Value Chain Mapping

Asset Management Use Case

The Added Value of 3D Geo-information

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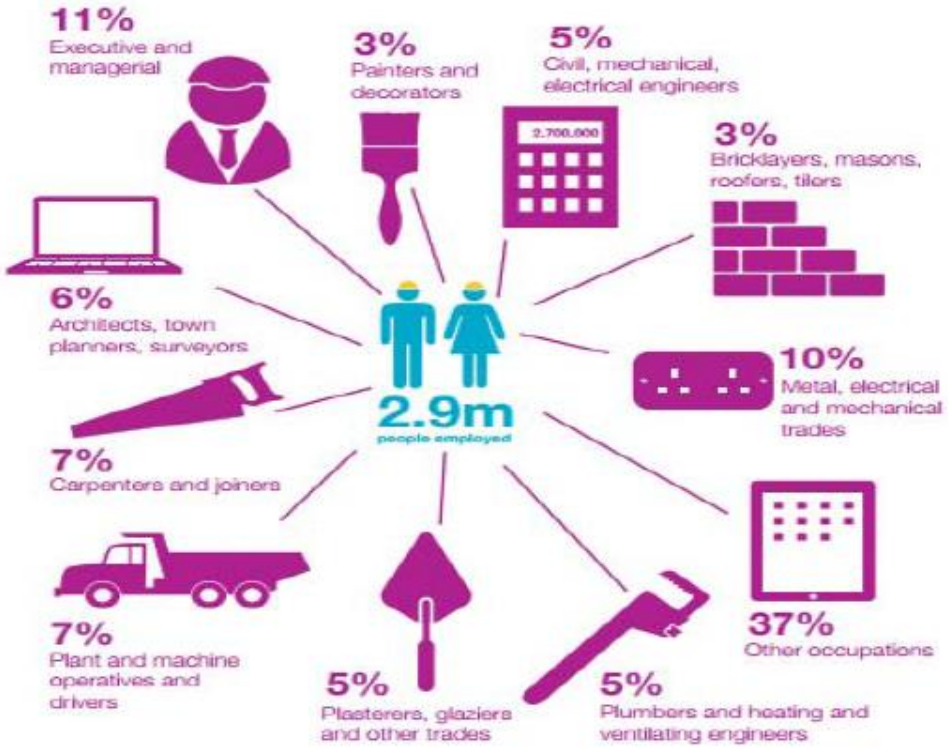
Agenda

- Purpose: why look at asset management?
- Approach: what we did.
- Results: what we achieved
  - Value chain
  - Qualitative benefits
  - Reference material
- How can the deliverables be used

Purpose

Construction contributes nearly **£90bn** to the UK economy, 6.7% of the total



There are **2.9 million** jobs filled in the Construction Industry, circa 10% of all jobs (in over 280,000 businesses)

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Policy paper

Government Construction Strategy: 2016-2020

From: Cabinet Office and Infrastructure and Projects Authority
Part of: UK economic growth
First published: 23 March 2016

Government Construction Strategy sets out plan to deliver £1.7 billion efficiencies and 20,000 apprenticeships.

