Rethinking learning in the new digital age

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The digital revolution

- We are in the middle of the greatest digital revolution in human history
- More than 40% of the world's population has access to the internet
- Digital technologies have boosted growth, expanded opportunities, and improved service delivery
- Industries around the world are subjected to this revolution and should seek to grasp the benefits

Social Age of learning

- In this information age, Knowledge resources and expertise are as crucial to success as other economic resources
- This is starting a new Social Age for learning (Stodd, 2014), where personal and professional developments are being reimaged

Social Age of learning

- Foresight studies offer a new vision of future learning that promotes
  - personalisation
  - collaboration and
  - informalisation
- This promotes a lifelong and lifewide learning shaped by exponentially growing digital networked infrastructure
- This requires learners to see the world in a connected way

Connectivism

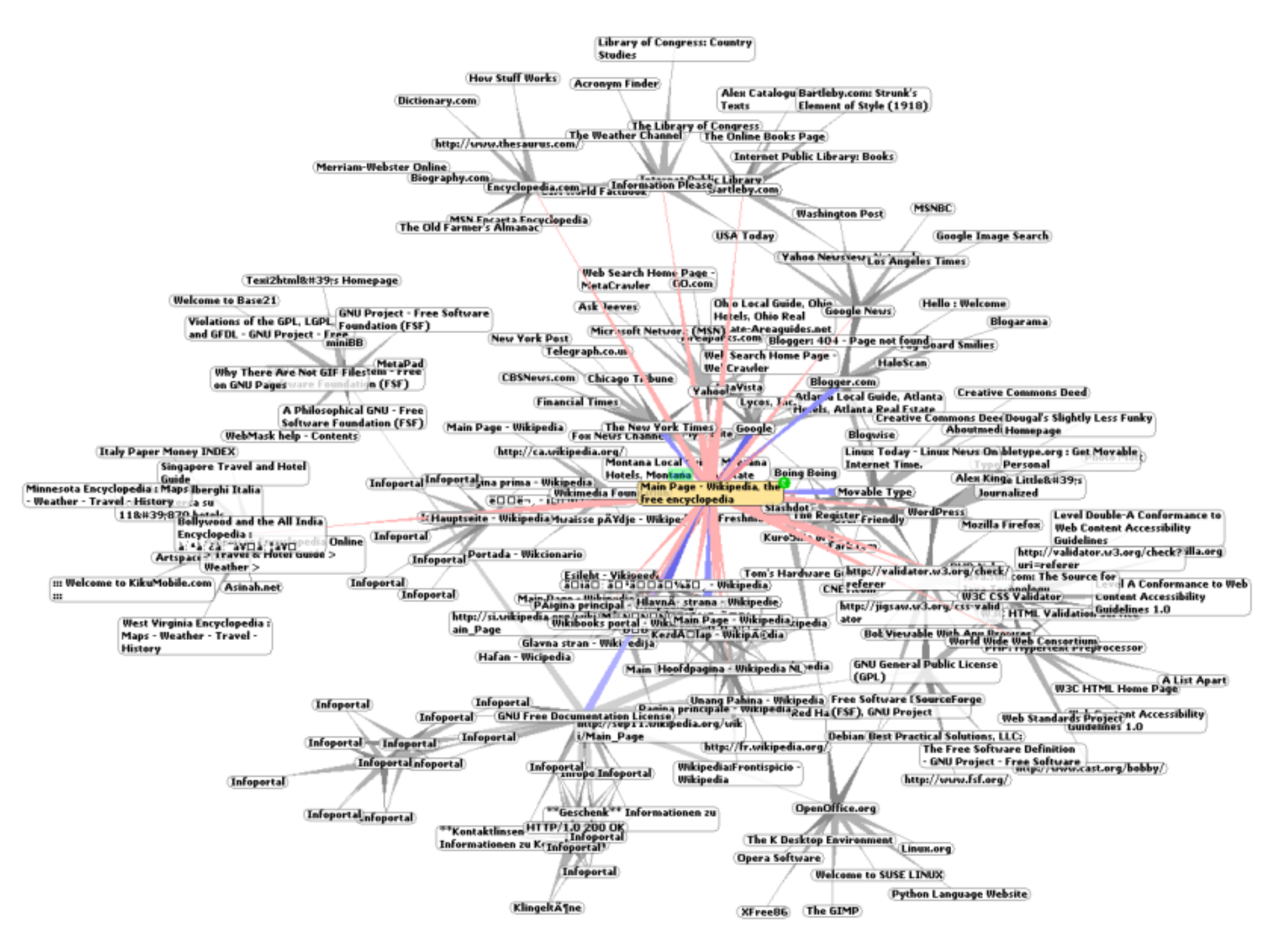
- Here learning is driven through forming connections between sources of information and other components in the environment to create useful information patterns
- This is mainly useful in rapidly changing environments such as disaster situations

Connectivism

- A combination of principles explored
  - Chaos theory
  - Network theory
  - Complexity theory and
  - Self-organising theory
- Connectivism is about understanding the patterns and self-organising through finding the connections within networks to learn something new

