Smart Cities/Smart Buildings

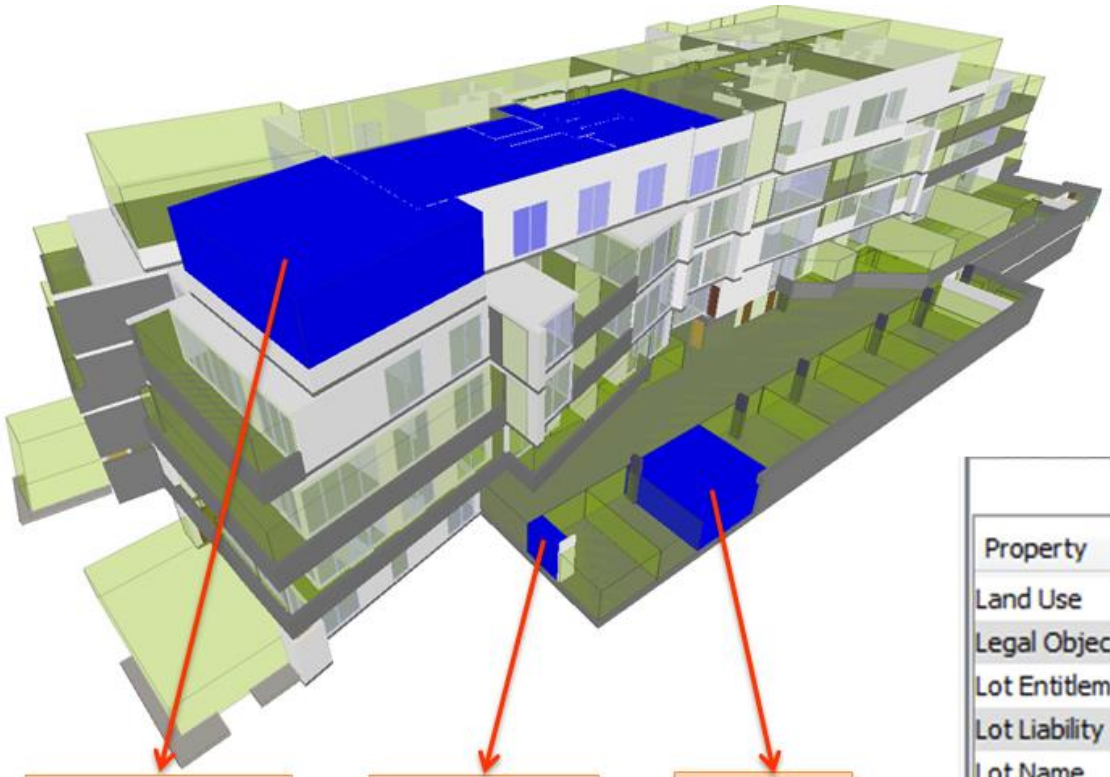
…….. A Short Tale of Two Scales

James Kavanagh RICS – WPLA/CLRKEN workshop 21st April – session 3

Content

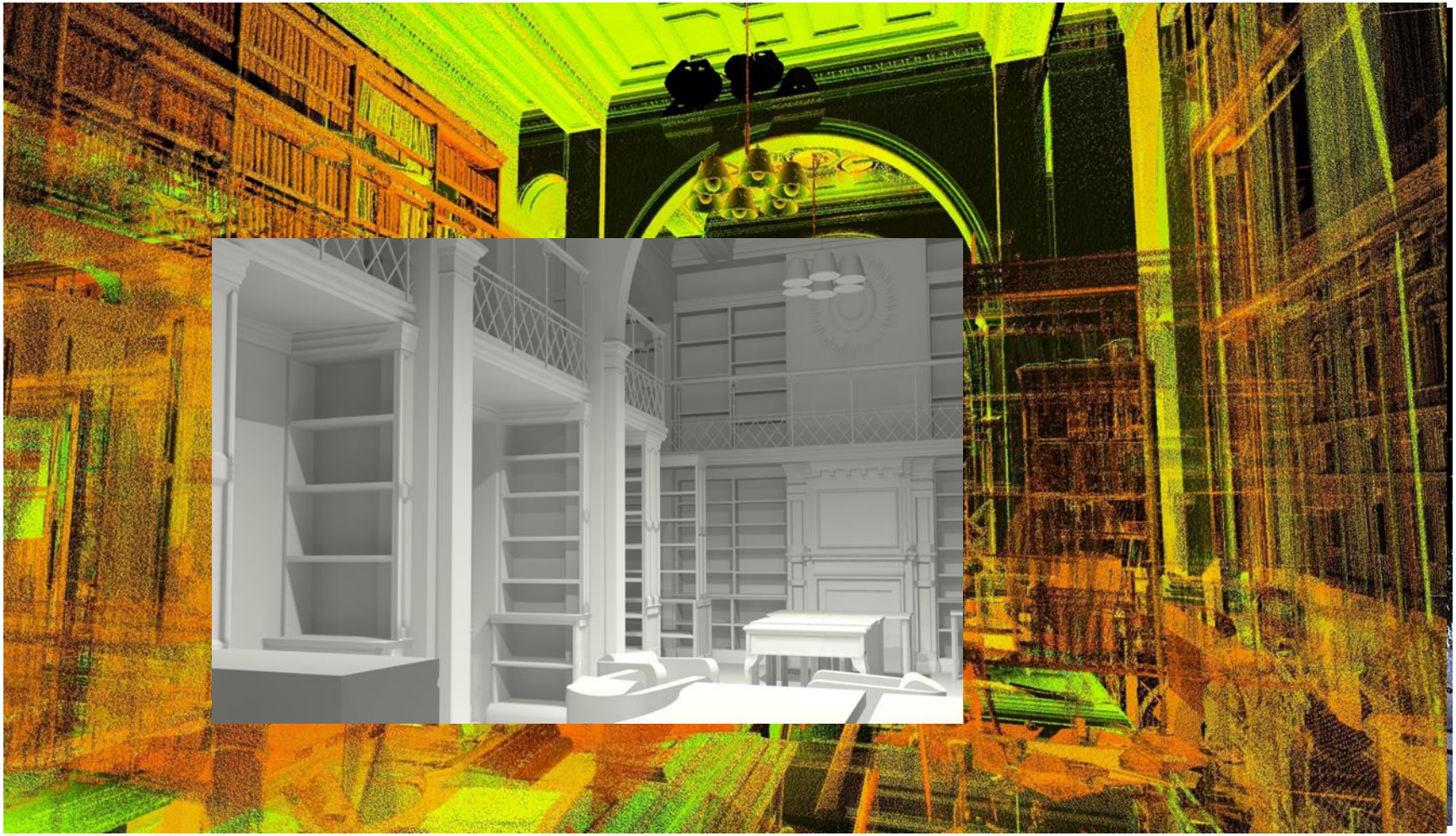
- A brief introduction to BIM & Smart Cities
- Smart cities, dumb buildings
- Interoperability and standards
- The sharp end – funding mechanisms PPP
- Different governance structures, buildings as ‘super’ sensors
- Conclusions