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23 January 2017 — Alert

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Purpose

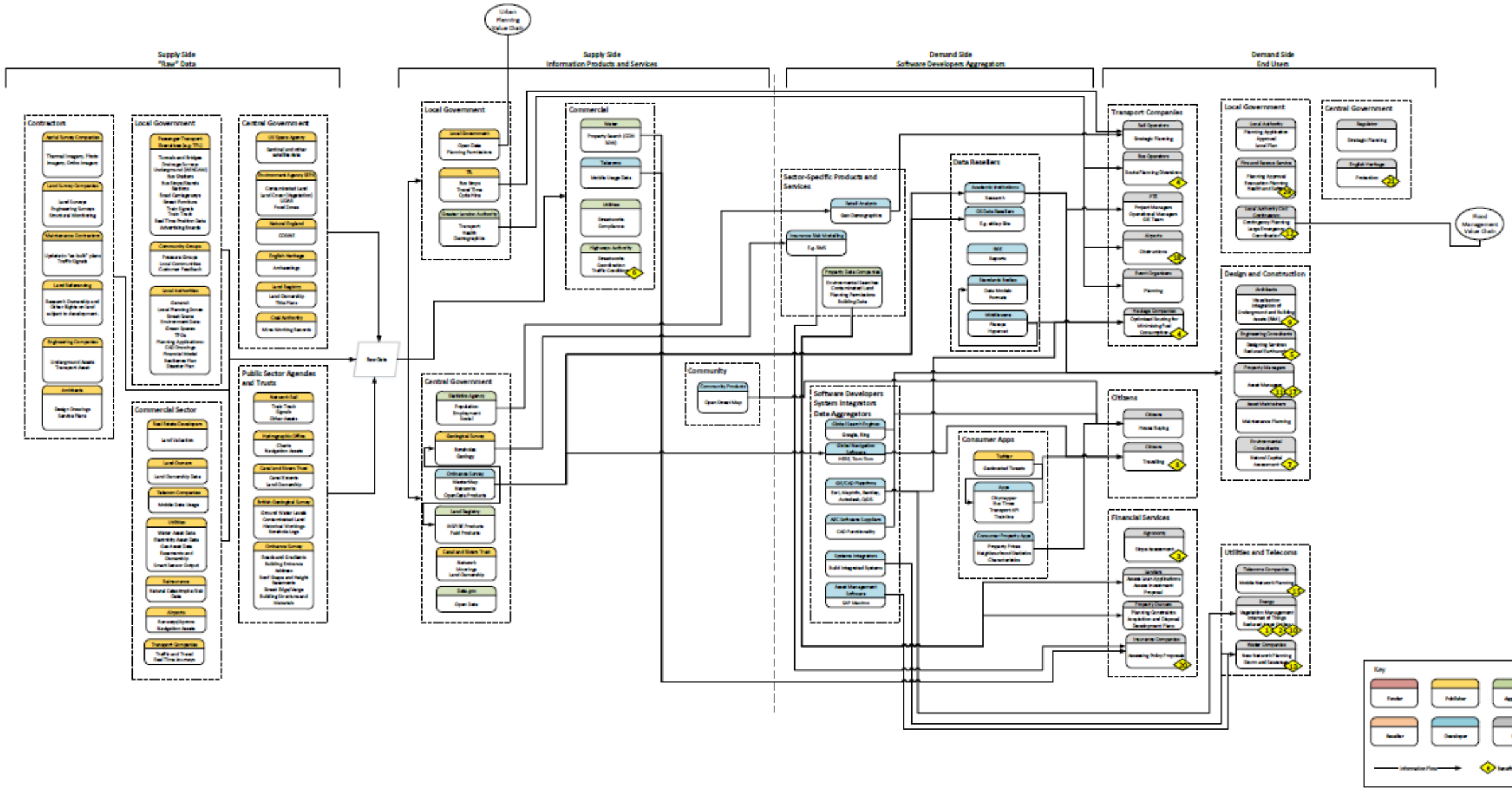
- **Aim**: graphically document value chain throughout the infrastructure asset **life cycle** (CapEx/OpEx)
- to better understand the data, stakeholders (actors) and processes involved in creating value in the **infrastructure asset life cycle**.
- identify where most significant socio-economic benefits would be added by 3D geo-information use.
- Provide a starting point for **quantifying** the **costs** and **benefits** of 3D products and services for this use case.

Organisation	Description
Telefonica	Head of Smart Radio (represented by account manager)
UK Broadband	GI and Analysis Manager
Forestry Commission	Cycling and Walking Gov initiative
Technics Group	buried assets specialists, co-authored PAS128
Arup	Former head of Smart City Programme, Mancheseter (Northern Powerhouse representative)
PCSG	Technical Director, key member of Government Task Group
FlexEye	Commercial Director
New London Architecture	Chairman of New London Architecture (a key advocate for a London model)
EY	Exchange of Asset Information (EAI) Project Lead, ORBIS Programme (within Network Rail)
TfL	Asset Data Manager
ITO World	CEO
Autodesk	Solutions Lead
Bentley Systems	Executive Consultant, BIM
Wales & West Utilities	Asset Data Manager
Thames Water	Water Resources & Process Modelling Manager
BGS	**Smart Cities Lead**
Future Cities Catapult	**Head of Projects**
National Grid Gas	Asset Data Manager
Thames Water	Director of Strategy
GLA	**Head of GI**
CASA	Lead Researcher