Connectivism

- knowledge is distributed across the networks
- Learning is no longer an internal, individualistic activity
- Works through understanding the decisions which are based on rapidly changing information
  - nature of the collaboration also needs to be altered according to these changes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The Online Books Page
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Biography.com
Encyclopedia.com
Information Please
Bartleby.com
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The Old Farmer's Almanac
Washington Post
MSNBC
USA Today
Google Image Search
Yahoo News
Los Angeles Times
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GO.com
Texi2html's Homepage
Welcome to Base21
Ask Jeeves
Ohio Local Guide, Ohio Hotels, Ohio Real
Google News
Hello : Welcome
Violations of the GPL, LGPL and GFDL - GNU Project - Free
GNU Project - Free Software Foundation (FSF)
Blogarama
miniBB
New York Post
Telegraph.co.uk
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Board Smilies
Why There Are Not GIF Files on GNU Pages
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HaloScan
CBSNews.com
Chicago Tribune
Blogger.com
Financial Times
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Atlanta Local Guide, Atlanta Hotels, Atlanta Real Estate
A Philosophical GNU - Free Software Foundation (FSF)
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Montana Local
Hotels, Montana
Boing Boing
Alex King
Little's Journalized
Minnesota Encyclopedia : Maps - Weather - Travel - History
Iberghi Italia
Wikimedia Foun
Movable Type
Hauptseite - Wikipedia
Huaisse pÃŸdje - Wikipe
Slashdot
WordPress
Bollywood and the All India Encyclopedia :
Mozilla Firefox
Level Double-A Conformance to Web Content Accessibility Guidelines
Online
Portada - Wikcionario
http://validator.w3.org/check?uri=referer
Artspace > Travel & Hotel Guide > Weather >
Tom's Hardware
http://validator.w3.org/check/referer
Welcome to KikuMobile.com
Asinah.net
CNET
W3C CSS Validator
Content Accessibility Guidelines 1.0
http://jigsaw.w3.org/css-validator
HTML Validation
West Virginia Encyclopedia : Maps - Weather - Travel - History
Wikibooks portal - Wikipedia
Main Page - Wikipedia
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Hafan - Wicipedia
World Wide Web Consortium
GNU General Public License (GPL)
W3C HTML Home Page
A List Apart
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GNU Free Documentation License
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Debian Best Practical Solutions, LLC:
The Free Software Definition - GNU Project - Free Software
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http://www.fsf.org/
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OpenOffice.org
HTTP/1.0 200 OK
The K Desktop Environment
Linux.org
Opera Software
Welcome to SUSE LINUX
Python Language Website
XFree86
The GIMP
Infoportal

Disaster management context

- Disaster management has become a multi-faceted subject area in the recent years
- Complexity is due to its multidisciplinary nature, multi-institutional involvement and inclusion of all the basic management functions
- Knowledge continues to grow and evolve however, ‘important’ or ‘valid’ knowledge has become different from prior knowledge

Connectivism approach to DM?

- Who are the learners?
- Are we a community of leaners?
- What are the information sources?
- How Connectivism shapes life long learning?

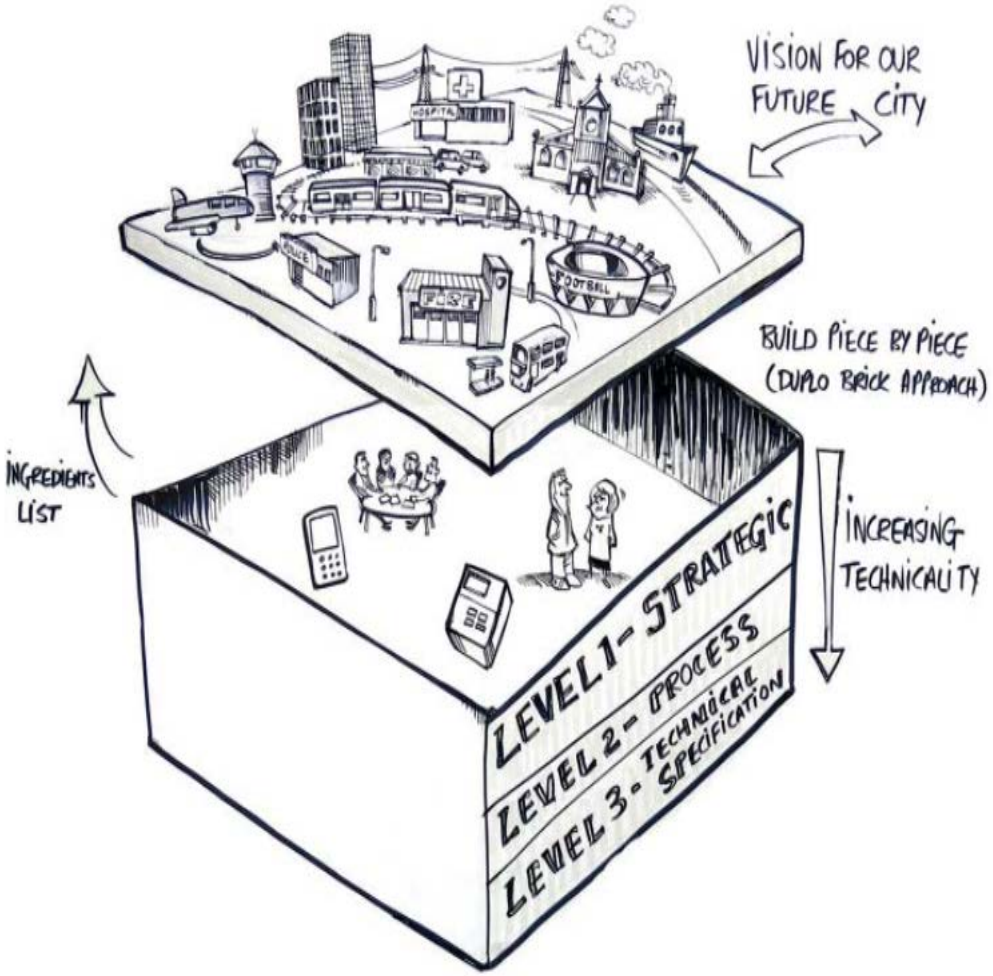
Case study: The UK Built Environment

- Construction industry and the built environment professionals have a vital role in contributing to society's improved resilience
- Resilience should be systematically built in to the whole design, construction and operation process and not simply added on as an afterthought
- Building Information Modelling and management and smart cities provide an avenue to integrate resilience

Smart cities

- 80% of global GDP is generated in cities
- Smart technologies could help address some of the challenges of urbanisation
- This requires system wide deployment. Existing processes will need to change.
- People need to learn the new approaches to digital integration to use and manage this system

