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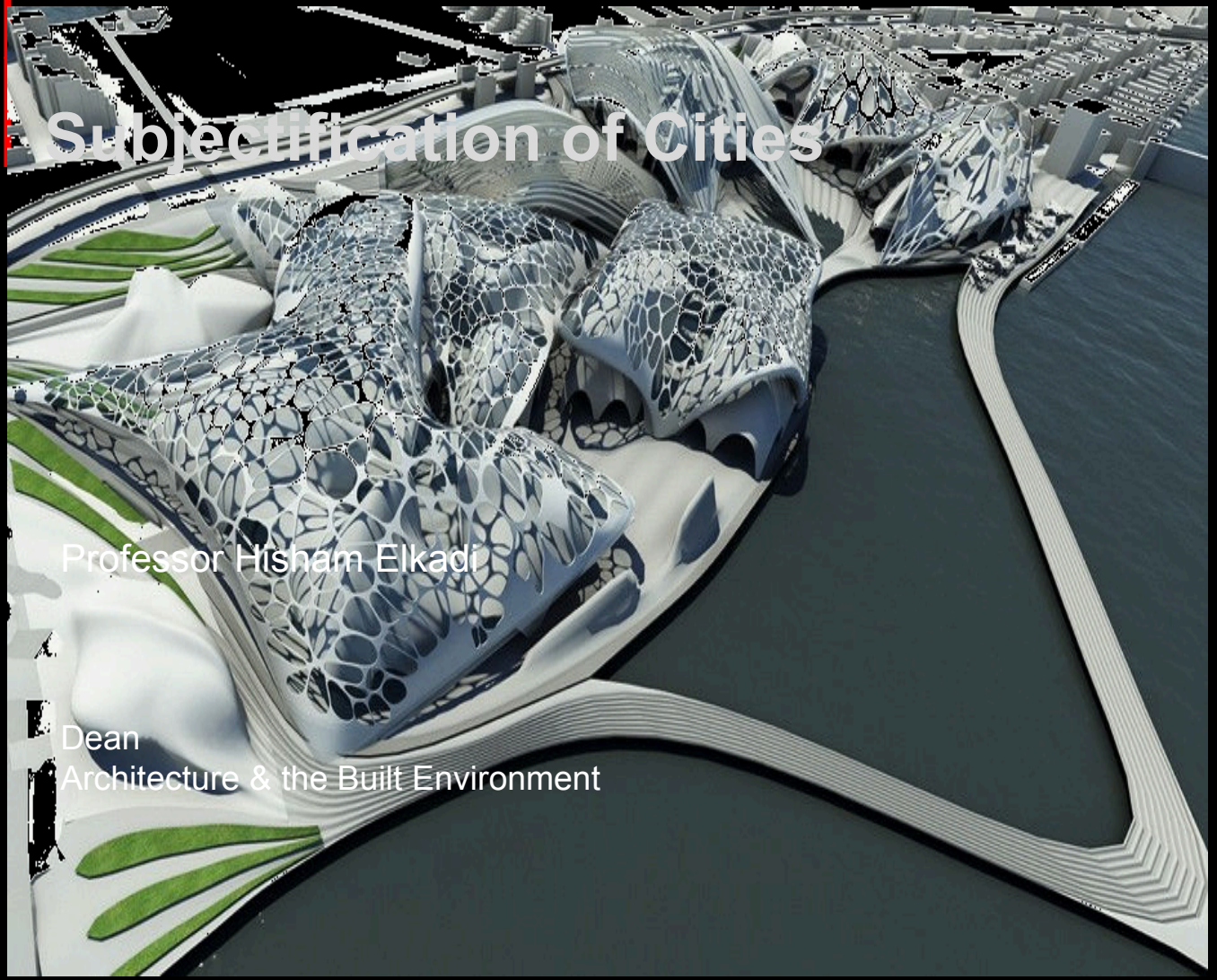
Subjectification of Cities



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Salford Industry Collaboration Zone

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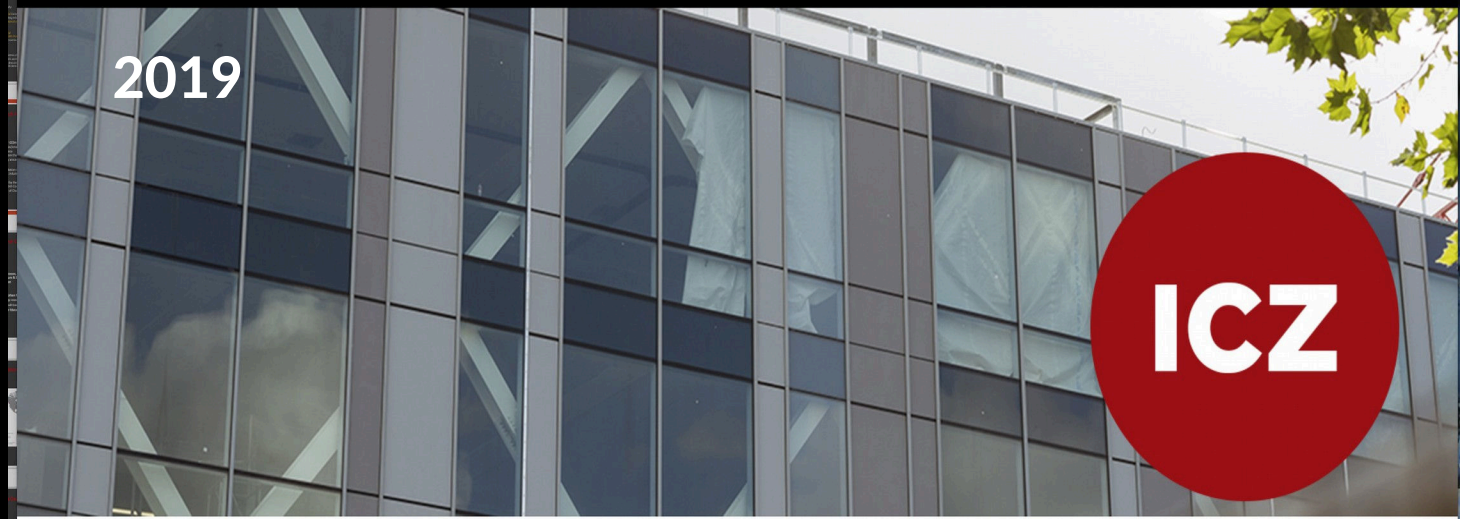