The BIM challenge

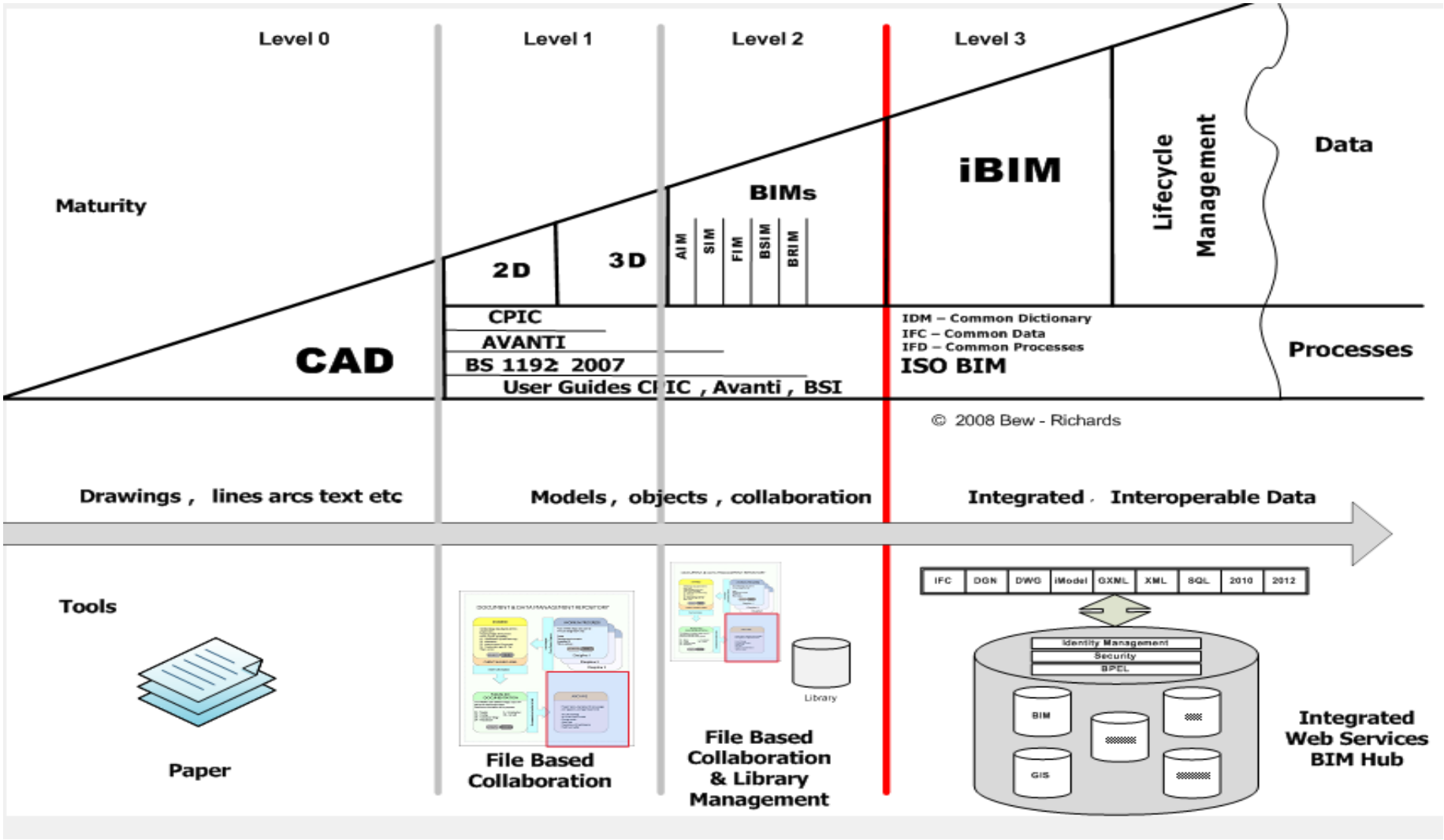


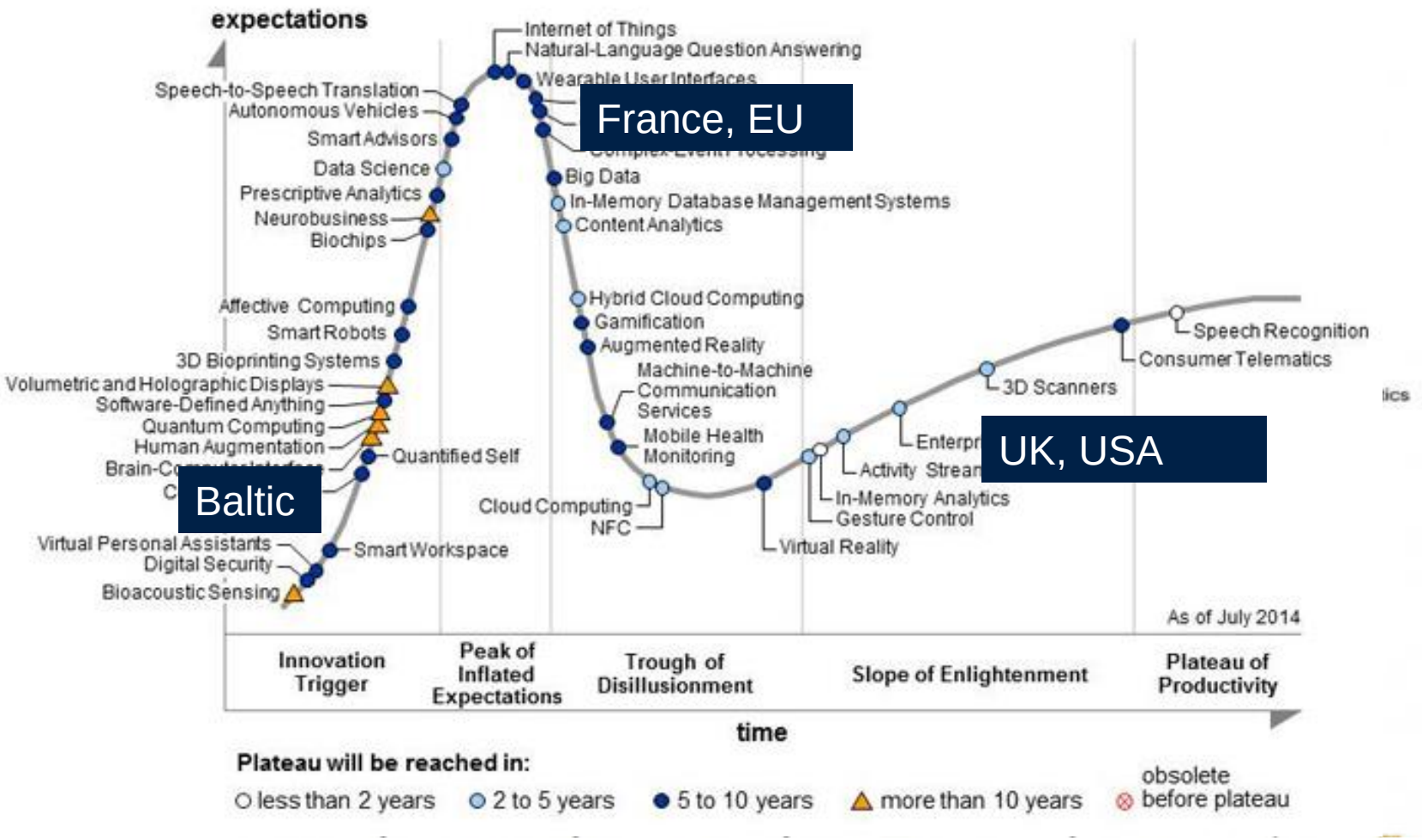
Subdivision Data Elements	
Property	Value
Land Use	Residential
Legal Object Unit	Multipart
Lot Entitlement	35
Lot Liability	55
Lot Name	LOT-406
Owner Name	Mr. Andrew Wilson
Owner Share	100
Owner Type	Person
Title Folio	724
Title Security Number	623542
Title Volume	10563
Volume of Parent Title	03242