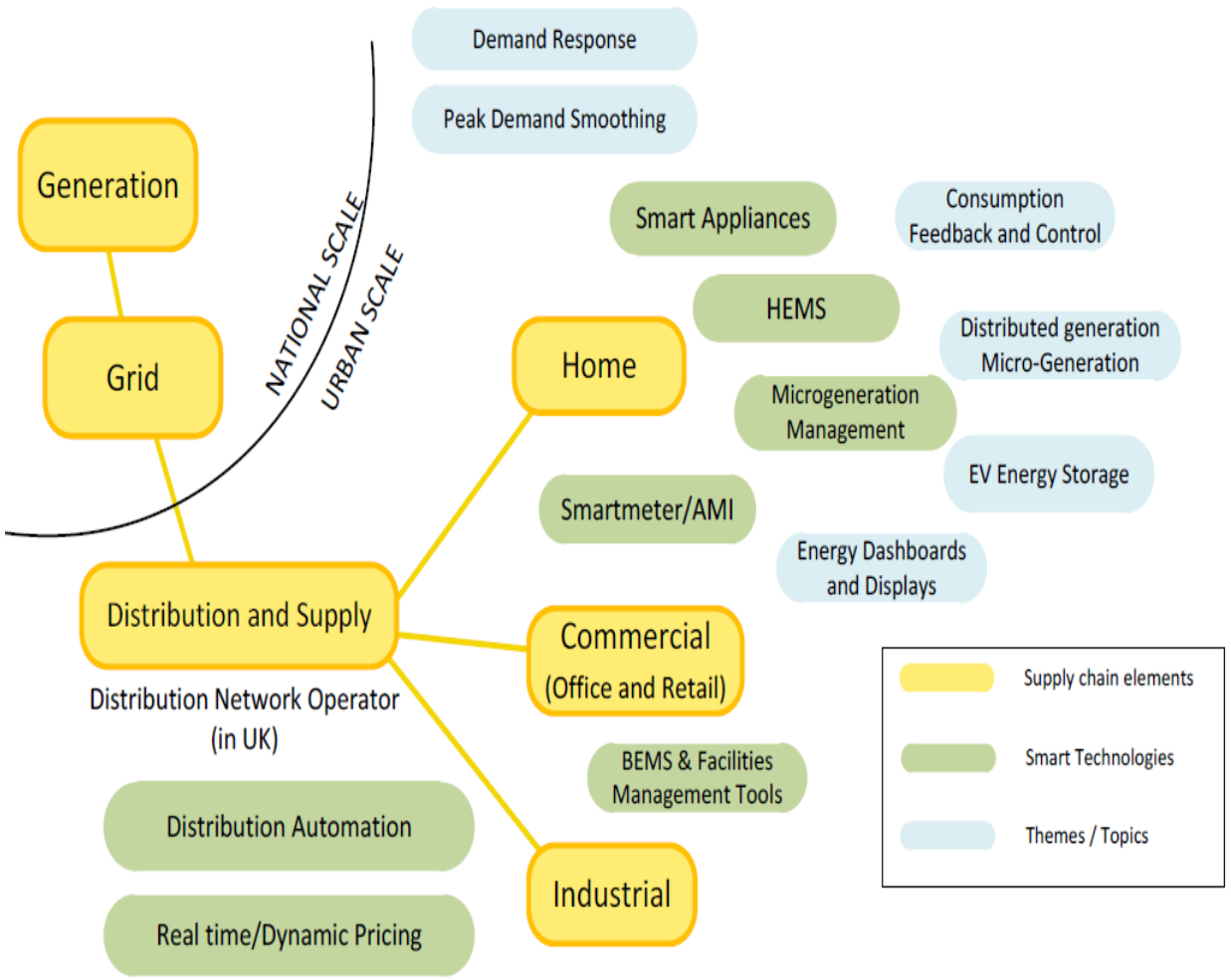
What is a smart city?