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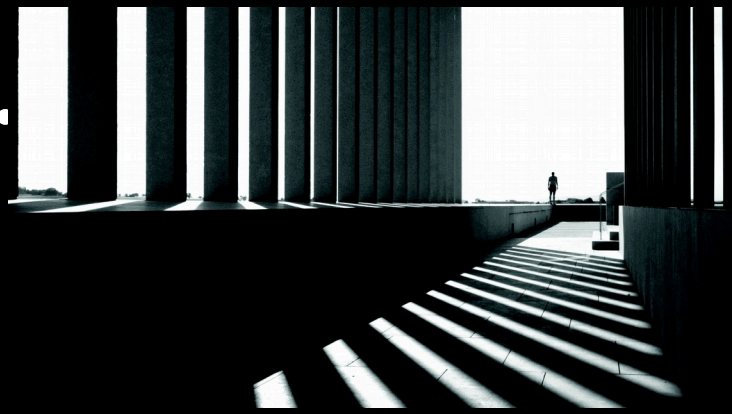
RANKED QS WORLD UNIVERSITY RANKINGS 2015 by subject Architecture / Built Environment Top 50

Research Profile of the School

- Leading academics in the built environment in the UK
- 5th in the UK QS World Rankings – 36th in the World in 2017-18
- International reputation in research
- Top ranked research power in the UK
- ademic staff



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Postgraduate Research

- Broad range of postgraduate research programmes with a high degree of flexibility to suit different backgrounds and circumstances
- At the forefront of built environment research
- Access to comprehensive in-house support and training
- Regular postgraduate workshops and seminars, and an annual Postgraduate Research Conference

Full-time research degree programmes - towards MPhil and PhD Qualifications

Part-time research degree programmes - towards MPhil, PhD and Professional Doctorate qualifications

Internet enabled non residential research degree programmes (MERIT) - towards PhD qualification

Split-site programmes - towards MPhil and PhD qualifications - with a student's home country providing the second campus

Professional Doctorate - Doctorate qualifications with students based in industry

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International Students

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Research

- Aims to transform the quality of life for society whilst ensuring the well-being of future generations, through the provision of better and more sustainable futures
- Exciting and vibrant research community engaged in advanced, cutting-edge, and impactful research
- Involves national and international partners from academia, industry, and the third sector

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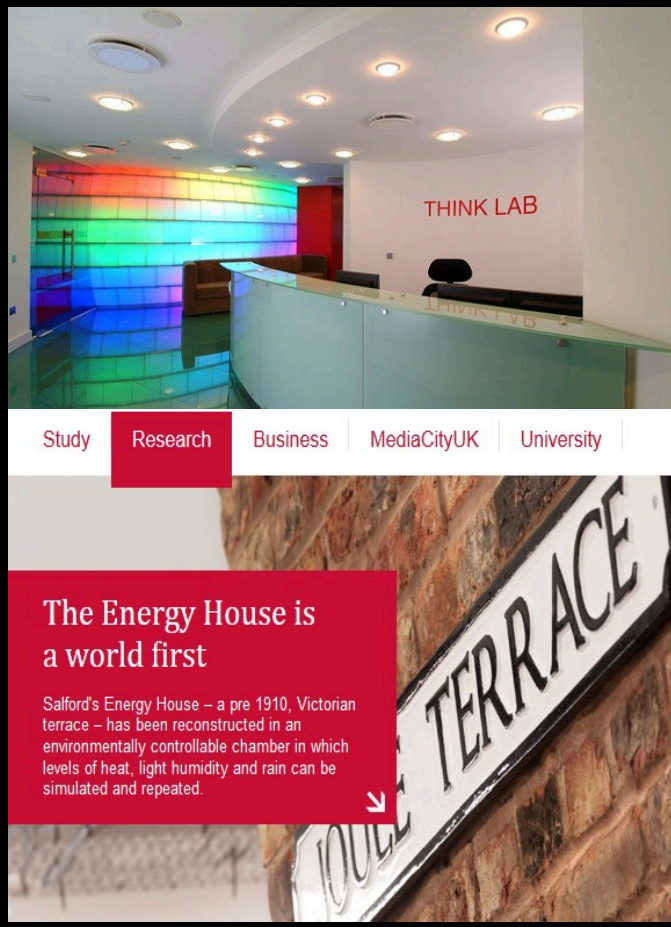
Research Centres

UPRISE

Urban Processes, Resilient Infrastructure & Sustainable Environment

- **Smart Urban Futures (SURF)**
- **BE Energy research Group**
- **Digital Built Environment**
- **Disaster Management**



