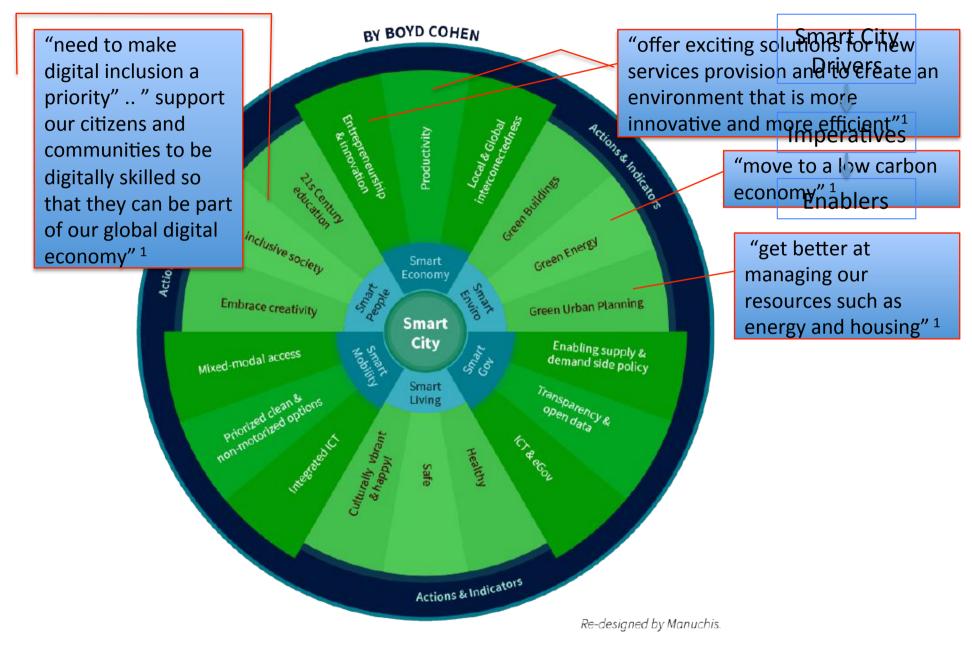




Drivers for Data Driven Smart City





Each core system can be made 'smarter' through intelligence, giving cities unprecedented prediction powers to drive better business outcomes

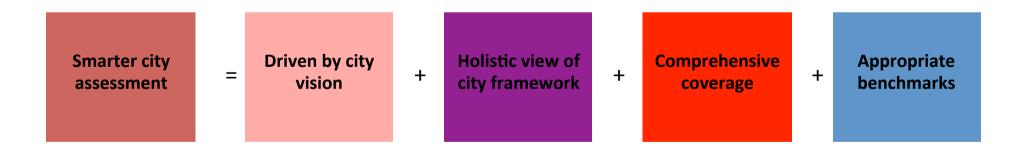
System	Elements	Instrumentation	Interconnection	Intelligence
City Services	Public service managementLocal government administration	Creation of local authority management information system	Interconnected service delivery	Immediate and joint-up service provision
Citizens	Health and educationPublic safetyGovernment services	Patient diagnostic and screening devices	Interconnect records for doctors, hospitals, and other health providers	Patient-driven pre-emptive care
Business	Business environment Administrative burdens	Data gathering about use of online business services	Interconnect stakeholders across city's business systems	Customized service delivery for businesses
Transport	Cars, roadsPublic transportAirports, seaports	Measuring traffic flows and toll use	Integrated traffic, weather, and traveller information services	Real-time road pricing
Communication	■Broadband, wireless ■Phones, computers	Data gathering via mobile phones	Interconnect mobile phones, fixed line, broadband	Information for consumers on city services in real time, on their own time
Water	■Sanitation ■Freshwater supplies ■Seawater	Gather data for water quality monitoring	Interconnect businesses, ports, energy users of water	Real-time quality, flood, and draught control
Energy	■Oil, gas ■Renewable ■Nuclear	Fit sensors to gather data on usage across the energy system	Interconnect appliances & devices between energy consumers and providers	Optimise the use of the system and balance use across time

- **City Operations Systems**
- **City User Systems**
- City Infrastructure Systems © 2013 IBM Corporation



