Smart Cities/Smart Buildings

…….. A Short Tale of Two Scales

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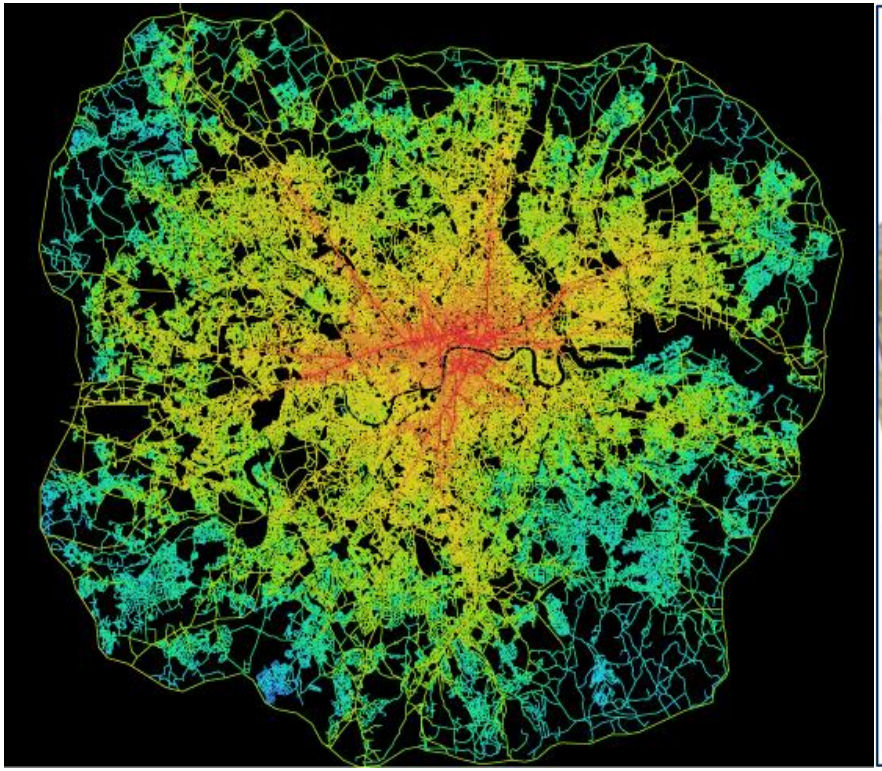
FIG Working Week 2016
8052 - TS07I - Urban and Cities Planning, Land Consolidation and Resilience
Time: 5/5/2016 2:00:00 PM

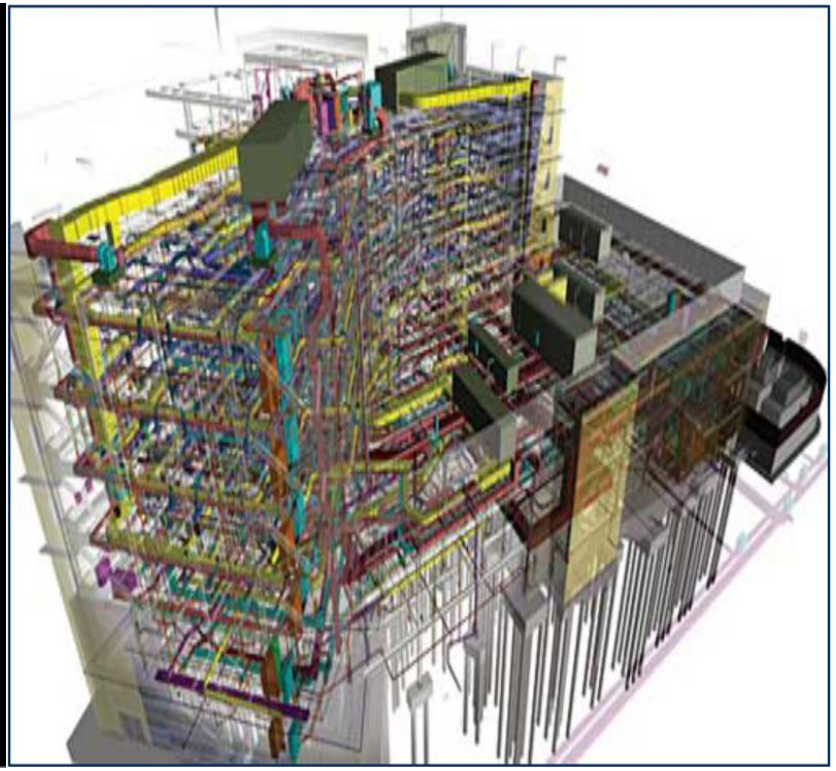


Smart

City (Space syntax UCL)



Building (Ghafari/AR)