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Research Funds

Since 2018:

- A further **£15m** of research funding - £5m in Eco/smart Cities and Governance
- 14-18 More than 300 journal papers
- Currently around 150 PhD students

Implementation in close collaboration with international partners from academia, industry and government

Supported by the European Union, UK Foreign and Commonwealth Office, British Council, Joint Information Systems Council and Royal Institution of Chartered Surveyors

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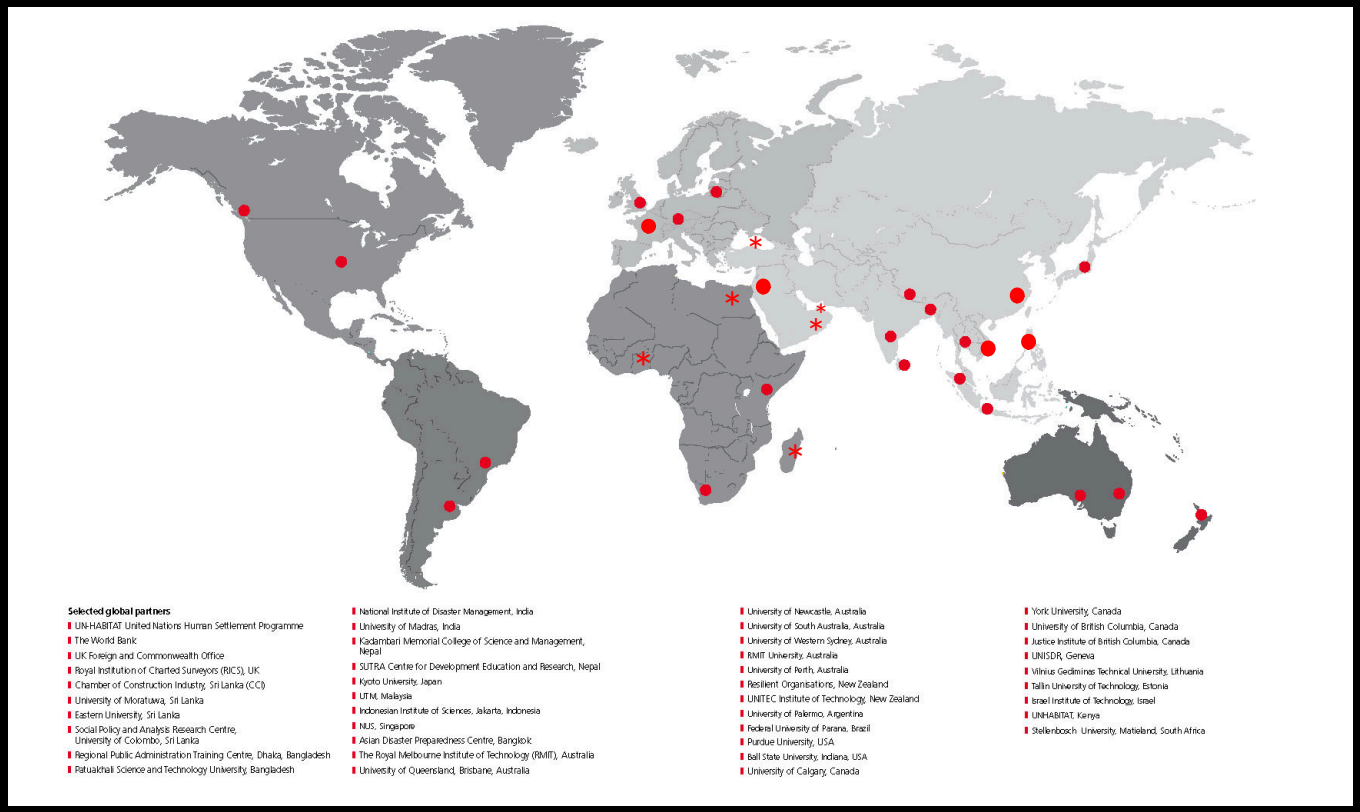
International Collaboration