23rd June 2016

Scope of Use Case

- Definition of asset management problematic - wide scope and different interpretations by delegates from specialised backgrounds:
  - a standards facilitation company,
  - property data aggregation start-up
  - Transport for London.
- Constrained the scope to focus on the following:
  - large urban areas (cities)
  - infrastructure assets: buildings, water, energy, telecoms, highways and transport
  - geo-referenced information related to these assets
- Overlap with other target use cases e.g. urban planning and resilience



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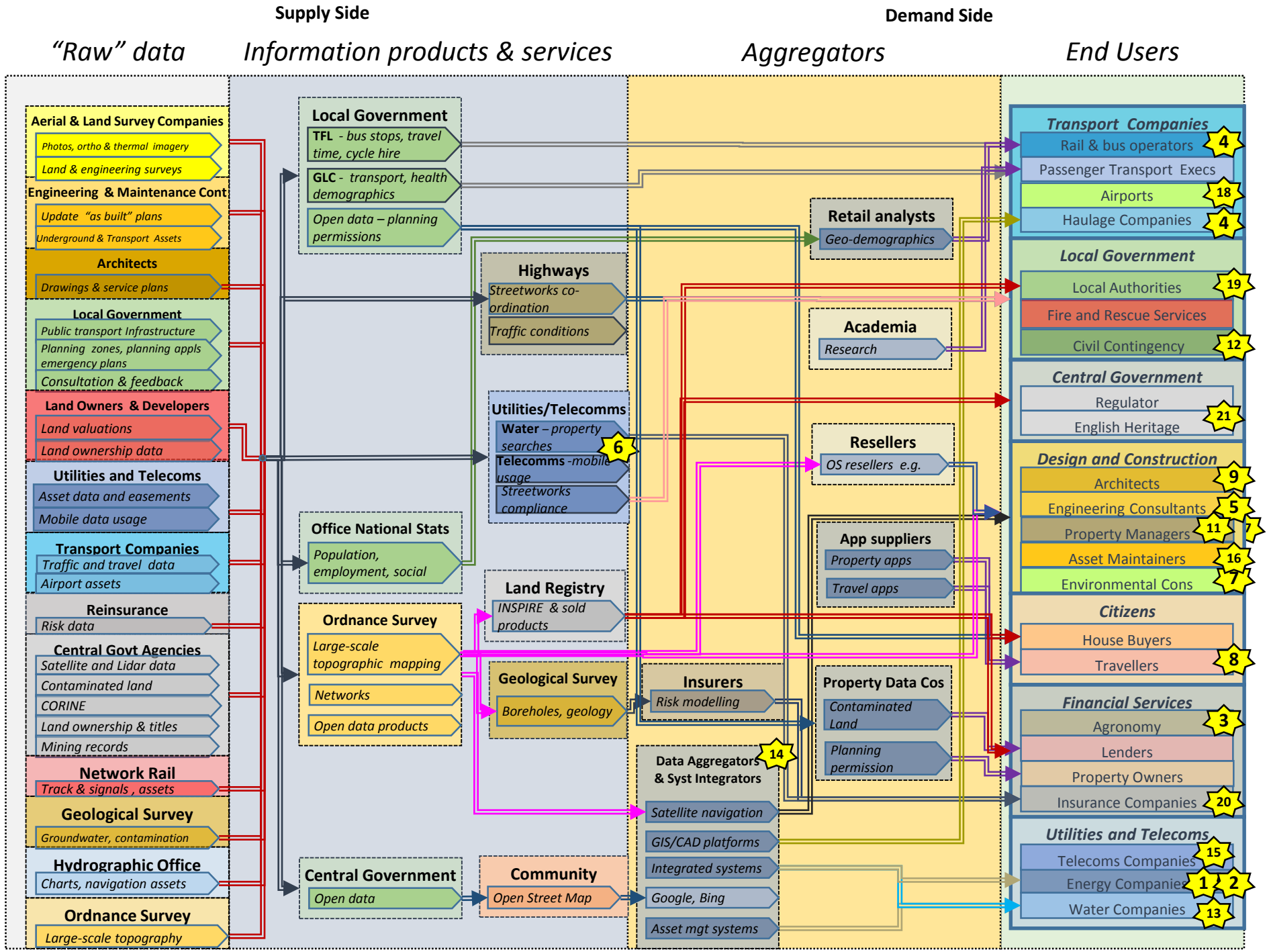