The BIM challenge



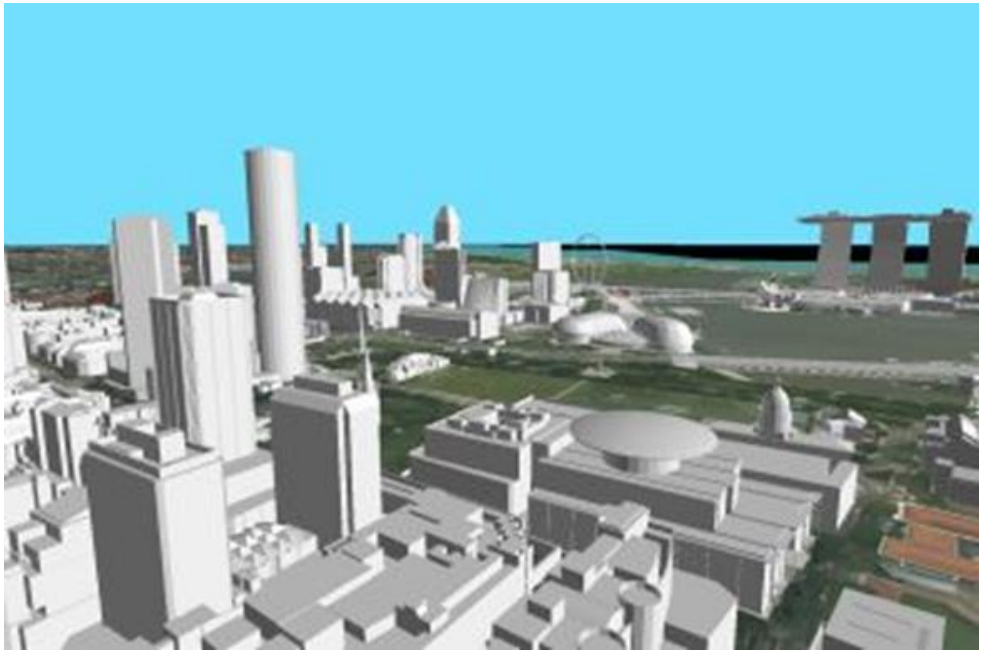
Capex & Opex cost data sets




expectations
Internet of Things
Natural-Language Question Answering
Wearable User Interfaces
Speech-to-Speech Translation
Autonomous Vehicles
Smart Advisors
Data Science
Prescriptive Analytics
Neurobusiness
Biochips
France, EU
Big Data
In-Memory Database Management Systems
Content Analytics
Affective Computing
Smart Robots
3D Bioprinting Systems
Volumetric and Holographic Displays
Software-Defined Anything
Quantum Computing
Human Augmentation
Quantified Self
Baltic
Hybrid Cloud Computing
Gamification
Augmented Reality
Machine-to-Machine Communication Services
Mobile Health Monitoring
Cloud Computing
NFC
Virtual Personal Assistants
Digital Security
Bioacoustic Sensing
Smart Workspace
Virtual Reality
In-Memory Analytics
Gesture Control
Activity Stream
3D Scanners
Speech Recognition
Consumer Telematics
UK, USA
As of July 2014
Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time
Plateau will be reached in:
less than 2 years
2 to 5 years
5 to 10 years
more than 10 years
obsolete before plateau

What's so Smart about a Smart City?

A Smart City provides effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens



Smart City Indicators

- ISO/DIS 37120 - Sustainable development and resilience of communities — Indicators for city services and quality of life
- OGC Smart Cities Spatial Information Framework
- UNECE – Smart urban solutions for developing countries

Economy, Education, **Energy**, Environment, Recreation, Safety, Shelter, **Solid waste**, Telecommunications and innovation, Finance, Fire and emergency response, **Governance**, **Health**, **Transportation**, **Urban planning**, Wastewater, **Water and sanitation**