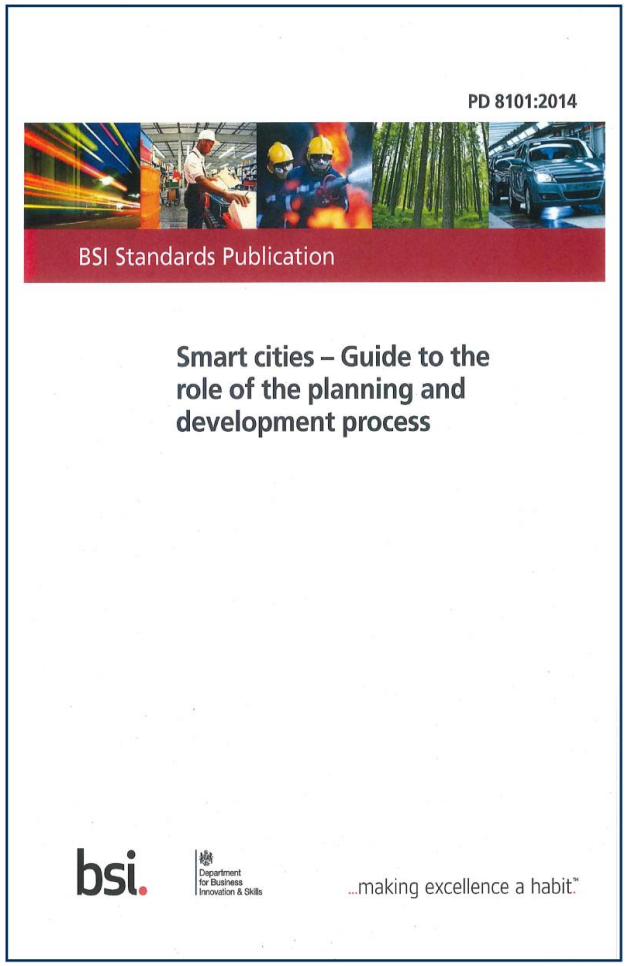
Cultural differences

Ensuring the two are talking to each other

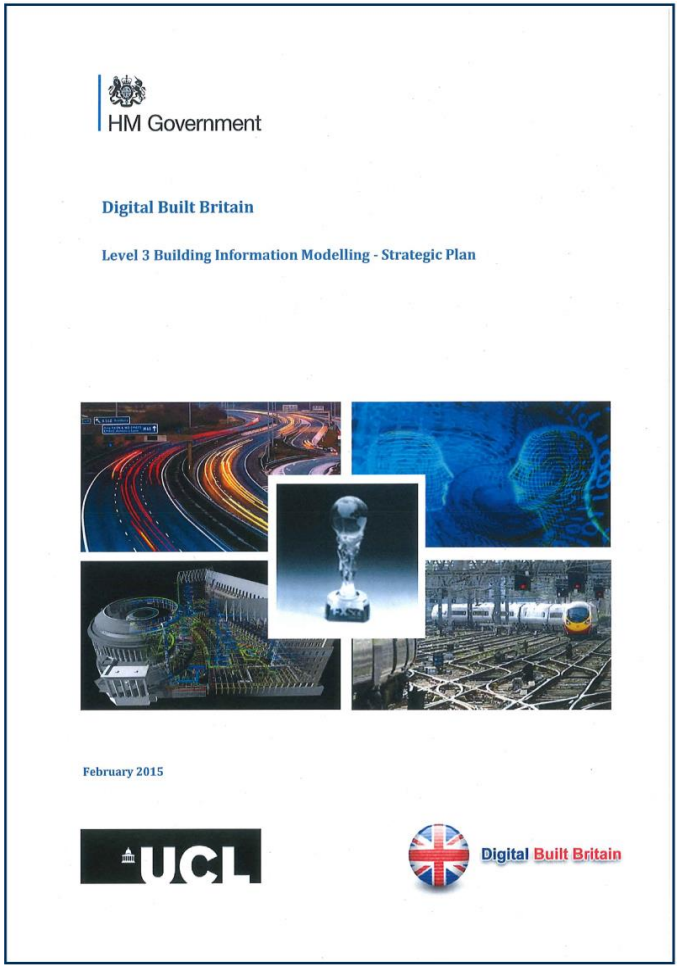
- Citywide project - planner
- Site based project (also street scale) - architect
- Different motivations
- Different governance structures
- Different technical platforms - interoperability

The business end of ‘smart’

Smart Cities



Smart Building



Smart Cities

Economic drivers

Global market estimate £400 billion by 2020

UK market estimate £40 billion by 2025

- Transport
- Energy
- Health care
- Water
- Waste
- Telecoms

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

Smart Cities Challenge

Build foundation for widespread exploitation of data

- Additional costs
- Data security and privacy
- Workable commercial arrangements - developer
- Data capture issues

Use digital modelling to deliver people-centred physical environment

- Identification of useful data
- Good practice often ignored
- Lack of software tools
- Lack of application of the potential of digital design