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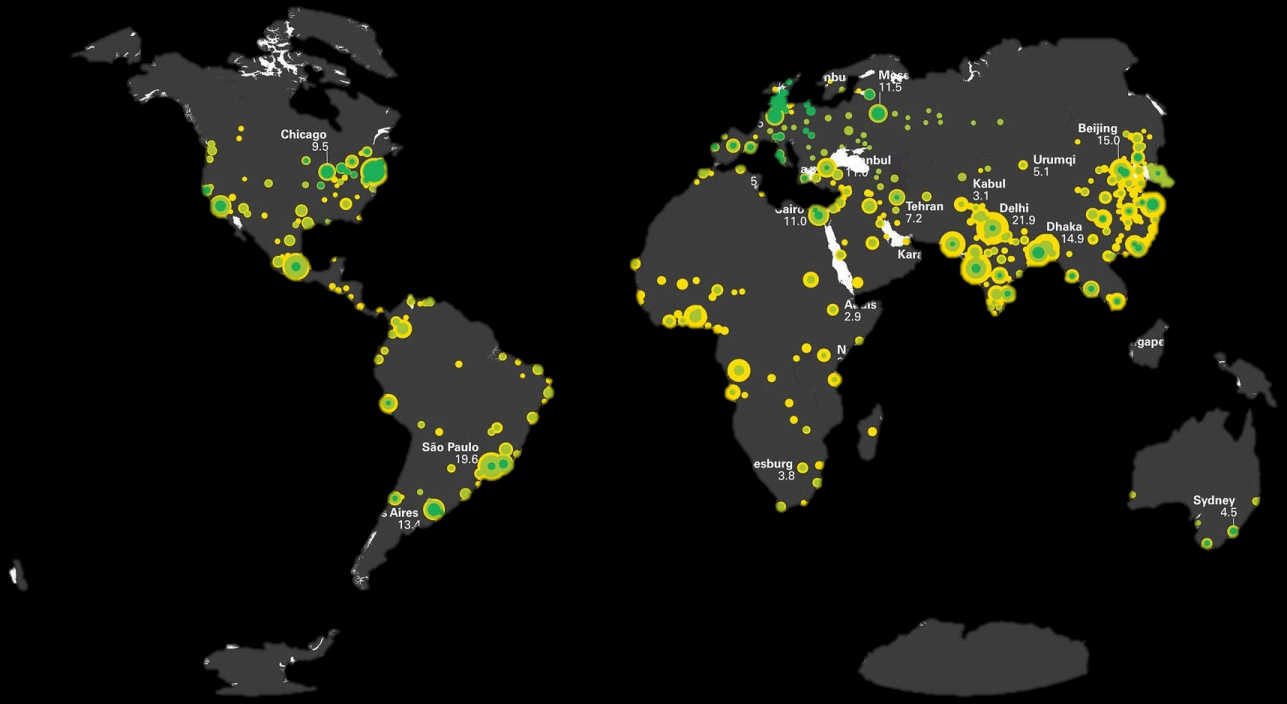
GROWING CITIES



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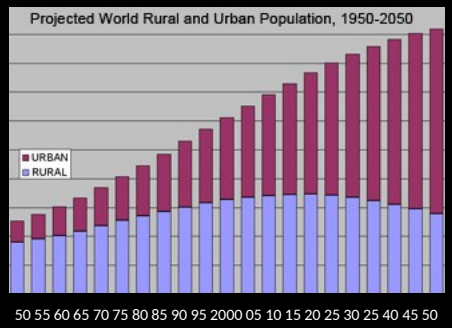

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Recent Development

1. The reality of climate change
2. The challenges of infrastructure
3. The economic turmoil
4. The challenge to governance
5. The emergence of ecology of cities

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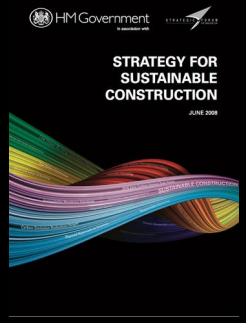
UK Construction 2025



The four themes：

2007	2014
Environment	Sustainable
People	Leadership
Processes	Growth
Technology	**Smart**

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The reality of climate change

1

- Failure of Engineering resilience
  - Redefine resilience
- Not just reduction of CO2
- Design solutions
- Energy- Integrated renewables

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The emergence of Ecologies of cities 2

- Vulnerability vs Stability models
- Ecosystems are complex, diverse, resilient and unpredictable (Holling 2002)
  - Change is both discontinuous and gradual
  - Surprise events are normal
  - Processes of creative destruction are essential for renewal
  - Many possible steady states

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The emergence of Ecologies of cities

2

1

Linear urban metabolism

Cities as potential resource

2

Mapping the black box

City data and city objects

People and governance

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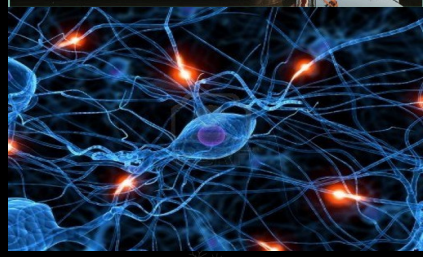
The challenges of infrastructure

3

Design **S**ense **L**earn **A**dapt

- Innovation: smart infrastructure
- **Digital Urban Infrastructure**
- Disruptive technologies
- Design Uniqueness
- Site Labour intensity- Off-site
- No. of Interfaces/transactions - client



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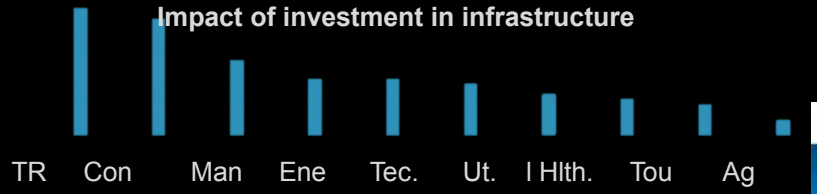

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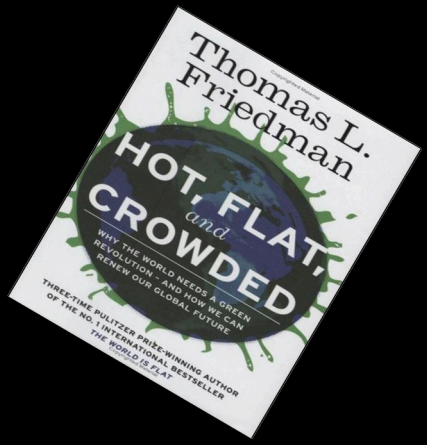
The Economic Turmoil



Our Current Economy

- Under value the environment
- Privatise the gains
- Socialise the losses

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Smart Cities Defined

Techno Centric

A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of things (IoT) solutions in a secure fashion to manage a city's assets.

