
 - Began internal performance reporting and management through performance dashboard for city administration in 2007
 - Opened NYCStat reports to public access in 2010
 - **Public Safety**
 - **NYC Real Time Crime Center**
 - Integrates data from criminal records, parole and probation files, criminal complaints, 911/311 calls and summonses, national crime records and public records.
 - **Transportation**
 - NYC Bike Sharing
- **Funding:**
 - NYC Budget



Barcelona – Truly smart city from governance to waste management

- **Location:** Spain
- **Type:** Existing city
- **Population:** 1,621,537
- **Actors:**
 - City of Barcelona, ENDESA, Orange, Circulator, Santa & Cole, IRED, SECE, DEXMA, eControls, IREC, IBM, Cisco, Schneider Electric and other partners
- **Drivers and goals:**
 - Create economic engine by fostering innovation;
 - Improve public space quality
 - Improve citizen services
 - Public sector modernization
 - Improve performance management
- **Initiatives:**
 - **Governance**
 - Tracking key performance indicators (KPIs)
 - Integration between budget processes and administrative and political objectives including new processes and measures/indicators, cross-functional information, manual data input and data analysis.
 - Performance management and reporting
 - Data center modernization and security
 - BCN Open Data
 - **Transportation**
 - **Traffic management systems**
 - Cameras to count vehicles and monitor traffic across district 22@ (pilot project)
 - Informative panels
 - **Sensor-based parking initiative**
 - **Municipal fleet management**
 - **Building/urban infrastructures**
 - Public lighting controls
 - Installation of urban furniture supports with multipurpose sensors
 - Waste management
 - Smart meters
- **Funding:**
 - Municipal budget and pilot projects with companies who offer short term solutions.
 - Grants, funds and other PPPs funded the sensor platform



Columbus, OH – Goal to become a leader in economic development

- **Location:** United States
- **Type:** Existing city
- **Population:** 787,003 (2010 census)
- **Actors:**
 - City of Columbus
 - Columbus 2020 investors
 - County government
- **Drivers and goals:**
 - Retain and attract companies and industries
 - Attract major employers to the region
 - Create more enterprises by encouraging innovation and entrepreneurship
 - Improve the civic infrastructure and political conditions that enhance the economic development environment
- **Initiatives:**
 - **Governance**
 - Data center consolidation
 - Business analytics
 - Custom reporting and comparable statistics for potential investors
 - **Buildings (not necessarily “smart”)**
 - 4,7000 new housing units
 - Riverfront parks, promenades
 - Commercial construction
- **Funding:**
 - \$3.7 million from the city and private investors in Columbus 2020
 - Additional funds from the county



Yokohama – Earthquake and tsunami (aka 311) act as change agents

- **Location:** Japan
- **Type:** Existing city
- **Population:** 3.7 million
- **Actors:**
 - Yokohama City, Accenture Japan Ltd., TOKYO GAS, The Tokyo Electric Power Company Inc., Toshiba, NISSAN MOTOR, Panasonic, Meidensha, Ministry of Economy, Trade and Industry (METI)
- **Drivers and goals:**
 - Innovation to attract investment and people in response to an aging population and falling tax base,
 - Climate change mitigation
 - Reduced dependency on fossil fuels
 - Export “smart city” concepts as thought leadership.
- **Initiatives:**
 - **Buildings**
 - Minato Mirai 21 – Redevelopment of Japan’s leading port area
 - Kohoku-New Town – Development of large-scale business and residential area
 - **Smart grid and utilities**
 - Retrofit of existing power grid with ICT and residential smart meters
 - Water, waste water management, solid waste management,
 - **Education**
 - Technical assistance and training opportunities
 - **Governance**
 - Overall city management
 - Disseminating accumulated know-how on urban development and environmental management
- **Funding:**
 - Public-private partnerships
 - Collaboration with universities, CITYNET, strategic partner cities



Malaga – Demonstration project spurs city leadership and wins awards

- **Location:** Spain
- **Type:** Existing city
- **Population:** 500,000
- **Actors:**
 - City of Malaga
 - ENDESA
- **Drivers and goals:**
 - Address climate change
 - Optimize and retrofit energy grid
 - Participate in regional collaborations – collective governance – such as CAT MED, Covenant of Mayors etc.
- **Initiatives:**
 - **Utilities**
 - **Smart grid**
 - ENDESA lead project to demonstrate distributed production and localized distribution, and the use of self-healing networks.
 - Optimize use of existing grid
 - **Smart meters**
 - 12,000 residential meters installed
 - **Street lighting optimization**
 - Light reduction street lights reduced electricity use by 27%
 - **Alternative energy sources for lighting**
 - **Transportation**
 - **Integrated transport system**
 - Traffic control center optimizing traffic signals, flow and incidents
 - **Parking**
 - Identification of availability; mobile phone payment system
 - **Electronic vehicles**
 - 6 charging stations, some bi-directional
- **Funding:**
 - Public-private partnership; €32 from European Regional Development Fund over 4 years.

