CDBB
Capability Framework and Research Landscape Scoping Workshop

Workshop: Capability to negotiate and decide the outcomes and outputs sought by STAKEHOLDERS from digital built Britain

Centre for Digital Built Britain

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UNIVERSITY OF CAMBRIDGE

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Centre for Digital Built Britain

This document captures the working notes from the workshop "Negotiate and decide outcomes and outputs", 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.

1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB - Research Summary		
Rank order	Topic title	
1	Negotiation	- Barriers + enablers to interpreting information, data and models - Regularising data - Understand cultural, organisational change, need to facilitate this - Policy + regulation - More in housing sector where it is harder to communicate the benefits on a smaller scale - Learning from other sectors - Trust, responsibility / liability understanding to enable better teamwork collaboration
2	Understanding stakeholders, mapping them and what drives their profile?	
3	Modelling capability - Incorporate evidence and feedback from the whole lifecycle in to delivery model. This includes e+f from all stakeholders:	- Value creation - Model verification - Investment performance
4	What are the indicator values of (asset) performance relative to stakeholder profiles? How are these identified, defined and measured?	

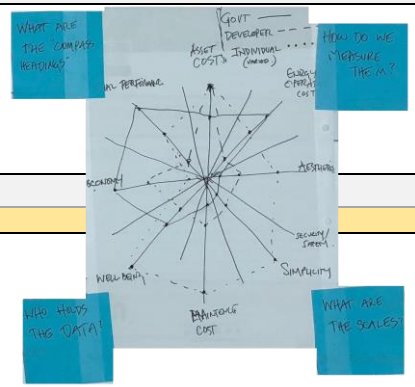
Research Topic: ...	
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB	

Scope:

Scope - In	Scope out	What sub-topics might overlap with other topics?
- Stakeholder definition - what? and who? - Evolving roles - Multi-faceted stakeholders - Fragmentation of roles vs integration of roles - People and groups of people - Timing of involvement of stakeholders - Fragmented view of "the stake"  - Beneficial outcomes > Aesthetics - for whom? > Costs - to whom? > Energy > Simplicity - Which stakeholders associate/buy-in to which outcomes? - Data information knowledge. What data exists, who holds it, what to do with it? - Information -> Hold? -> Need? -> Know -> Alignment - Value of information, quality of information - What is the life course? - What processes are we using? - Perverse incentives (MR)		

Step 2. Scope change by thinking about stakeholders

- Reluctant stakeholders
- Unexpected stakeholders
- Assets
- Costs
  - Fixed
  - Operation
  - Maintenance
  - Retrofit



Step 3. Scope change by thinking about spatial differences

e.g. National/Regional	e.g. City/local	
- Tacit/explicit	- Sets/groups of people - Physical & digital	

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
'- Users... but what about the abusers?						

- Systems integration
- Standardising systems & info between them

Research Topic: …	
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB	

Scope:

Scope - In			Scope out	What sub-topics might overlap with other topics?
- Process/tools > Modelling > Monitoring > Negotiating = VALUE - Tools "application" - What are the limits for negotiation? (process/tools) - Do we have the tools? Do we need to develop new tools? Topics - Regulations - Standards - Regulation vs economic instruments vs information/ soft instruments - Are we laggards? Or leading compared to tech/business?	- Process "strategy" - Process - Ex-ante vs ex-post assessment - Technology professional practice - Monitoring - Lay… stakeholders core territories - Spatial scales	- How to measure success? £s? Quantity? Quality? - What type of outcomes are we looking at? Goal of the intervention/policy - Running opportunity introduction workshops for local SMEs - Negotiations - Negotiating inter-stakeholder outcomes (short & long term) - Supplier conferences (formal socialisation) - Social network analysis [mapping stakeholders interactions]		- Openness of research/process to interdisciplinary work - Supply chains - Helping local SMEs realise value and outcomes - Types of suppliers - their outcomes - Investment in local SMEs - help them achieve their outcomes - BIM as a sensor for others - Interfaces to other areas: - Finance - Legal - Health

Step 2. Scope change by thinking about stakeholders

- Bringing all stakeholders together - Cultural change - End-users involve/parties - Overlap with stakeholders from other areas. Is DBB different? - Participatory collaborative approaches - Legislation institutions governance - Planning, building regs, NUBC, Insurance	- Timescales of different outcomes? Short/med/long - Who delivers outcomes? +ve/-ve - Making implicit expectation of outcome explicit - Supply network mapping (time wise) - Making tacit decision explicit - evidence based	- Housing supply chain SMEs/suppliers - Barriers to engagement adoption? benefits? - Contracting for outcomes (performance based?) - Which suppliers are ahead/behind? - Organisational knowledge creation theory (Nomaka, Issue)

Step 3. Scope change by thinking about spatial differences

e.g. National/Regional	e.g. City/local	e.g. Asset specific
- Shared database	- Investment portfolios: risk & return - How should we measure risk/return? To whom? - BIM '- How might the regulatory environment need to change? - Understanding political barriers? - Costs savings - Lagging behind? Catching up? Planning for future? - Non £ costs/savings. Quality of the wellbeing	- Making fuzzy outcomes more precise - Valuation of buildings (in £) - Coding checking application for "valuing" embedded in regulations - How can sectors learn from one another?