Assessment should be guided by four key principles

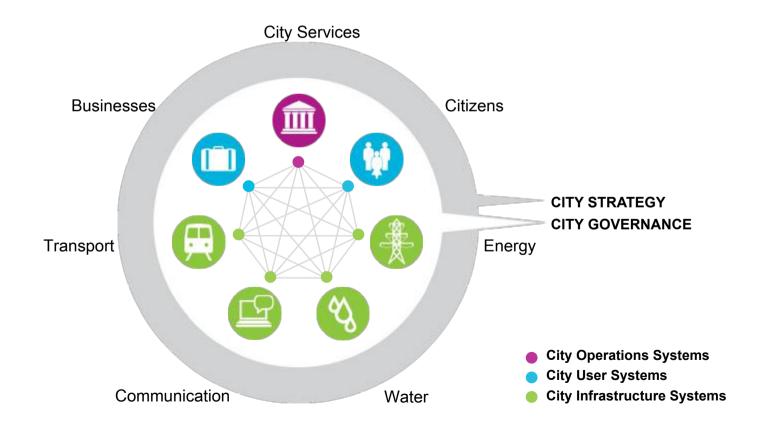
- Driven by city vision
- Provide a holistic view of the city framework
- Have comprehensive coverage of the transformation of each system
- Benchmark against relevant peer cities



IBM

The assessment of a city's smartness needs to be holistic and cover all elements of the city's overall framework...

- Cities should strive for a complete picture of their city performance
- Partial measurement may result in wrong conclusions and misallocation of resources and effort

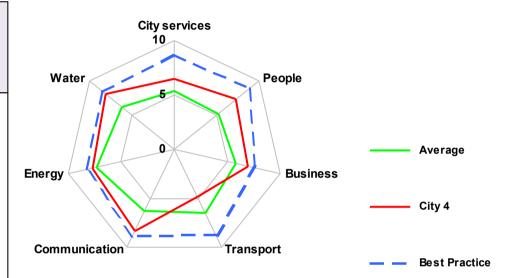


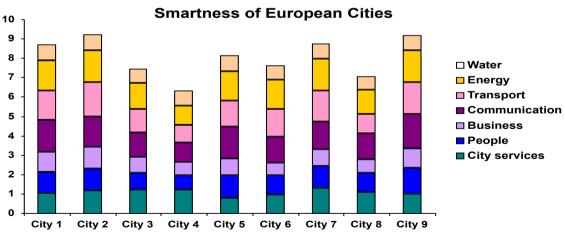


... and use the findings as input for action

Smarter City Measurement Methodology

- Offers evidence-based assessment of requirements and smartness features
- Provides in-depth understanding of strengths and weaknesses
- Highlights challenges that cities face and specifies where improvements can be made
- Provides input for action plan to support city agenda
- Enables monitoring of progress







Data Challenge for Data Driven Smart City



Smart City Drivers

Imperatives

Big Data (Data Rich to Insight Rich to Action @ Speed of Tenhett)

- Volume: 4.1 terabytes per day per square kilometre of urbanized land area by 2016.
 - Birmingham City estimate: 267.8 km² ≈ 1098 TB/day ≈ 1.07 PB/day
- Variety: Unstructured (video, audio, CDR, telemetry, UHF/VHF)
- Velocity: Streaming real-time (CCTV, traffic sensors, utility model volume to Variety)



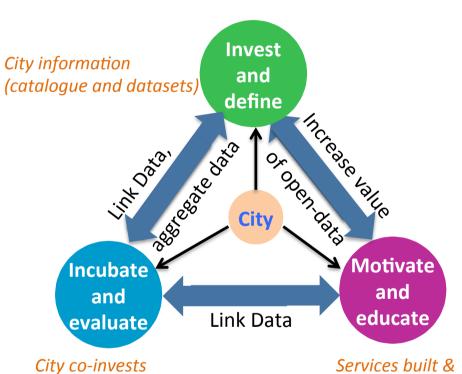
Velocity

Veracity

Balancing Between Engagement and Business Models Engagement, Ownership and Cost



Engagement Model



Accelerate evolution

of ecosystem

Business Model

Citizens-Pay	Cities-Pay	Businesses-Pay	
 Private Company Sell value- added services to citizens 	 Private Company Sell inexpensive services to city Typically cloud-based 	 Services free or discounted Funded by other parts of the business Can be non-profit organisations 	

Services built & maintained by community on top of open-data

What We Have Learned



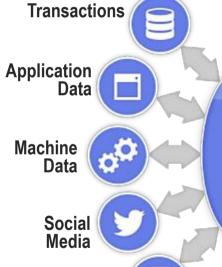
A Comprehensive Set of Capabilities Is Required To Address The Challenge

8 March 2013

- Drills break through into busy London rail tunnel
- Services were stopped after a driver said muddy water had poured on to his roof
- An hour later, two piling drills came through as a train with only a driver and Network Rail manager approached to inspect the area.
 2012 is unavailable at present due

"serious incident" averted data privacy issue and

will be back up as soon as possible.