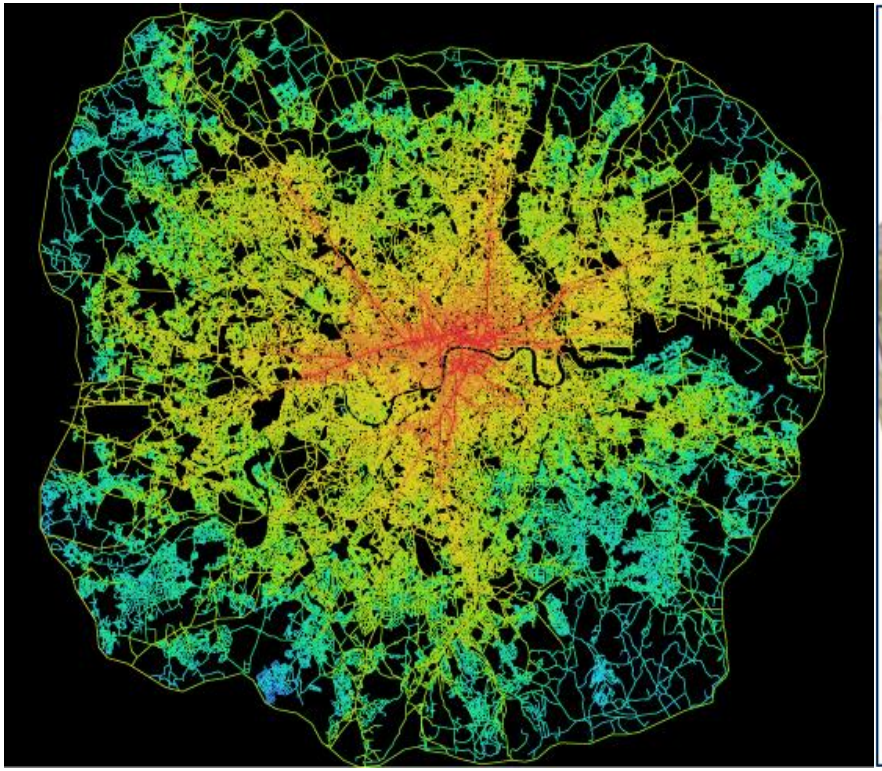
Operations Centre

Rio De Janeiro

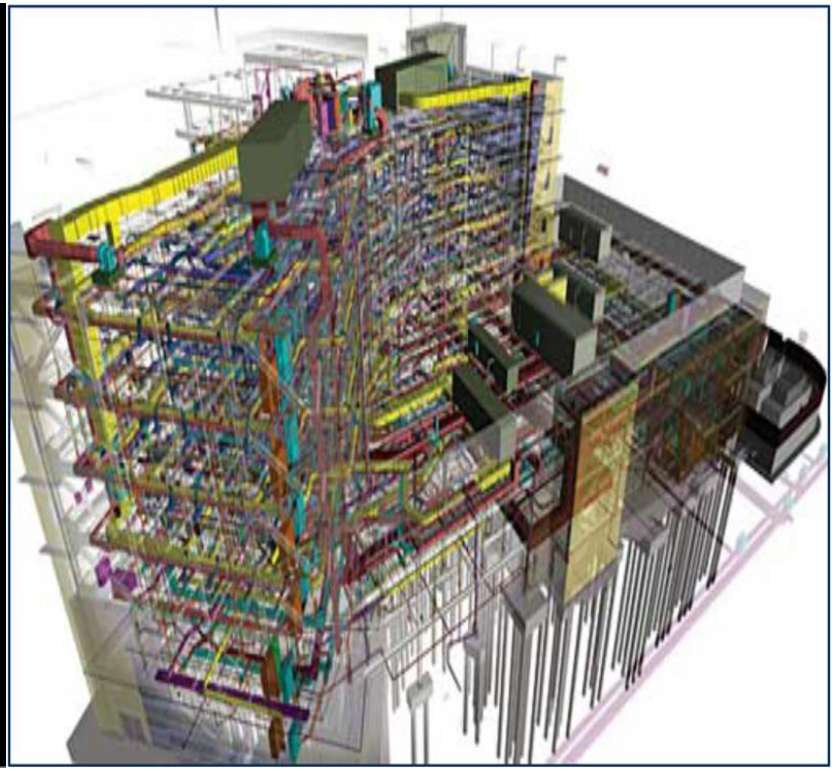