Smart Building Challenge

Social & Economic infrastructure

- Extensive renewal, modification and expansion required
- Limited resources after financial crisis
- Strong opposition to new projects on environmental impact or disruption grounds

- Transactional, tactical approach to designing and building infrastructure sub-optimal
- Price volatility during periods of growth shows construction being inefficient compared to other capital delivery industries
- Capital cost of building roads, railways and other economic infrastructure is as much as 40% more in the UK than in comparable European economies

Developing new business models

Enhancing value

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

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

Leeds City - self funding

Three layer model

- Foundation layer – operational foundation providing inter-operability for digital assets
- Differentiation layer – defines cities unique priorities based on skills and knowledge of people
- Innovation Layer – development of global leading projects that exploit Information, Human Capabilities and Digital technology

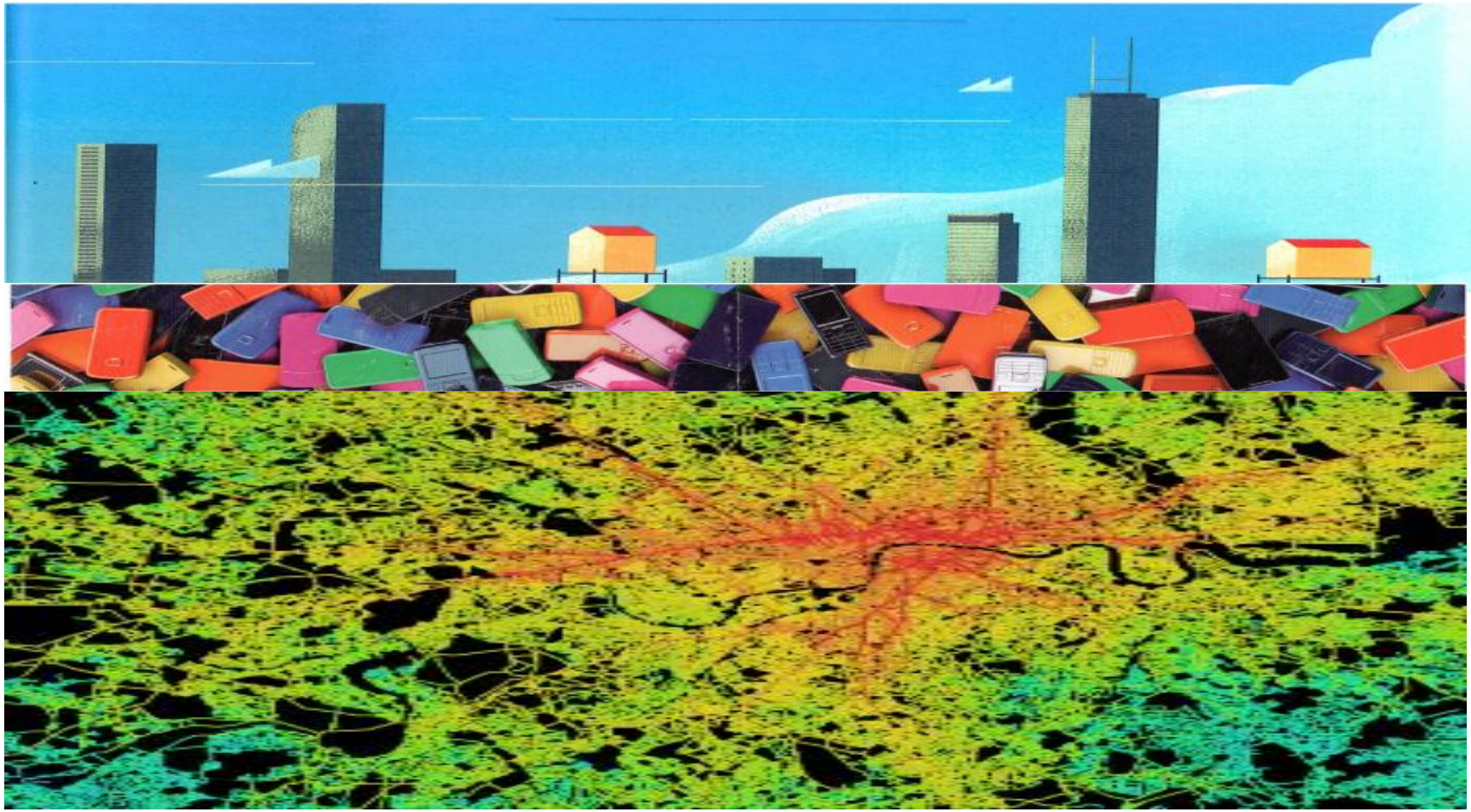
City Information Modelling (CIM)

Sharing building/city information

- Above Ground/Below Ground
- 2D and 3D interacting
- Location of underground services - expensive information not being harnessed
- Facilities management over life span of building – capacity to inform city planning and development in real time

City Information Modelling (CIM)

Seamless connection ?



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