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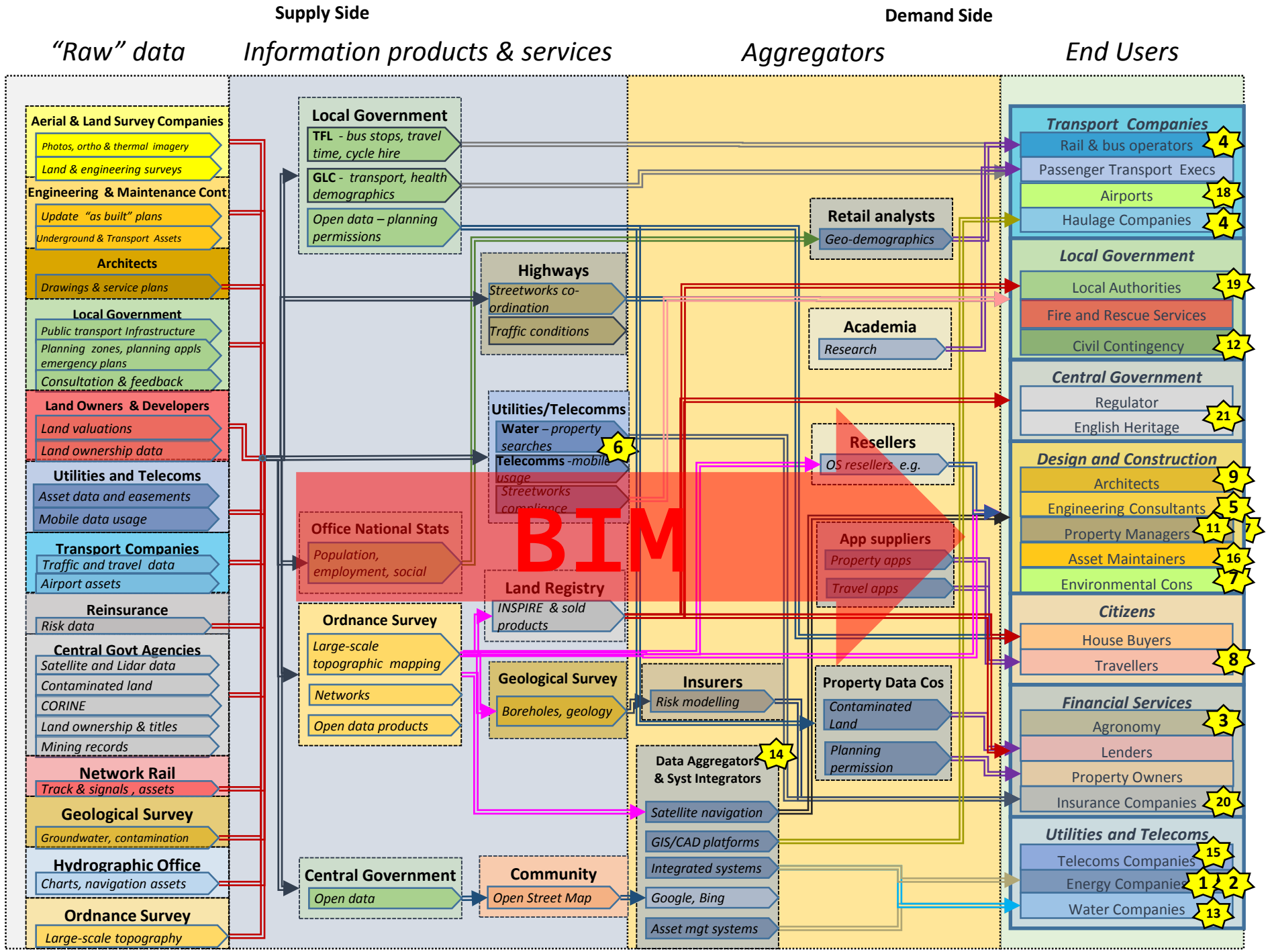

