CDBB
Capability Framework and Research Landscape Scoping Workshop

Workshop: Capability to specify, manage and deliver the SERVICES, based on, embedded in and providing the benefits of digital built Britain

Centre for Digital Built Britain

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UNIVERSITY OF CAMBRIDGE

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This document captures the working notes from the workshop "Specify, manage and deliver the services", held at Churchill College Cambridge on 10-11 April 2018

The summary sheets are assembled from the separate working groups from each of two streams; Research and Applications.

The details of the outputs from the individual working groups are captured in turn.

This material was used as a starting point for the creation and development of the Capability Framework and the Research Landscape. It is provided as source material for the interested reader.

Specify, manage & deliver Services - Research Summary		
Rank order	Topic title	
		- Performance benchmarking - Well being linked to quant data (energy as a metaphor) and (sense of control = happiness) Note: risk of measuring something C/C its easy
1	Open-Closed loop ,model of service information	Design/Service knowledge management - Citizen engaged lab (on election cycle timescales) - Democratic process of experimentation Note: configuration and optimising for what/whom?
2	Socio-Technical	Organisational behaviours and socio-technical solutions
3	Transforming and Innovating business models	- Retrofit models

The comments made at the interim stage after template 1

Space management across all scales/ integrated across scales: room - ward-	
Organisation attitudes / barriers to data sharing; - value business models vs.	
Measuring performance e.g. Energy , health, reputation	- New vs Refurbished - Current perf vs. benchmark - target - Quality, security, update of benchmark etc..
Benchmarked data:	
Maintenance, planning and optimisation of built assets	- As a service based on data
Ownership vs Access to data - business models	

Research Topic: …	
Specify, manage and deliver the Services, based on, embedded in and providing the benefits of DBB	

Scope:

Scope - In	Scope out	What sub-topics might overlap with other topics?
• Organisations holding on to data rather than selling it under value • Unexpected services built upon by-product data, used for benefit or detriment of building user/owner • Overcoming segregation of space at different scales using data/information sharing • Business models - data sciences - social sciences • Using data from building users to optimise layout/space use etc • 'Champions' for disruptive services even in large organisations • Performance analysis using AI • Predictive maintenance (diagnosis & prognosis) • Value of data & implications • Life cycle modelling of the asset • Ownership vs access to data • Maintenance planning & optimization • Organisations not wanting to share data as a mainstream approach	• Education/knowledge transfer. What services might exist?	• Knowledge of data • Retrofit of layout in legacy environments

Step 2. Scope change by thinking about stakeholders

- Different interests of stakeholders
- Perceptions of data ownership & information ownership when services exist
- People developing services don't know the needs of business models

Step 3. Scope change by thinking about spatial differences

e.g. National/Regional	e.g. City/local	e.g. Asset specific
• Space management across scales, e.g. hospital room, ward, department, site	• Data needs sub-sampling & its scale • Standardised & measured layout to improve building operations & user experience	

Step 4. Scope change by thinking about the lifecycle of assets and services

Articulate user needs and requirements	Conceive, plan and design (including optimisation and integration)	Build and commission (including optimisation and integration)	Manage and Operate (refine and enhance, optimise and integrate)	Provide valued services to users (and minimise downsides for non-users)	Retrofit / Renew / Decommission (with attention to the whole cycle)	…Assess, feedback and optimisation

Research Topic	
Specify, manage and deliver the Services, based on, embedded in and providing the benefits of DBB	

Step 1. What are the major research clusters/themes?	What are capabilities and research that will be needed as DBB matures from 'deliver' to 'operate' to 'integrate'?					
	Deliver *(create the built asset)*		***Operate*** *(manage asset through life and deliver the services that derive from and depend on the asset)*		***Integrate*** *(deliver services and benefits based on integrated systems and organisations)*	
	What capabilities and enabling research?	***Which people / institutions are working on this?***	***What extra capabilities and enabling research?***	***Which people / institutions are working on this?***	***What extra capabilities and enabling research?***	***Which people / institutions are working on this?***
• Organisational culture/behaviour to share Data & develop open solutions	• Adopting social-technical view [cross/inter-disciplinary] • Pre-competitive knowledge sharing • Identify end purpose & work backwards • How to translate learning into mainstream practices		• Enduring low level (physical) standards			
• Performance evaluating optimisation & maintenance • As-built as-designed	• Identify system boundary (how to make it more adaptable/dynamic) • Time & space - defined cyber security		• Post occupancy evaluation • Corporate vs project learning • Qualitative vs quantitative • Optimise space use		• Self diagnosis • Dynamic BIM space use information from design to post occupancy • Who are the beneficiaries?	
• Ethical/legal aspects • Liability/risks/accountability	• Smart contracts		• Permissions		• Mechanisms to withdrawal of consent	
• New/existing/transformation business models	• Holistic approach to value • Dichotomy BTW developers vs users & how benefits accrue over time					
• Cross-sectoral knowledge sharing						