01010110
BIG0110
01DATA
1000100

Smart ?

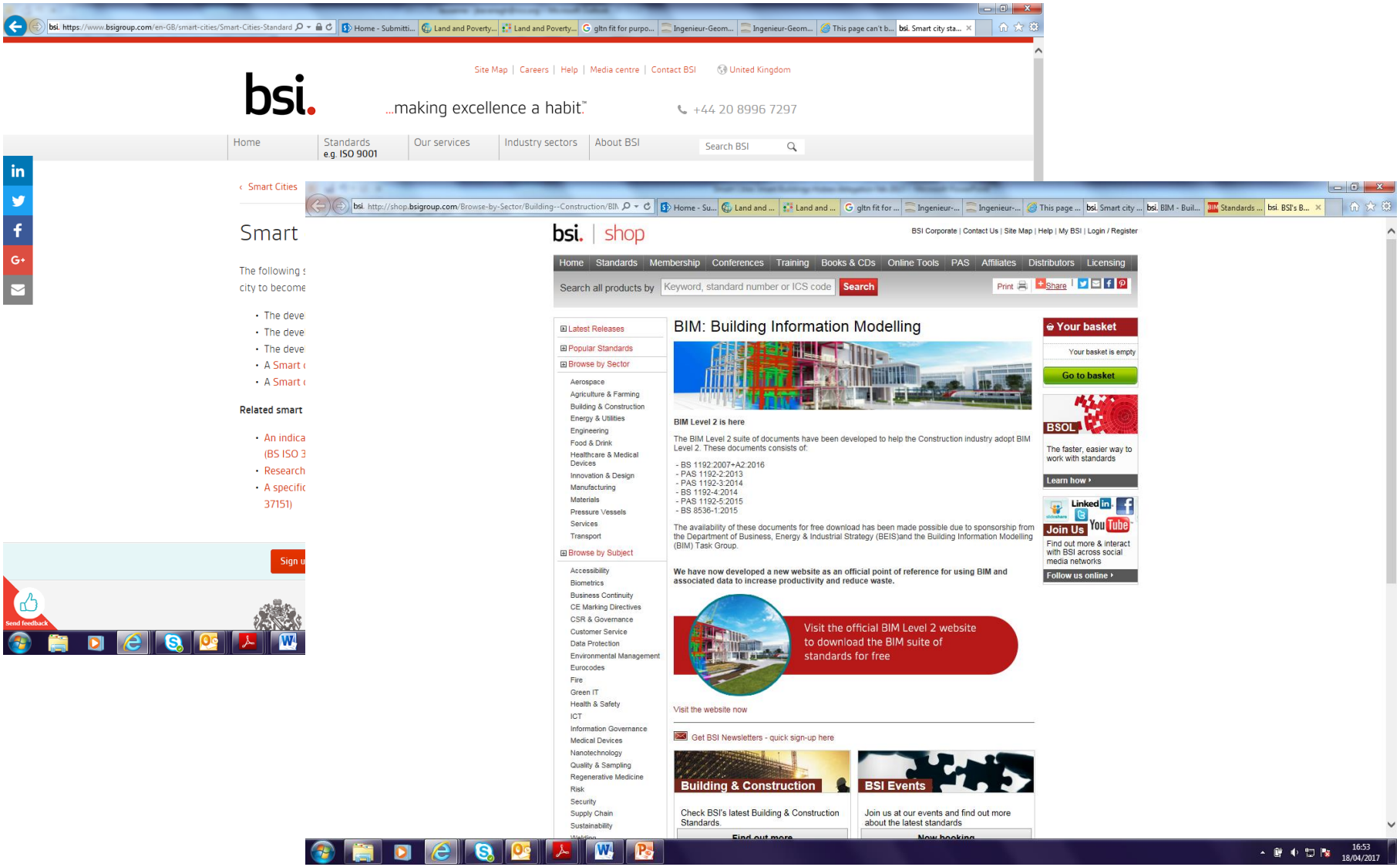
City (Space syntax UCL)