Reduce the Cost of Data

Manage

Trust & Protect Information

Integrate & Govern

New Insights From Big Data

Analyze

THE INFORMATION SUPPLY CHAIN



Rail staff spotted the drills which broke through into the tunnel

Analytic Applications



Enterprise Applications



Mobile/Cloud Applications

Applications

Big Data (1PB/day)

Content



CLIENT EXAMPLE

Smarter Airports play a unique and critical role as major connection points between all stakeholders creating more aviation efficiency and revenues

Ground Handlers



- Ground Handlers
- Refuelers
- Cleaners
- Tow truck Operators
- Loading Bridge Operator
- Pre-con air, power & water services
- In-flight catering
- Sewage services
- Baggage Handlers
- Cargo Handlers

Airport Operator



- Airside Operations
- Terminal Operations
- Landside Operations
- Security Operations
- Emergency Operations
- Enquiries Desk
- Back Office Staff
- Facilities Management

Third Parties



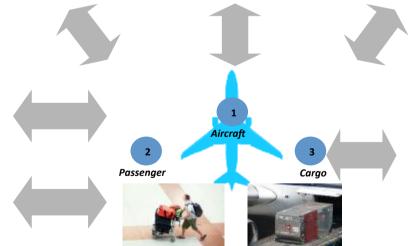
- Transport links
 - Rail
 - Taxi
 - Buses
- Airport Retailers
- Hotels
- Car Hire Companies

Air Traffic Control



Airline Operator





Three Important Entities of every Airport

Government Agencies





- Immigration
- Customs
- Security

Imagine what a Smarter Airport Could Mean



... imagine what a Smarter Airport could mean for the Passenger and for the Airport Operator



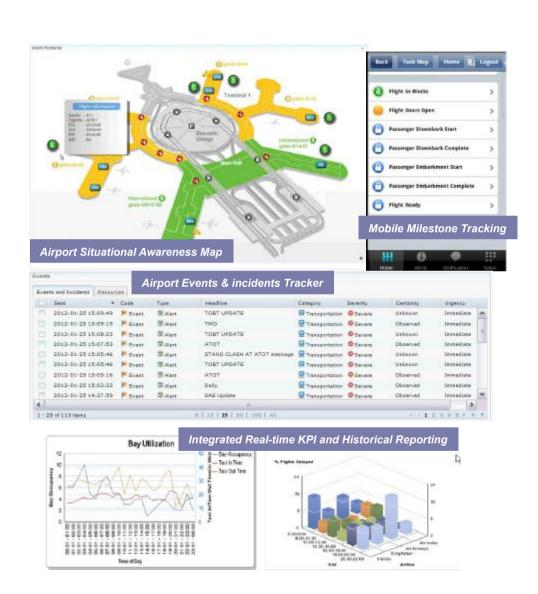


"Smart AOCC" powered by Intelligent Operations Center (IOC)

IBM's Smart "Command Center"

Product Features:

- Domain services request management system with Executive, domain Operations, and Agency dashboards that include domain KPI reports with trends and analysis of event and domain data.
- Centralized environment for planning, organizing, monitoring and sharing information continuously in response to changing conditions.
- Drill down capabilities on details of service requests, team members and assets assigned and status – which is also available in a geospatial context for situational awareness.
- Provides for integrated collaboration within the views and as an element on the dashboard.
- Event and directive management is achieved through integrated incident management, reporting and collaboration & communication.



Building a Smarter City and State



The Commonwealth of Massachusetts, The City of Boston and IBM are working together to transform the region's physical infrastructure, engage citizens, reduce costs and improve efficiency. Do you know where technology is at work where you live? Buildings: feet of property. Software helps improve maintenance, space and management across public sector technology makes transportation more efficient and Tens of millions of travelers pass through Logan better manage maintenance operations for equipment such as air conditioning, doors and escalators at Terminal A. Physical Assets: fire hydrants. Software helps city officials better manage and maintain physical assets. Special Events: the Boston Marathon and July 4th fireworks every year. Software can integrate and visualize critical information across city departments including fire.

6 Water

and plan special events."

Massachusetts Water Hesource Authority (MWHA) serves 2.5 million people in 61 communities. Using software, MWHA decreased corrective maintenance and project work orders by 38 percent.

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