Specify, manage & deliver Services - Application/Demonstrators		
Rank order	Topic title	
1	Limits of Cyber-Physical systems (Lifetimes: Cyber3-5 years; Physical 20+ years)	- Enabling data sharing that supports innovation and collaboration - Secure robust, resilient - need experts - Adaption of built environment - Regulatory context, Boundaries between built assets and technology - Cyber legacy: need a reference structure - Responsibility for bits of infrastructure
2	Free citizen APP	- Access to data (if this…then that…) - Turn data into useful data - Scalability to nationwide - Security concerns if data accessible - Natural language processing system

Application Topic: …	
Specify, manage and deliver the Services, based on, embedded in and providing the benefits of DBB	

Step 1. Scope: What topics should we include in this part of the framework – and what demonstrators would illustrate / stretch the boundaries?

Scope - In	Scope out	What sub-topics might overlap with other topics?
• Soft data measurements, e.g happiness • Shared data services for both acquire create manage & analyse & interpret • Digital indicators for benchmarking built environment • Inform (as a service) & demonstrate the value of totex provision of the built environment • Need to secure & federate knowledge from IoT for DBB services • Principles & not technical standards required • Developer needs access to updated benchmarks to evolve target for new scheme/retrofit benchmarks could be regularly updated • Desire not to standardise to stifle innovation - perhaps build principles not prescriptive standards (partic. at lower tech layers) • Data collected over time becomes an asset vs communication (internet) as a monetary thing • Proxies for data where info or sensors not available • How to handle attacks on digital infrastructure, eg DYN, DNS, DDOS takes out net • Technology stack to facilitate built env data use • Transnational and international interdependencies • APIs • GML City and other models • New standards - try to base on existing?		

Step 2. Scope change by thinking about stakeholders (Are there new / different aspects of the topic and its demonstrators?)

• Demolition criteria
  -> convince institution/owner
  -> consult stakeholders
  -> obtain building regs permission
• Building typologies standards difficult to classify to be usable for new project/retrofit new build
• Adding sensors etc cost with no benefit to owner (only user/occupant)
• Company e.g. Google has own specifications for eg VOC in fit-out materials
• Job seekers check out the "Green " reputation of company & eg cycling to work, showers etc

Step 3. Scope change by thinking about spatial differences (e.g. to consider how can scale make a difference to the demonstrators we would propose)

e.g. National/Regional	e.g. City/local	e.g. Asset specific
• Data on national infrastructure to evaluate more deeply • Need to understand risk and security options for emergencies planning/CNI '• Understanding value in terms other than money	• Data exchange & transactions • New buildings, legacy cities/regions	• API wrapper on assets • Existing buildings can it be retrofitted to a reasonable standard (defined term benchmarks) - or should institutions consider limitations?

Step 4. Scope change by thinking about the lifecycle of assets and services: Are there new / different aspects of the topic and its demonstrators if we think through the lifecycle of the assets and the services?

Articulate user needs and requirements	Conceive, plan and design (including optimisation and integration)	Build and commission (including optimisation and integration)	Manage and Operate (refine and enhance, optimise and integrate)	Provide valued services to users (and minimise downsides for non-users)	Retrofit / Renew / Decommission (with attention to the whole cycle)	…Assess, feedback and optimisation

Application Topic	
Specify, manage and deliver the Services, based on, embedded in and providing the benefits of DBB	

Step 1. What are major demonstrators that are required?	What capabilities / functionalities of the demonstrators illustrate the maturing of DBB from 'deliver' to 'operate' to 'integrate'?					
	Deliver *(create the built asset)*		***Operate*** *(manage asset through life and deliver the services that derive from and depend on the asset)*		***Integrate*** *(deliver services and benefits based on integrated systems and organisations)*	
	What would be the big challenges?	***How?***	***What would be the big challenges?***	***How?***	***What would be the big challenges?***	***How?***
• What GML limitations are there at scale for IoT	• How is GML shared to enable services • Secure robust resilient. How do we do this? • Understanding (hidden) service dependencies	• Digital key exchanges, eg Diffie-Helman • Experts in the fields of security, resilient	• Adaptation of B environment to change over time • Boundary between IT & building services - fuzzy • Evolution of context over time; regulation, aims, desires, behaviours, tech … • Data → information → knowledge how • Lifetime of building physical bricks & mortar is at odds with lifetime of software of 3 years	• Cyber cycle 3-5 years. B envir 20-25 years. How to manage the tension	• No ref infrastructure to manage • Who is going to provide & ensure appropriate network administration? • For individual computer suppliers can have remote service deal which lets computer preferred correct/update system instead of householder?	• Gov verify as an exemplar
• "Free citizen" app • Open innovation demonstration value of DBB shared to citizen • "If this then that" web service to surface data	• How to manage identity & access?	• Gov	• Infrastructure to deliver capability • How to secure IT • Changed problem: from Heating to cooling/shading because of overheating therefore new bit needed • How to scale an application? To be big (success) to end of life		• Publicising system operation into access & training	• Prove integration is possible • Scale issues