Building (Ghafari/AR)

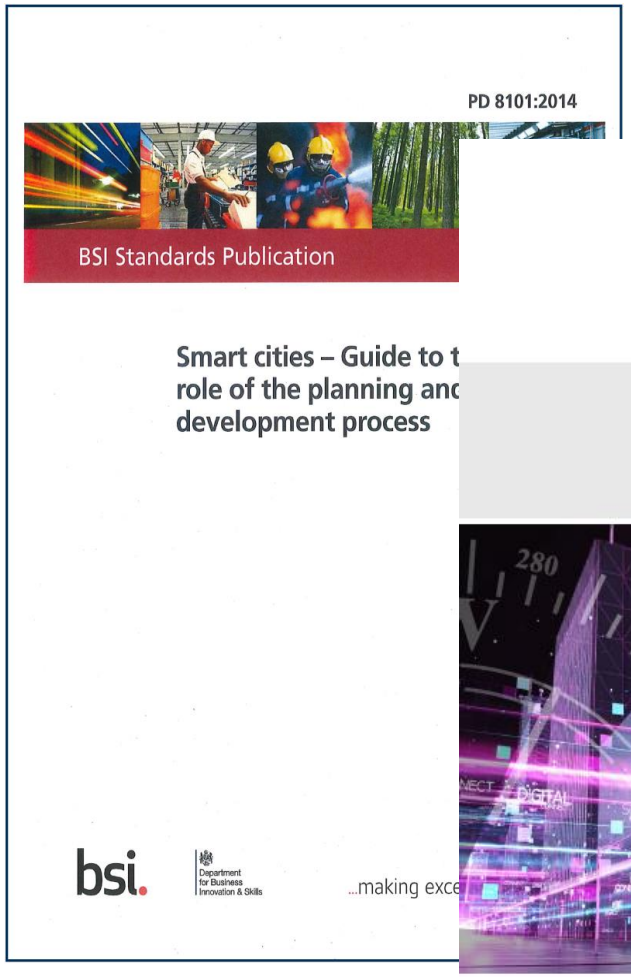


Standards and scale

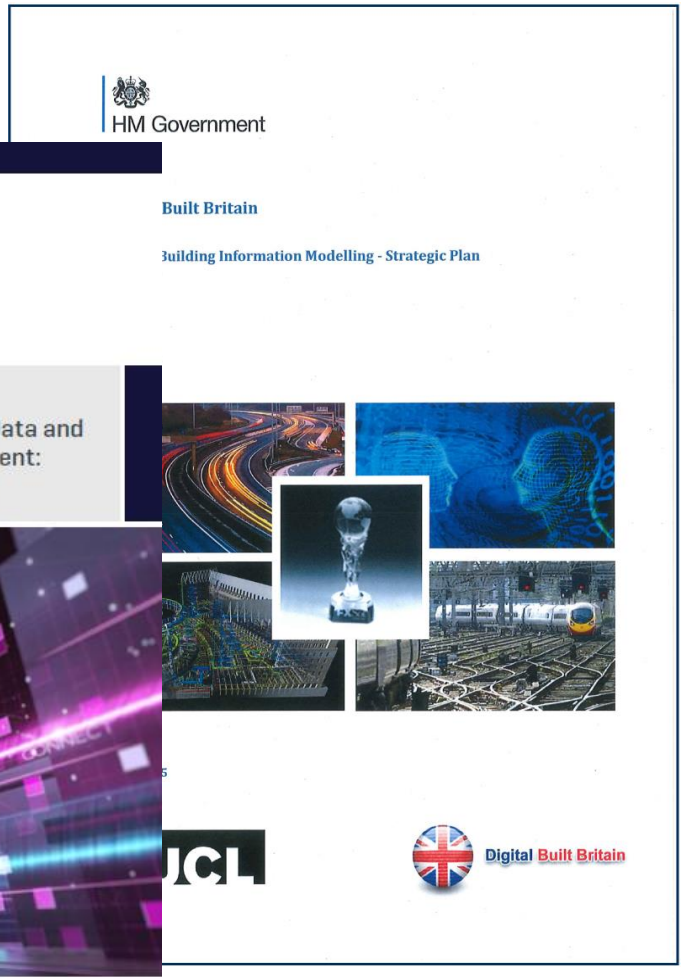


The business end of ‘smart’

Smart Cities



Smart Building



Smart cities, Smart Buildings?