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Approach

- Workshop in Future Cities Catapult (a Government-sponsored innovation centre) in central London
- What we learned

Entrenched operational silo's (reinforced by commercial models)

Lack of confidence in corporate data

issues of data management (investment)

data capture tools/costs (sub-surface)

Lack of inter-organisational trust

Incentivisation to share (i.e. fines) is not driving new behaviours (PAS256)

Historical bias to 'plan' based working (professional dogma)

Vast amounts of research available (a well quantified problem space)

Top Qualitative Benefits

1. **Reduced utilities strikes** – improved 3D underground and surface data would facilitate reduction in injuries/ lives lost as a result of excavators hitting cables and other sub-surface assets. A study by the University of Birmingham on the causes, impacts and costs of strikes on buried utility assets quotes figures of 12 deaths and 600 serious injuries/yr from contact with **electricity cables alone**.
2. Reduced earthwork volumes on infrastructure projects – more accurate 3D information about existing surfaces, has the potential to make large savings in the cost of moving materials during preparation for construction.
3. Reduced costs of construction – in certain areas the superficial geology (recent deposits) are not well mapped, their 3D profile not being well known. A pilot study in Glasgow has shown more accurate 3D geological data to have the potential to reduce costs of construction by allowing engineers to be better informed about ground conditions.
4. Internet of Things (IoT) planning – accurate 3D models of buildings can be used to locate sensors in the optimal locations for coverage of the required area and to take into account site access and installation conditions.
5. Telecoms planning – 4G/5G networks require a much greater density of transmitter masts than with previous generation wireless systems. Accurate 3D geo-information for buildings, in urban situations particularly, will reduce costs of planning and implementing such networks. Masts locations are susceptible to changes in the environment (vegetation/building extensions). Monitoring such change using 3D models reduces the need for site visits.
6. Water network planning – more accurate surface and geological models allow better planning of pipe networks to minimise excavation costs and materials;
7. Airport Management – rationalisation and joining up of systems currently used to manage different asset types in large complex sites such as Heathrow Airport require interoperability of data, much of it geospatial and 3D. Such rationalisation has the potential to yield substantial reductions in cost.
8. Interoperability – sharing and reuse of 3D geo-information will reduce data acquisition and handling costs and make it easier to maintain asset inventories. (e.g. PAS256 : https://www.linkedin.com/pulse/bsi-pas-256-coming-paul-Clarke)

Reference Materials

Inspiring Future Cities & Urban Services Shaping the Future of Urban Development & Services Initiative. World Economic Forum. April 2016.

Available at: https://www.weforum.org/reports/inspiring-future-cities-urban-services-shaping-the-future-of-urban-development-services-initiative/

Metje, N, Ahmad, B & Crossland, SM 2015, 'Causes, impacts and costs of strikes on buried utility assets' Institution of Civil Engineers. Proceedings. Municipal Engineer, vol 168, no. 3, pp. 165-174., 10.1680/muen.14.00035.

Available at: http://pure-oai.bham.ac.uk/ws/files/24091427/Metje_Ahmad_Crossland_2015_Causes_impacts_costs_ICE_Proceedings.pdf

Sid Snitkin, Bob Mick, Russ Novak (July 2010) 'Asset Information Management (AIM) Part 1 – The Case for Developing an AIM Strategy'. ARC Advisory Group.