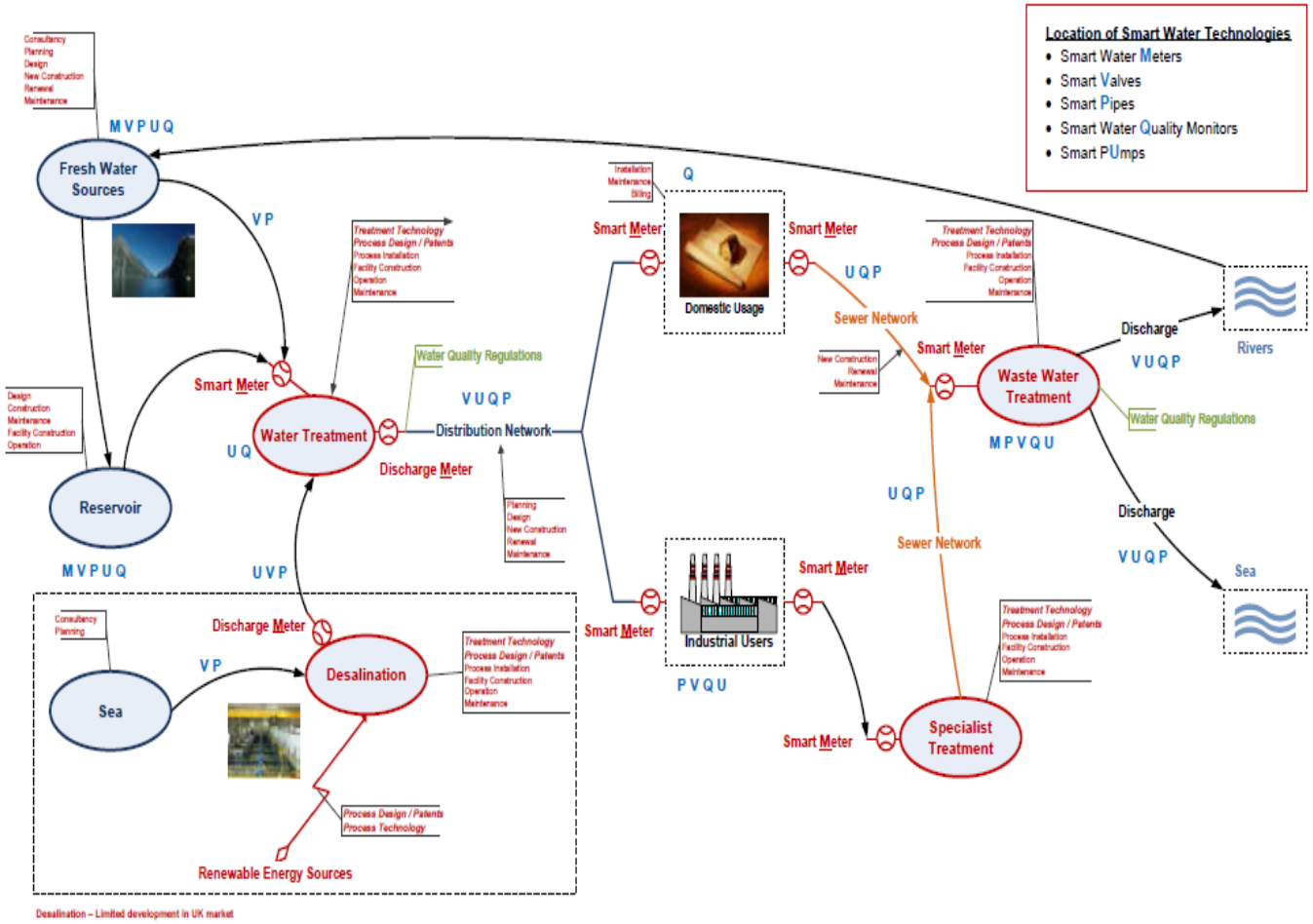
What is a smart city?

- Effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens
- Main areas to consider: water, buildings, energy/power, transport and assisted living/people