(Oxford dictionary)

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the use of ICT makes the critical infrastructure components and services of a city – which include city administration, education, healthcare, public safety, real estate, transportation, and utilities – more **intelligent, interconnected, and efficient**

(Washburn and Sindhu, 2009)

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Smart Cities Defined

Techno Centric

In a Smart City, networks constantly gather, analyse and distribute data about the city to optimise efficiency; be able to **communicate** and share such data and information around the city using common definitions and **standards**; they should **provide solutions to multiple problems from a holistic city perspective**. (Copenhagen Cleantech Cluster, 2012)

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‘Cities should be seen as **systems of systems**, and that there are emerging opportunities to introduce **digital nervous** systems, intelligent responsiveness, and **optimization** at every level of system integration. (MIT, 2013)

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Smart Cities Defined

People Centric

Smart City strategies require innovative ways of **interacting with stakeholders, managing resources, and providing services**.

(Nam and Pardo, 2011)

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[a city may be called 'smart'] when investments in **human and social capital** and traditional and modern communication infrastructure fuel sustainable economic growth and a high **quality of life**, with a wise management of natural resources, through **participatory governance**

(Schaffers et al., 2011)

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Smart Cities re-Defined

Eco Centric

Smart Cities should be those who have the ability to **vary their states** or actions in response to varying situations and past experience; those that have **self-organising** characteristics.

Design Sense Learn Adapt

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Smart Cities

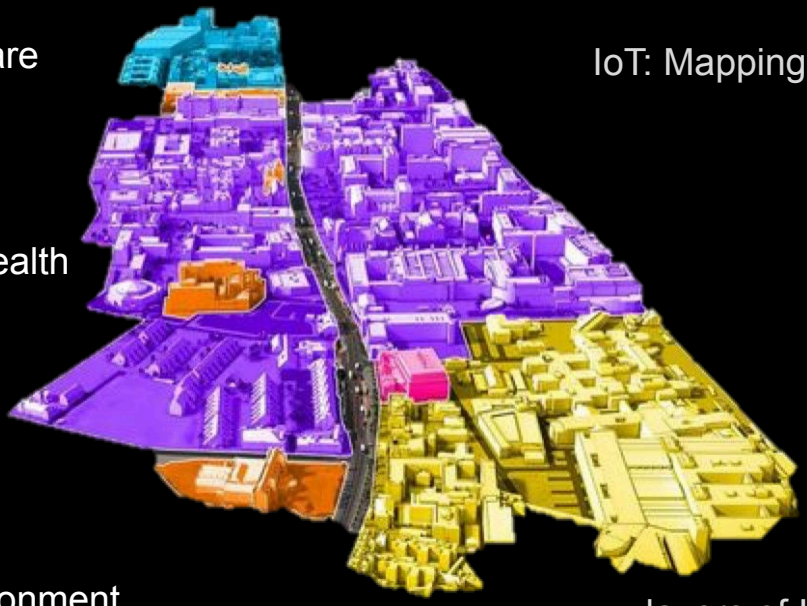
Projects

CityVerve Manchester

BIM: VIRTUL MODEL

Health and Social Care

IoT: Mapping Assets



Culture and public Health

I N T E G R A T E

Transport and Travel

Energy and the Environment

layers of Infrastructure

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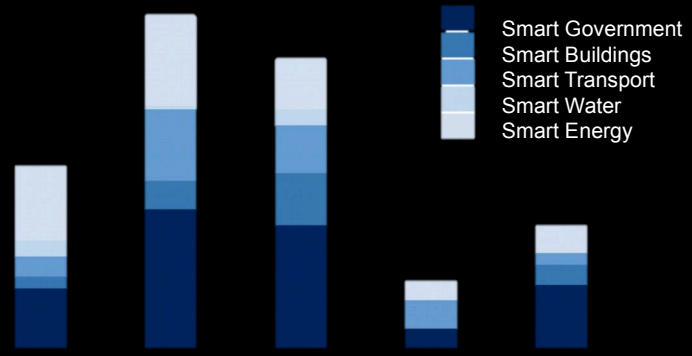

Smart Cities Projects World Market 2017

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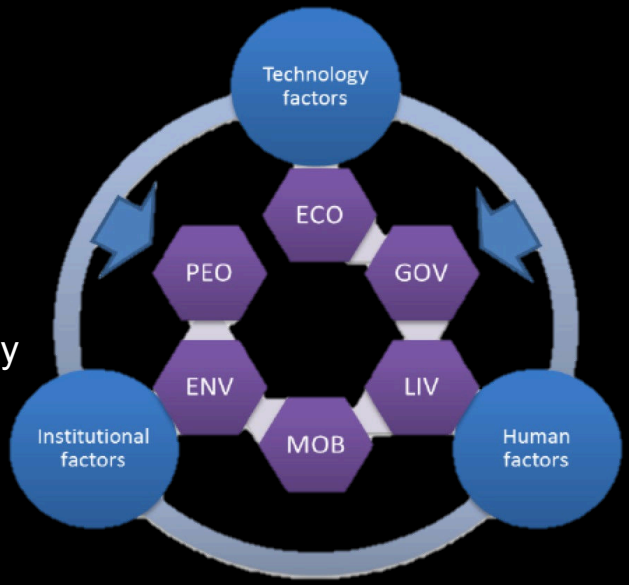
Smart Cities