Smart cities, dumb buildings?

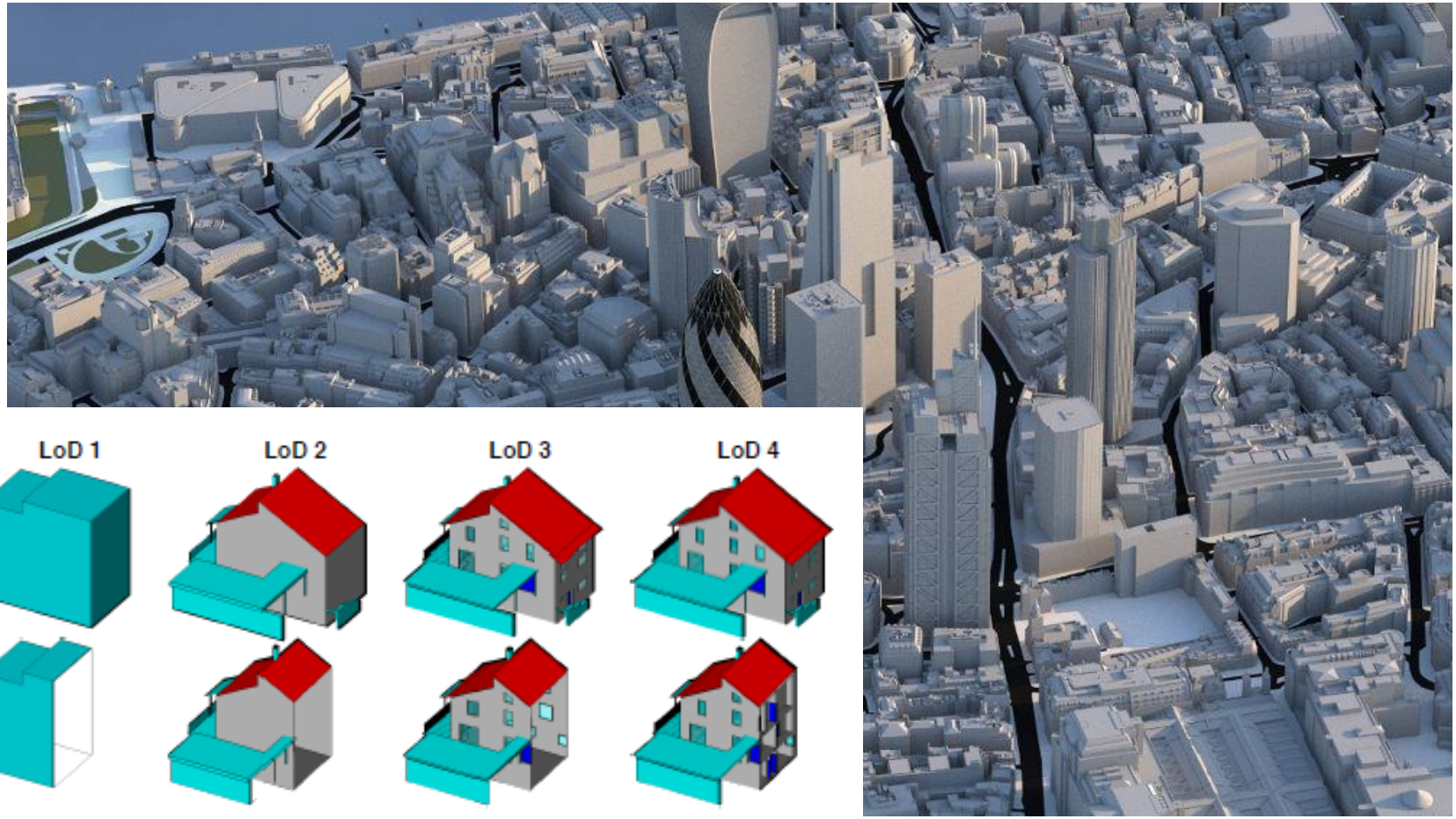


Figure 2.5: Four LoDs of CityGML. LOD0 is not shown here. Courtesy of Karlsruhe Institute of Technology.

Smart Cities issues

Interoperability

- City scale v Site scale
- City planning v Building design
- Public interest governance v Private interest governance
- Public sector objectives v Private sector objectives
- Public data v Private data

- Planners, Developers, Surveyors & Architects

Macro, meso and micro scale data issues – what about the ‘street’?