Available at: http://www.arcweb.com/asset-lifecycle-management/alm-research-center/Asset%20Information%20Management%20-%20Part%201%20-%20The%20Case%20for%20Developing%20an%20AIM%20Strategy.pdf

Reference Materials

Mapping the Underworld: ESPRC research project into sub-surface asset mapping.

Available at: http://www.mappingtheunderworld.ac.uk/

National Underground Assets Group (ceased): Announcement of proposed service

Available at: https://www.waterbriefing.org/home/technology-focus/item/4086-new-national-underground-asset-information-service-launches-in-london

Scottish Road Works Register, VAULT: The Office of the Scottish Roadworks Commissioner (2015)

Available at: http://www.roadworksscotland.gov.uk/LegislationGuidance/Guidance/Vault.aspx

Digital Built Britain: Government strategy for BIM Level 3

Available at: http://digital-built-britain.com/

Key Learning Points

Scope

- Asset management as a use case is insufficiently constrained, needs to be broken down into a series of more narrowly defined but interconnected use cases
- Not possible to represent all the significant information flows and value-adds in the wider scope

Supply side

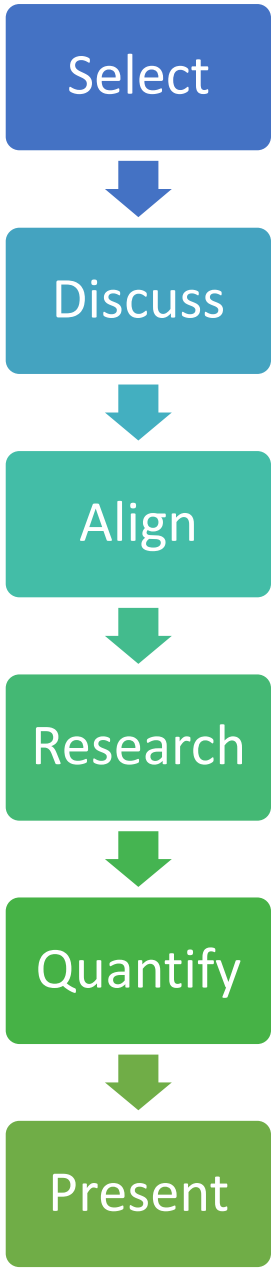
- Large number of actors
- From an examination of the actors and connections in the value chain the main components of the cost of creating 3D products and services can be identified

Demand side

- Software developers, resellers, system integrators and data aggregators are all well represented
- Market is well developed with competition in most of the sectors (within silo's)
- Promotion and regulation by the UK Government of Building Information Modelling (BIM) for public infrastructure projects appears to have stimulated the market (and will continue to do so)
- Key users
  - Design and construction, transport, utilities and telecoms,
  - Financial services and
  - Central and local Government.

What next?

- Assess whether asset management is one of the strongest use cases for your country
  - Analyse value chain materials
  - Rank against political and business priorities
- Stakeholder Engagement
  - Organise business case workshop with main actors on supply and demand sides
  - Use value chain mapping exercise to facilitate consensus
- **Align to official government policy** on asset management
  - Understand policy positions, and how 3D geo-information provides solutions
- Research reports into costs of asset management
  - Costs and Benefits from existing studies
  - Look to examples for benefits transfer
- Prepare Business case
  - Strong emphasis on costs and benefits as good evidence
- Presentation
  - Leading actors in the public and private sectors



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Summary [*Needs to be reviewed*]

- Attendance at the workshop was not fully representative of asset management:
  - impacted on the quality of the deliverables for this use case
- Asset management is wide in scope has too many actors to be adequately represented in all its complexity by one value chain
- Spreadsheet has a long list of benefits:
  - Benefits substantial to both public and private sectors including reduced incidence of utilities strikes and reduced costs of construction
- Reference material
  - Lots of available examples (internationally as well)
- Next steps
  - Continue to define the AM sectors and develop individual Value Chains
  - Provide output from Project Iceberg to EuroSDR (May)
  - Continue to engage with evolving policy (UK and Internationally)

Thank You

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