Components

Smart Infrastructure Digital Networks

Governance Policy



Human Capital

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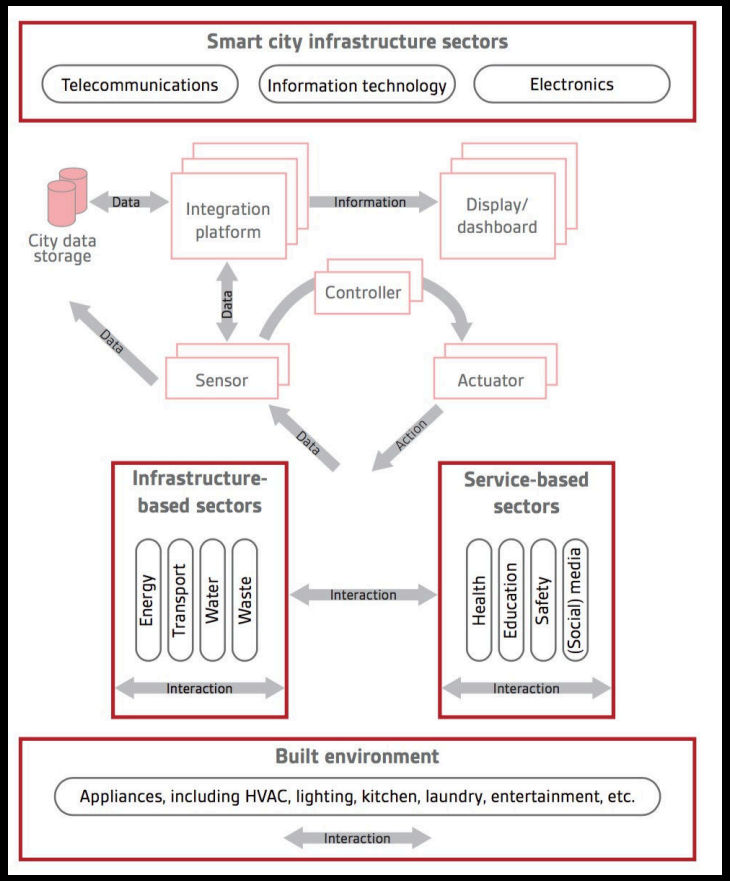
Smart Cities

Framework

Micro – Macro flow



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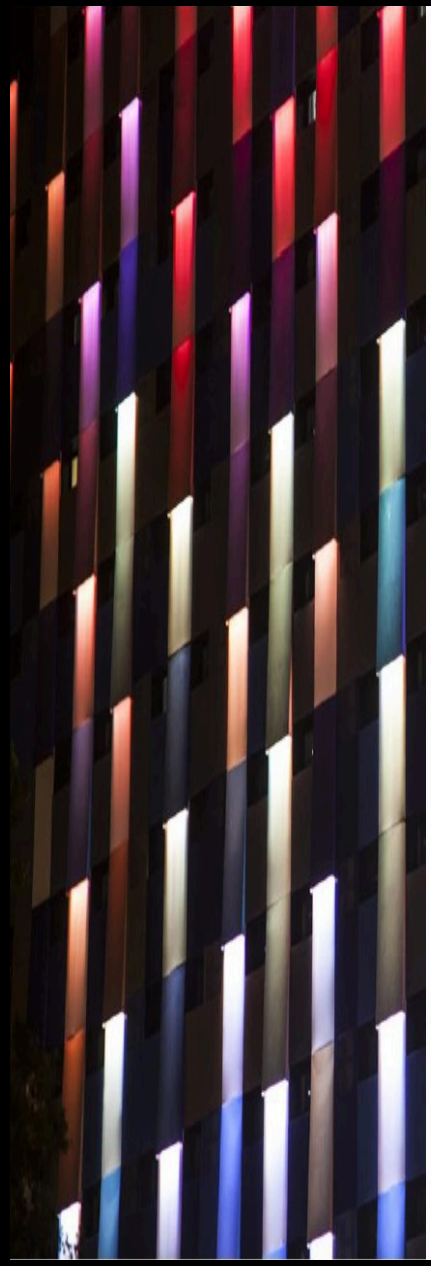

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Data Flow

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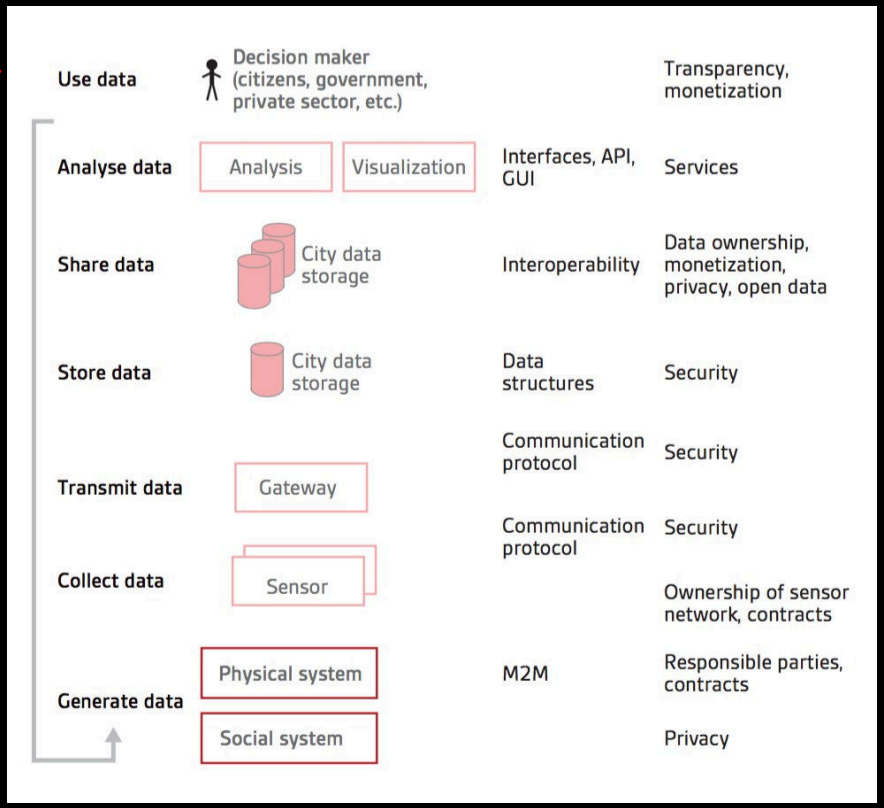