Soft Infrastructure – Placemaking, economic viability, market economics

Smart Cities

Economic drivers

Global market estimate £400 billion by 2020

UK market estimate £40 billion by 2025

- Transport – 170 new mass transit systems in China by 2025
- Energy – Berlin 220k rooftops producing 3 million megawatts
- Health care - $1.2 trillion investment in India
- Water – freshwater crisis in Africa
- Waste – 75% of global carbon emissions
- Telecoms – Digital Smart Nation Singapore

Smart Building

Economic drivers

Procure, deliver and operate the built environment

- UK construction employs over 3 million people
- Delivers £107 Billion output (2010)
- Key contributor to UK growth
- Critical in meeting UK Climate Change Targets
- Growing Facility/Asset Management sector
- Level 2 BIM case studies secured 20% capital savings against 2009/10 benchmarks
- Global construction forecast to grow by over 70% by 2025

Smart Cities

5 Key Areas to Support Smart City Aspirations

1. Build the partnerships to deliver holistic solutions

2. Build the foundation for widespread exploitation of data

3. Use digital modelling to deliver a people-centred physical environment

4. Put in place an enabling digital and communications infrastructure

5. Develop and test new business models and processes

New Government Funding

Key measures

1. Create new international ‘Open Data’ standards

2. Establish new contractual framework for projects procured with BIM

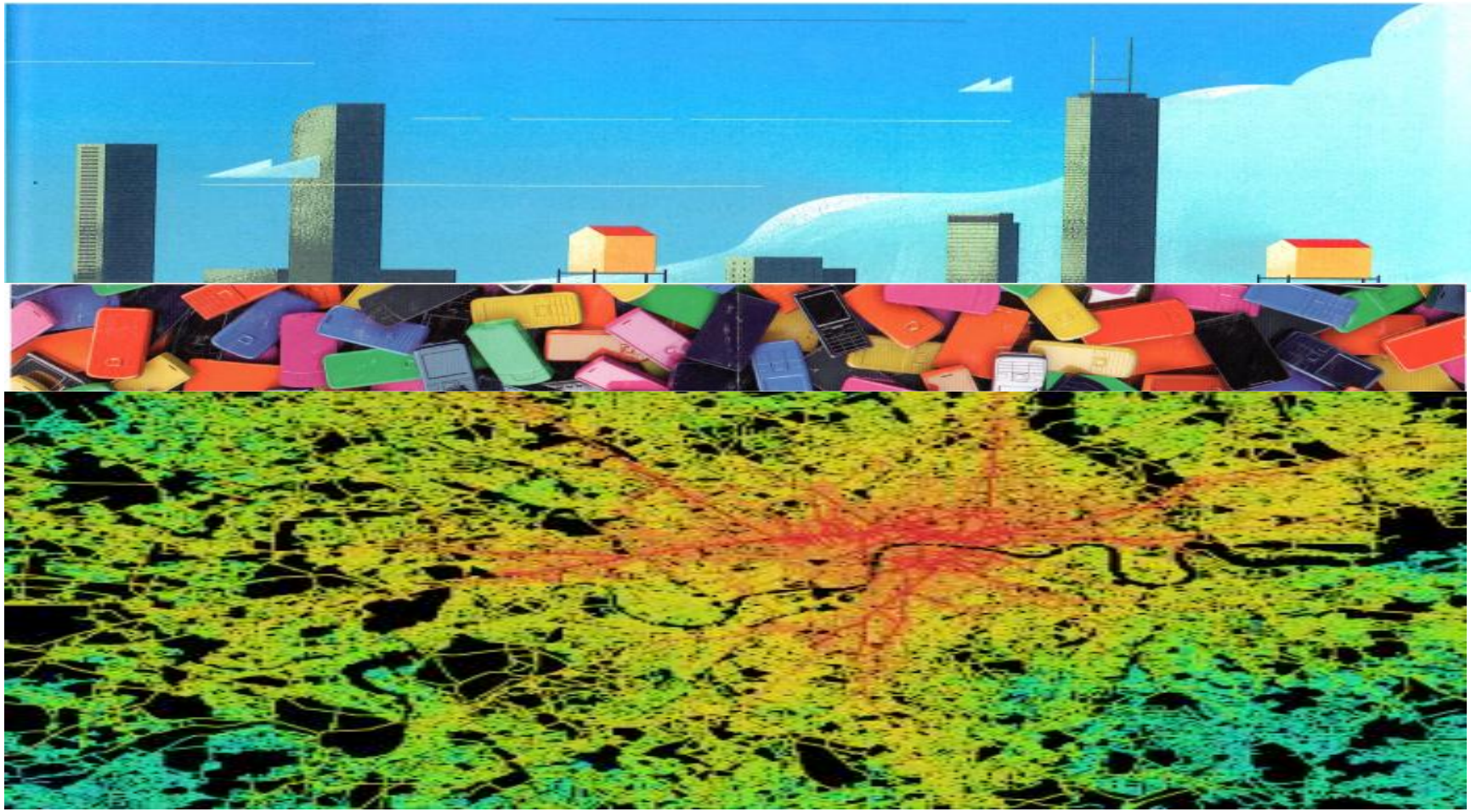
3. Create a cultural environment which is co-operative, learning and sharing

4. Training public sector client in use of BIM techniques

5. Driving domestic and international growth and jobs in technology and construction

City Information Modelling (CIM)

Seamless connection ?



Innovation UK - Future Cities Demonstrators

Glasgow, UK

- Awarded £24 million
- Integrate transport, communications and other infrastructure
- To improve city's economy and quality of life
- Reduce environmental impact

Bristol, UK 'Bristol is Open'

- Test-bed – programmable city
- Conversion of old cable television network to superfast fibre
- JV University of Bristol, Bristol City Council, NEC - £75m

Conclusions

- Energy and telecommunications capacity
- Centrality of Open Standards and geospatial data
- Interoperability
- Policy – Planning Policy & Data provision as part of the ‘approval’ process
- Public Private Initiatives – incentivising development
- Soft infrastructure

Contacts

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