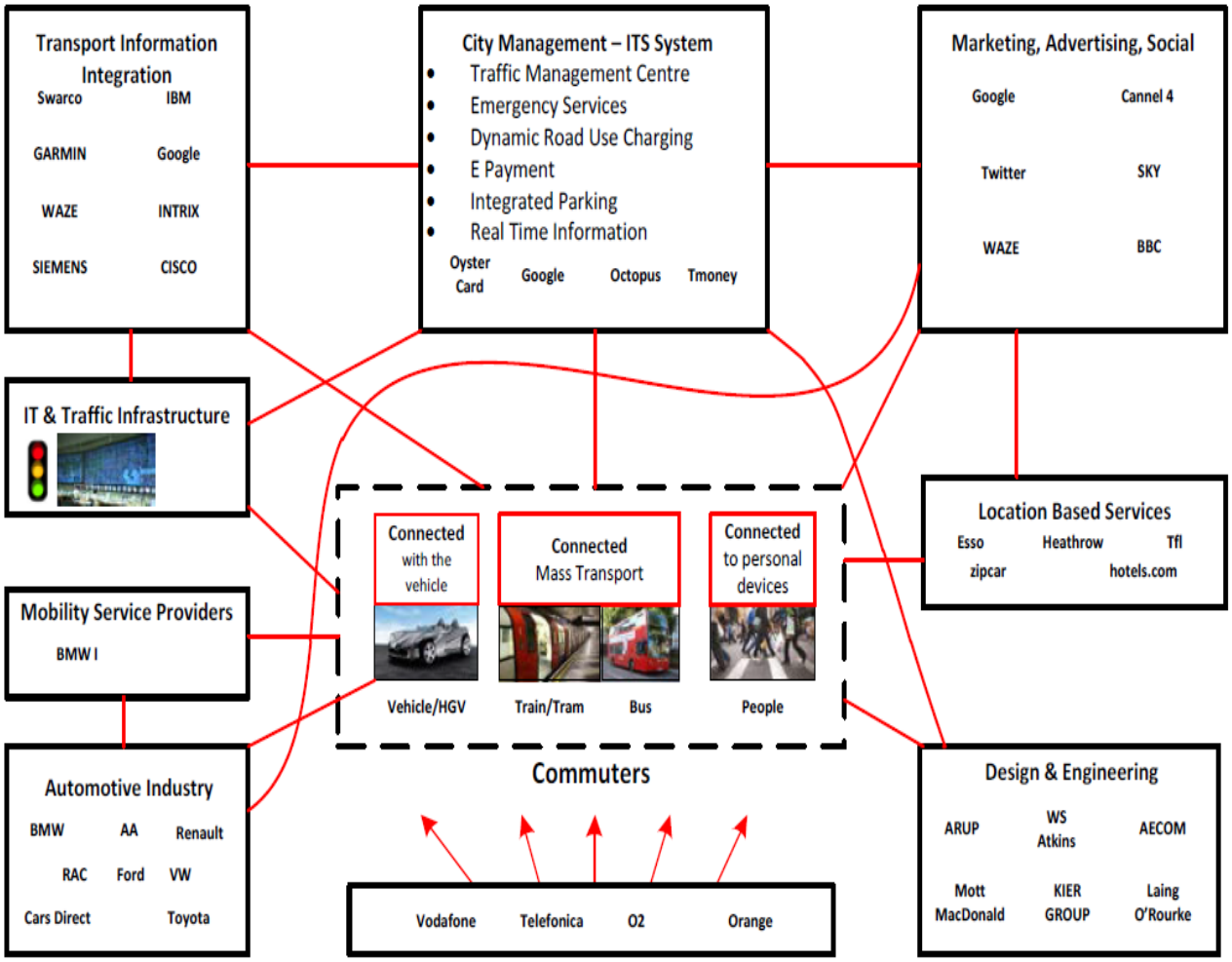
Energy/Power



Water


Location of Smart Water Technologies
• Smart Water Meters
• Smart Valves
• Smart Pipes
• Smart Water Quality Monitors
• Smart PUmps
Consultancy
Planning
Design
New Construction
Renewal
Maintenance
M V P U Q
Fresh Water Sources
V P
Reservoir
M V P U Q
Design
Construction
Maintenance
Facility Construction
Operation
Treatment Technology
Process Design / Patents
Process Installation
Facility Construction
Operation
Maintenance
Smart Meter
Water Treatment
U Q
Water Quality Regulations
V U Q P
Distribution Network
Discharge Meter
Planning
Design
New Construction
Renewal
Maintenance
U V P
Consultancy
Planning
Discharge Meter
Sea
V P
Desalination
Process Design / Patents
Process Technology
Renewable Energy Sources
Desalination – Limited development in UK market
Installation
Maintenance
Billing
Q
Smart Meter
Domestic Usage
Smart Meter
U Q P
Sewer Network
New Construction
Renewal
Maintenance
Smart Meter
Waste Water Treatment
M P V Q U
Discharge
V U Q P
Rivers
Water Quality Regulations
Discharge
V U Q P
Sea
U Q P
Sewer Network
Smart Meter
Industrial Users
P V Q U
Smart Meter
Smart Meter
Specialist Treatment

Transport


Transport Information Integration
Swarco
IBM
GARMIN
Google
WAZE
INTRIX
SIEMENS
CISCO
City Management – ITS System
Traffic Management Centre
Emergency Services
Dynamic Road Use Charging
E Payment
Integrated Parking
Real Time Information
Oyster Card
Google
Octopus
Tmoney
Marketing, Advertising, Social
Google
Cannel 4
Twitter
SKY
WAZE
BBC
IT & Traffic Infrastructure
Location Based Services
Esso
Heathrow
Tfl
zipcar
hotels.com
Connected with the vehicle
Connected Mass Transport
Connected to personal devices
Vehicle/HGV
Train/Tram
Bus
People
Mobility Service Providers
BMW I
Commuters
Automotive Industry
BMW
AA
Renault
RAC
Ford
VW
Cars Direct
Toyota
Design & Engineering
ARUP
WS Atkins
AECOM
Mott MacDonald
KIER GROUP
Laing O'Rourke
Vodafone
Telefonica
O2
Orange

AND BUILDINGS…

Building Information Modelling

- BIM (Building Information Modelling) is one of the key developments in the built environment
- It is about **managing information**

Why BIM (Building Information Modelling)?

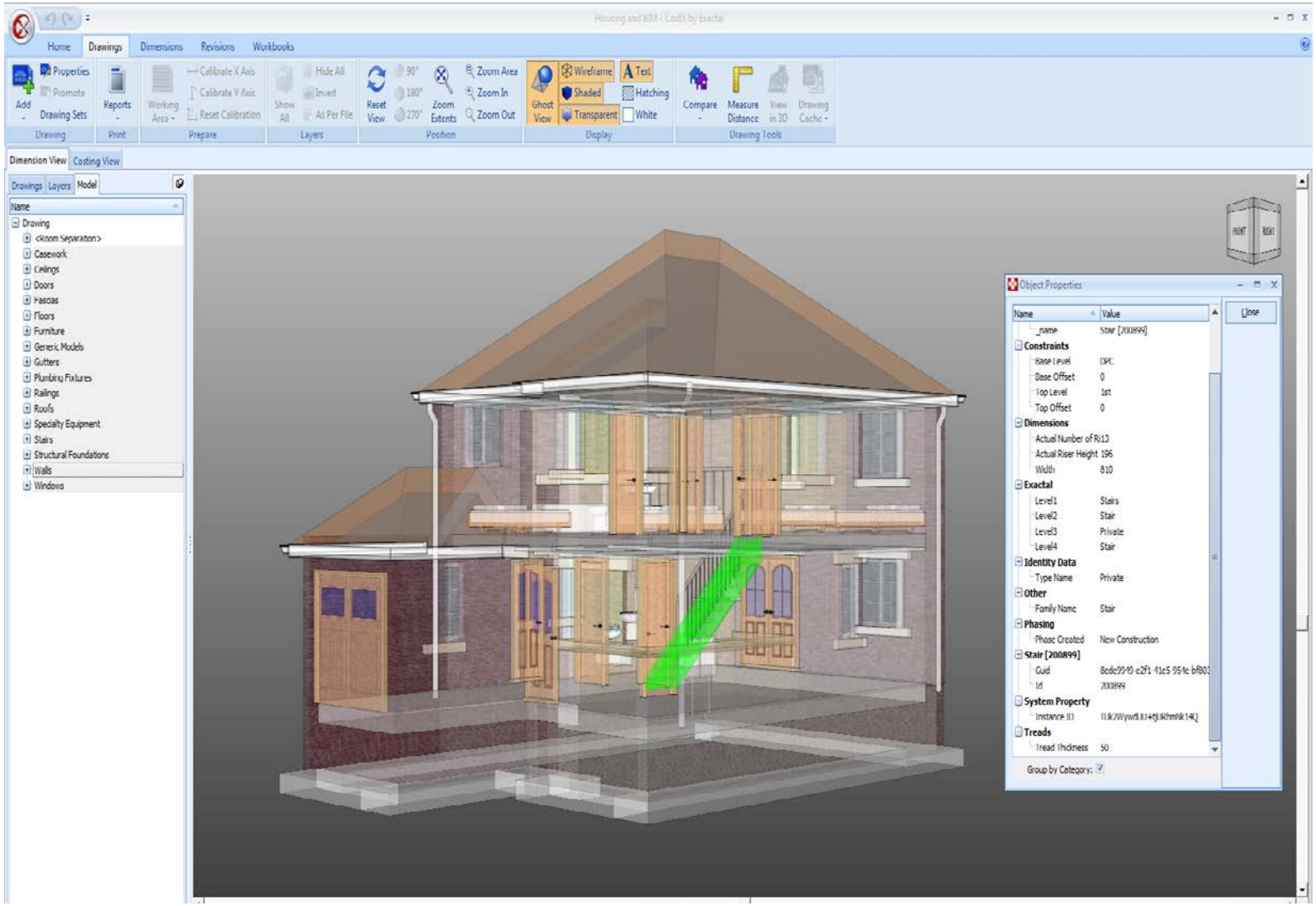
- Government Construction Strategy (2011), Section 2.32
  - The UK Government has mandated that all construction companies tendering for government work should have level 2 BIM by 2016 (BSI)

What is BIM?