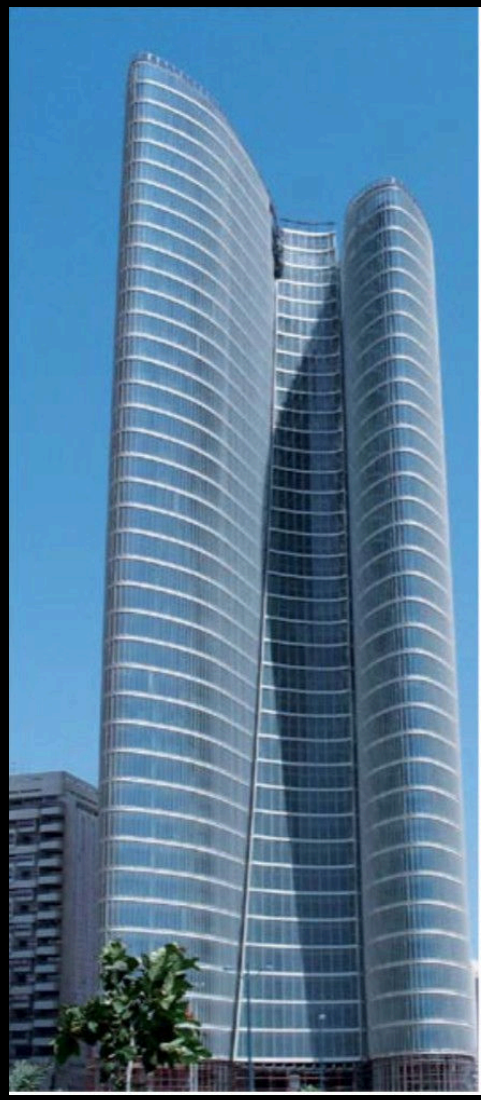

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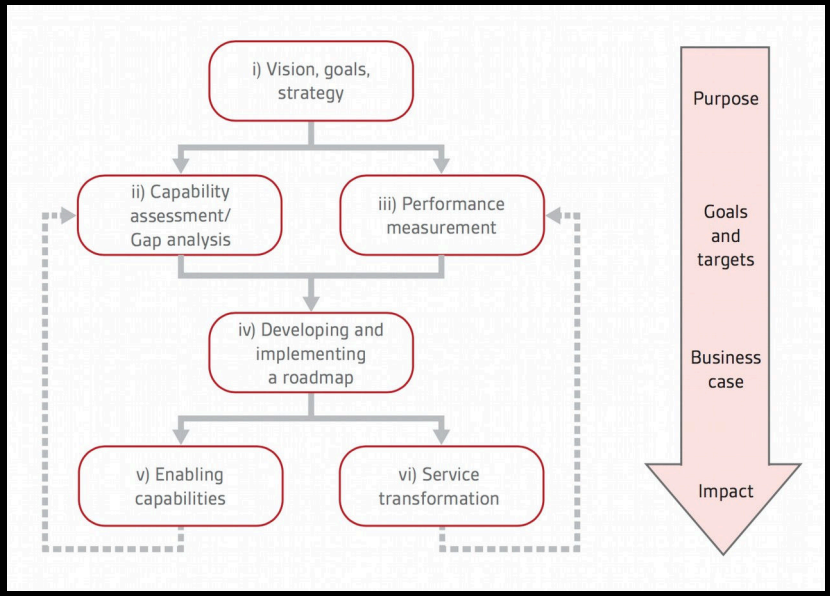
Smart Cities Smart Buildings

Standards

Leadership

Process

Technical Specs



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Buildings permanently deliver data such as values, error messages and alarms.

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Smart Cities Smart Buildings

Digital Built Britain

Isolation **Collaboration** **Integration**

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Mandating BIM whilst preserving with traditional construction methodologies and fragmented models will not drive transformational change

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Smart Cities Smart Buildings