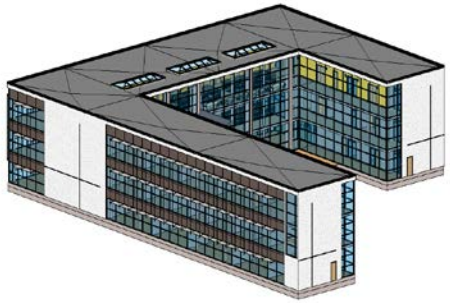
What is BIM?


Lumion Educational Free 4.5.1
Scale
Reflection Colorize
Reflection Falloff
Brightness
Glossiness
Bump
Reflectivity
Saturation
Emissiveness

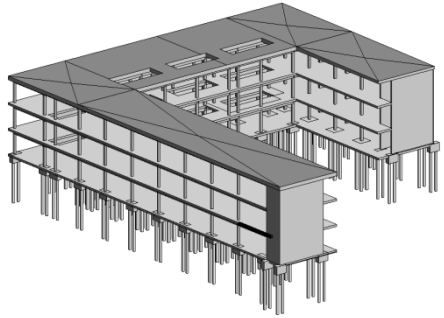
What is BIM?


Home
Drawings
Dimensions
Revisions
Workbooks
Dimension View
Costing View
Drawings
Layers
Model
Drawing
Casework
Ceilings
Doors
Fascias
Floors
Furniture
Generic Models
Gutters
Plumbing Fixtures
Railings
Roofs
Specialty Equipment
Stairs
Structural Foundations
Walls
Windows
Object Properties
Close
Constraints
Base Offset
Top Level
Top Offset
Dimensions
Actual Riser Height
Width
Exactal
Identity Data
Type Name
Other
Family Name
Phasing
Phase Created
New Construction
System Property
Treads
Tread Thickness
Group by Category:

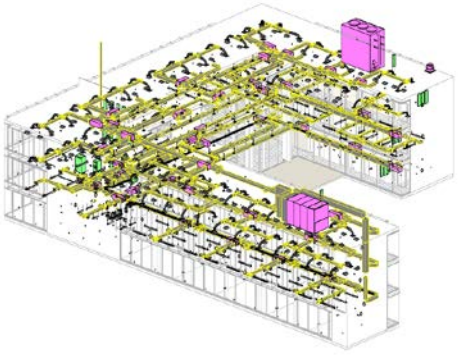
A BIM federated model: abstract view



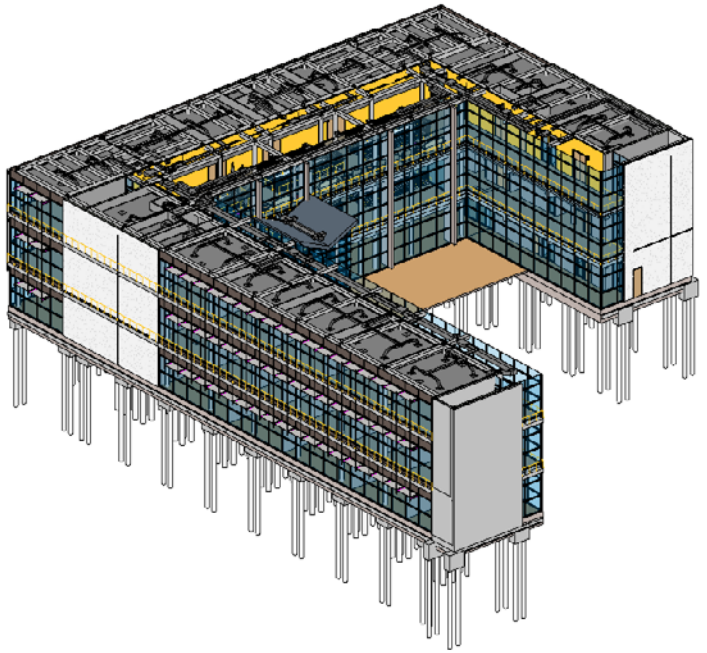
Architectural



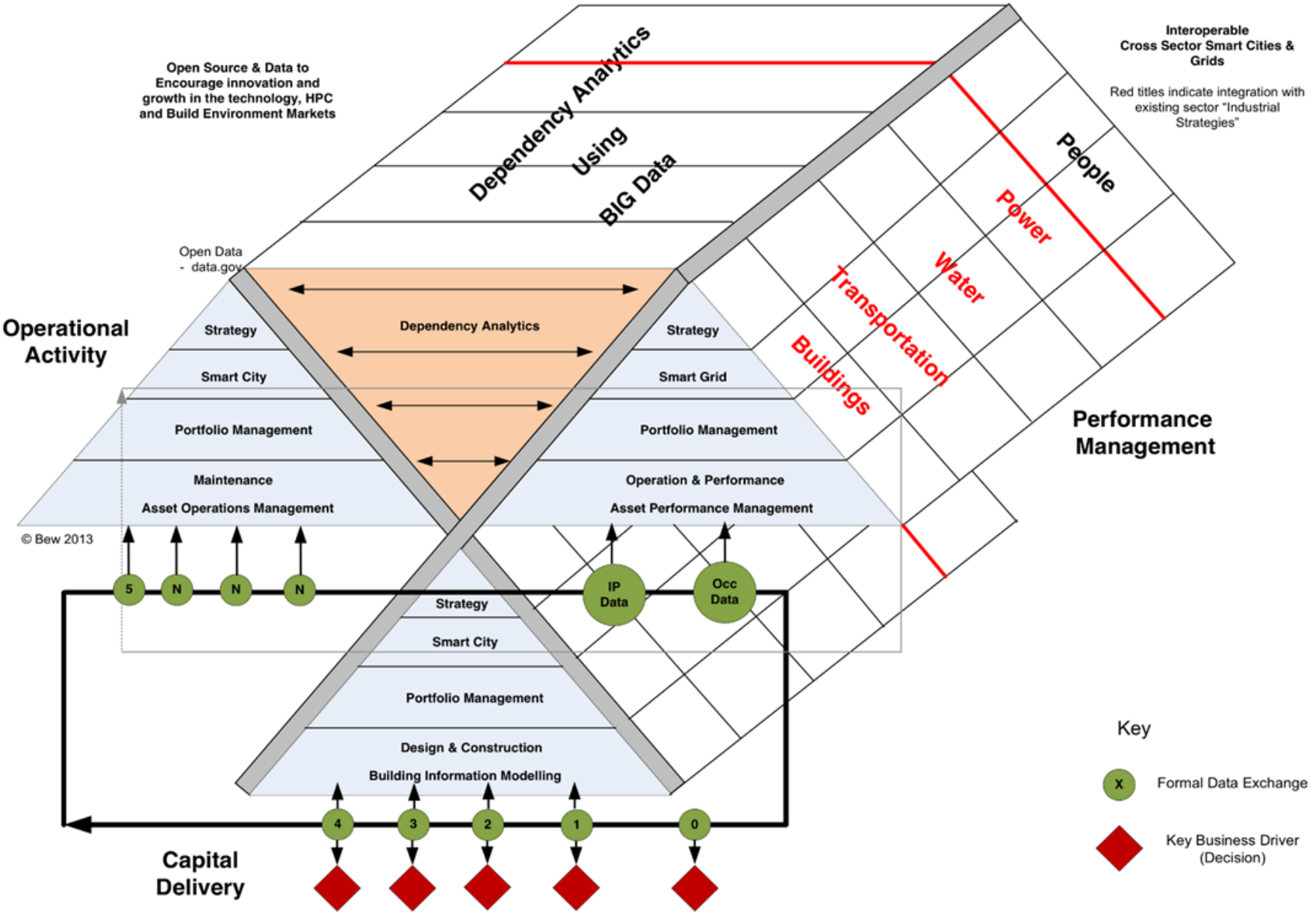
Structural



MEP



Federated Model in BIM Environment


Open Source & Data to Encourage innovation and growth in the technology, HPC and Build Environment Markets
Dependency Analytics Using BIG Data
Open Data - data.gov
Interoperable Cross Sector Smart Cities & Grids
Red titles indicate integration with existing sector "Industrial Strategies"
People
Power
Water
Transportation
Buildings
Performance Management
Operational Activity
Dependency Analytics
Strategy
Smart City
Portfolio Management
Maintenance
Asset Operations Management
Strategy
Smart Grid
Portfolio Management
Operation & Performance
Asset Performance Management
© Bew 2013
5
N
N
N
IP Data
Occ Data
Strategy
Smart City
Portfolio Management
Design & Construction
Building Information Modelling
4
3
2
1
0
Capital Delivery
Key
X
Formal Data Exchange
Key Business Driver (Decision)

Learning in this new digital construction world

- People are different
- Organisations are different
- Tasks are different
- Information requirements are different

- How do we provide a learning environment in this context?