Digital Built Britain

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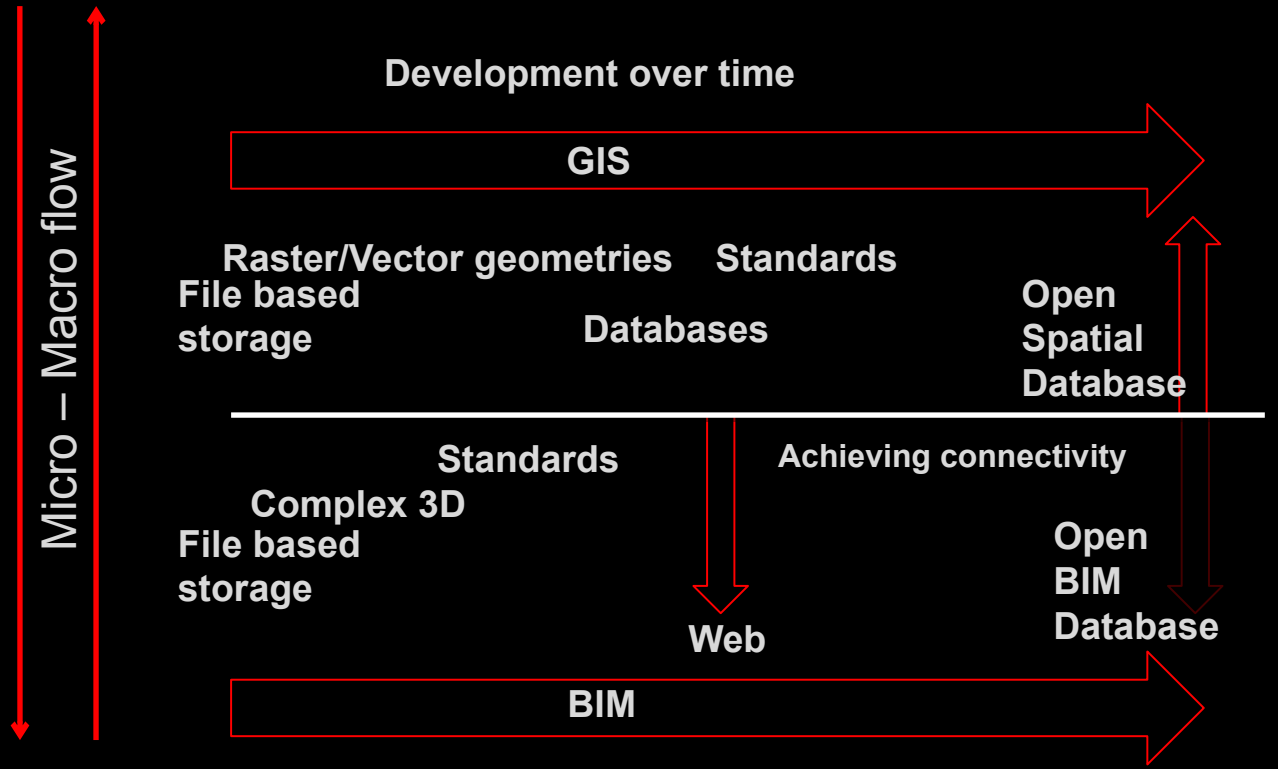

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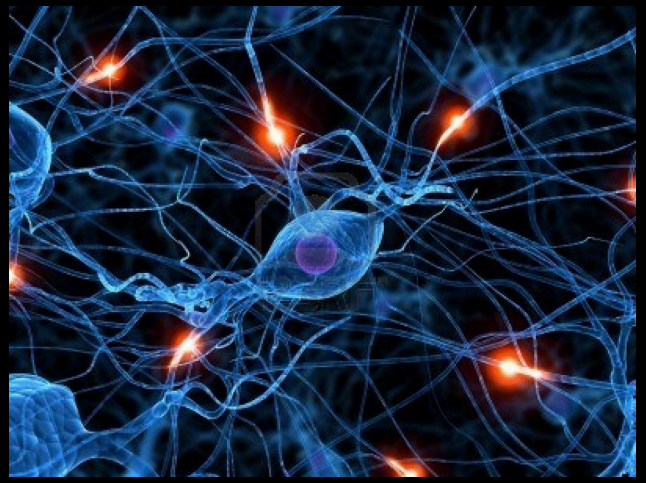
Digital Transformation

Universe of matter

Universe of mind



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Urban Data for Smart Eco Cities

Design for diversity Adapt to change Transform when necessary

1. Contextualise intervention: Regional platforms
2. Support self-organisation – self governing
3. Embed self monitoring and self correcting
4. Promote non- linearity
5. Plan for discontinuity and episodic dynamics
6. Design for spatial heterogeneity where possible
7. Monitor urban ecology evolution and mutation
8. Facilitate resilient based on tolerance

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Conclusion

- Smart cities will be those that sense, analyse, adapt, and correct
- Cities would be de-infrastructurised as well as infrastructurised
- Cities are made of overlays of interlocking frames of priorities of different sectors
- All city frames have an integrated ecological data canvas
- Frames overlays are made of city data objects
- Need a clear strategic plan with realistic measurable tractable outcomes

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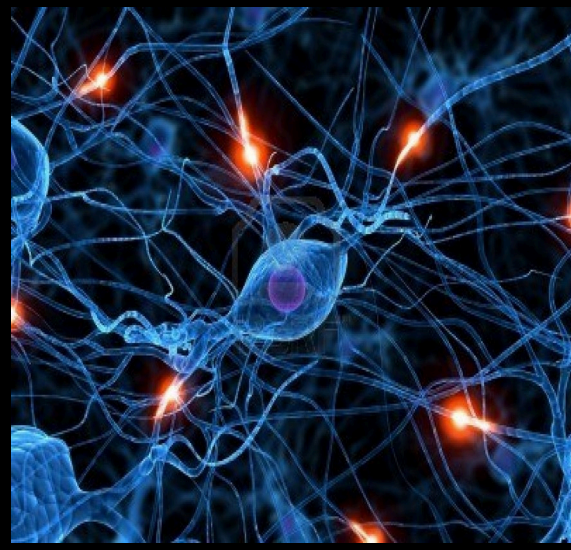
Future Challenges



- What is the next disruptive technologies
- What constitute city data objects
- How to contextualise it?
- What is the capacity of big data analytics?
- How to prepare society?

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Thank you

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