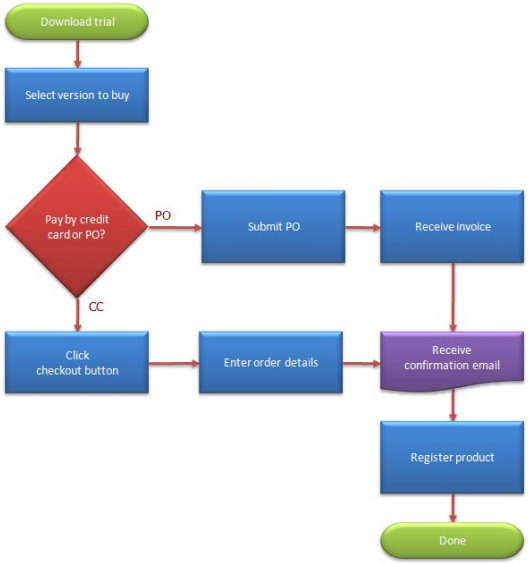
People are different

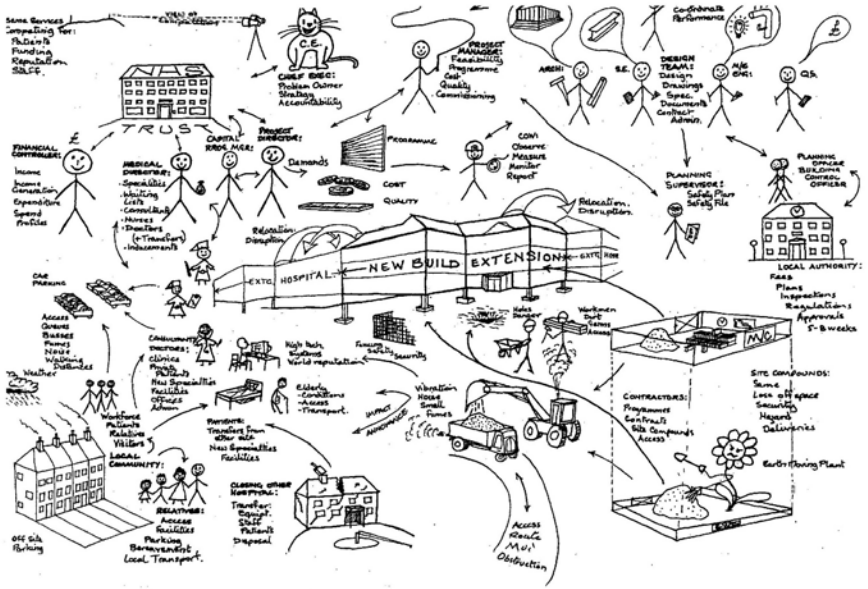
Planning
Procedures
Quantities
Reports

Structuralist

Actions
Sensing
Qualities
Solutions

Adapter





The world of different tasks

Calculative

Have been done before
Have been determined and rationalised
Have been procedurised
Have been quantified
Stable

$$\sin(2a) = 2\sin(a)\cos(a)$$
$$\cos(2a) = \cos^2(a) - \sin^2(a)$$
$$\cos(2a) = 2\cos^2(a) - 1$$
$$\cos(2a) = 1 - 2\sin^2(a)$$
$$\tan(2a) = \frac{2\tan(a)}{1 - \tan^2(a)}$$

Structuralist

Adapter

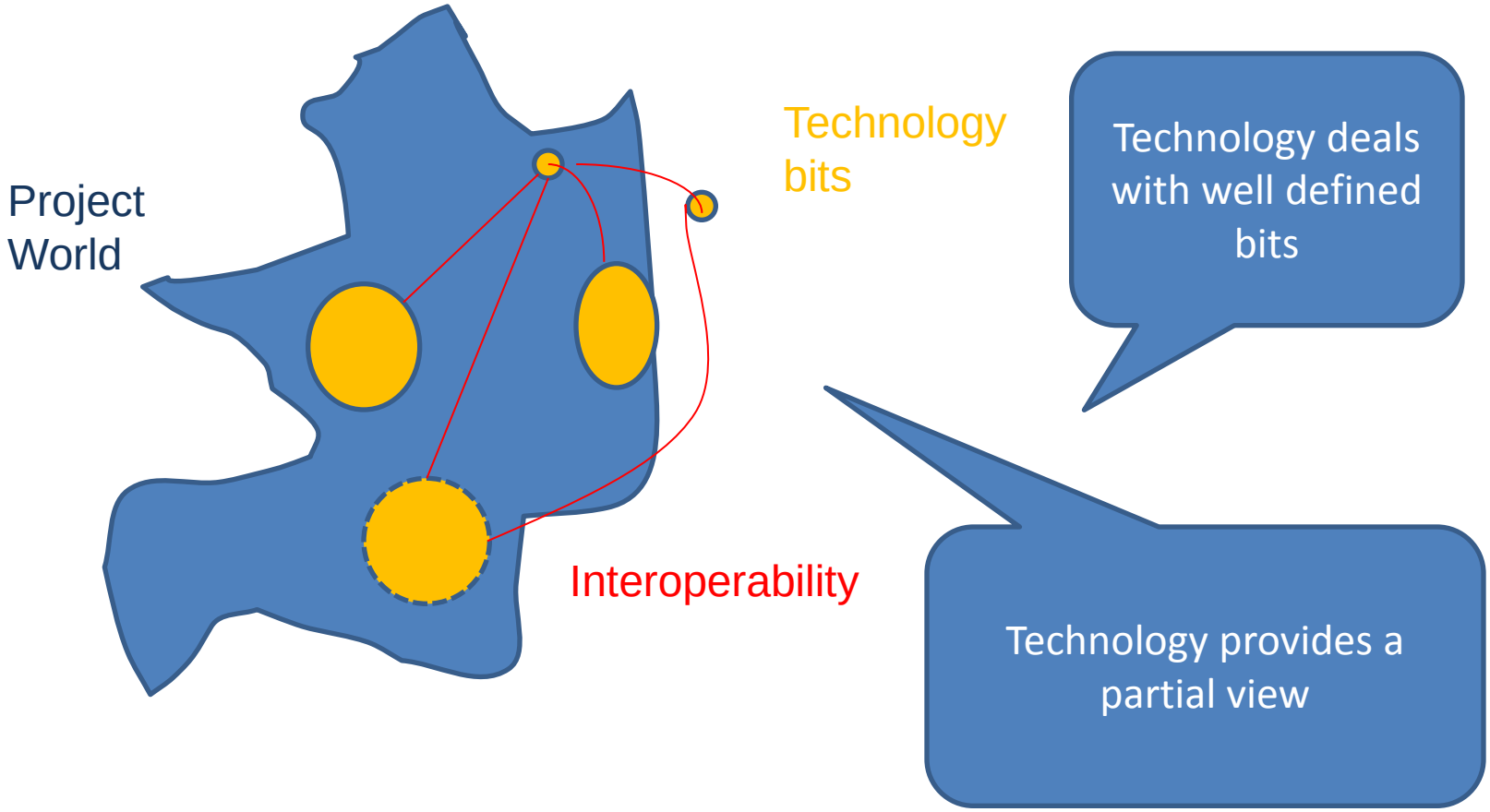
Judgement

The uniqueness
What doesn't work
Contested
Dynamic
Complex too many variables

Technology can be the wrong tool for some tasks

Find more tasks that can have aspects undertaken by BIM
These aspects become the task

Information view of project world



If you spend all your time managing BIM (technology), you don't manage project

It’s Not Information we are after?

It’s Not Information we are after?

When do we trust the data?

Digital dividends and analogue complements

- World is changing and starting to accept digital technologies
- Connectivism provides an approach to learning in the digital world
- However we need a much more inclusive approach to promote continuous learning which can recognise the components from both real (analogue world) and digital representations.

Thank you.

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