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
- What is the role of policy in promoting cultural change?	- What are the barriers for early engagement of stakeholders?	- How ex-post assessments can inform ex-ante evaluation to improve policy designs? - Put together results from case studies & scenarios	- Are the current standards regulations and policies sufficient for DBB?	- Run focus groups with users - Which users? What do different groups value?		- Databases for lessons learned for future projects - Open data

Research Topic						
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB - Mapping costs & values against (possible) available information - Is "mature" the right term? - Too linear!						
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?***
- Discovering the stakeholders "use cases" - Enabling better society	- What are the drivers of specific cases that drive general cases	- Future cities catapult - L&G homes (Legal & General) [offsite housing]	- Manufacturing "CNC" - Service delivery model [all 3]	- Phillips - OVG developers/technology - "AIRBNB" "dating service" [share other's assets)	- Data security (open data) ? - Digital/physical assets	- "Tech" firms > social media < Apple, Google, Ebay, Facebook, Alibaba
- What are their criteria? - Trust - Common understanding of cost & value? - Unpeeling the concept of value	- Team work & co-creation - "Turf wars" between supply-side stakeholders	- Transparency - silos		- We work [own building] flex location rental		
- Language - key, but difficult! - Common digital language	- Transformation of insurance on supply-side [from liability to product assurance - Responsibility - Government underwriting of 1 - Digital project insurance. Integrated project insurance 2					

Research Topic	
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB	

Step 1. What are the major research clusters/themes? **- Knowledge capability resource sharing in network - theme** **- Housing**	**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?***
- Modelling **- New build res: housing** >Build - supply chain, BIM activity >Operate - FM, MAS, home owners > Value - materials, energy costs, end user	- What's the role of policy (regulation, incentives or soft inst) in keeping the whole system working? - How do you specify, negotiate and communicate the outcomes? - How to "communicate" different perceptions of what is "value"? *Different outputs I2 - How to learn from other sectors e.g. car manufacturing to house building? e.g. OSM	- BIM - house builders GB	- Automated data capture		- Shared data for bench marking - How to more "precisely" model occupant behaviour for energy consumption? - PHP researcher at University Huddersfield	- Policy (governments) - Industry bodies
- Monitoring **- How monitoring (ex-post) can inform modelling (ex-ante)? (CP)** **- How to evidence it's a successful process?**	- What are the "origins" of the different ways to "measure" value?	- Danilo Gomes University Huddersfield research on "Early project collaboration"	- How to hand one data from build phase to use phase? GB - Data use/sharing cluster	- Bryden Wood are working on DfMa solutions	- Identify users now & in the future e.g. home owners	- Practitioner communities e.g. BIM groups
- How to estimate value or performance? Benchmarking? **- How to align the criteria that allow to measure value?** - Env. effectiveness - Distributed efforts - Cost saving impacts	- Visualising data evidence and gaps to narrow risk - Constr. cost vs sales price: How to measure estimate risk?	- Bryden Wood - data evidenced infrastructure	- Networking & sharing data and process - Awareness raising of potential benefits GB - Cost attribution - Lack of data on asset use GB	- Asset managers - FM housing associations GB	- Feedback to constr. & operations - Improved valuation, conditional on capex & opex - Interpreting to the right language for each sector - Valve	- Dep. of land economy 19 Silver St - C-EENRG (University Cambridge)
- Negotiating **- How to feed in data on supple chains? Risk? GB**	- Supply chain cluster - How stakeholders negotiate different perceptions over what is value in the project?					
- Data security **- What are the cultural and organisational barriers to change? GB**	- How do we foster change in supply chains? - Role of data autos e.g. gov/clients etc.? - Capacity in SMEs?	- All stakeholders	- Review of process policies regulations			

1A. Stakeholder outcomes / outputs	
Rank order	Topic title
1	Stakeholder engagement and requirements platform + Stakeholder engagements within a scheme - society clash detection
2	Shared data repository (national digital twin)
3	Modelling ROI
4	Pilot projects (that give demonstrable outcomes - single process, simple)
5	Clear definition of roles in Big data Governance
6	Minimise Energy use in buildings

Application Topic: …	
1A Negotiate and decide the outcomes and outputs sought by stakeholders from 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?
- How does DBB help retrofit? - Effective funding of: a) data exchange b) value/analysis of data Focus on the value case - Facility manager to "buy in" to digital model - Rate of regulators to drive asset programme & organisational behaviour - Change the messaging as to who "owns" the BIM/information process. The product champion/asset champion needs to also champion the information to facilitate it - Quality of ready information is always a barrier at the beginning of a project - Identification: follow the money - applying £ cost/benefit to each step of the business - Digitisation of product information production - BIM becomes business as usual - Ownership/amendment/management to digital model - What's in it for me... brick layer, electrician, plumber etc.	- Effective quantification of the "asset" of the UL to then allow the modelling of constraints & options - Need to create a relevant framework that identifies the benefits for each party across the lifecycle. There is enough to go around! - Industry-wide guidance on information collection and storage on the existing and new transport infrastructure assets - Skills vs qualification vs competences - Minimise energy use in buildings (part of meeting climate change targets - Outcomes to be in plain English - How to agree "companies view" of asset caught in the "current status" that we can work against - Exchange tool for showing data about legacy assets: data archive, data model, data tests - Clarify as to the overall drivers for decision making for investment across the lifecycle - what is the rate of information?	- Raising awareness of all levels of AIM in the construction industry with an emphasis on the advantages - Planning system approval or rejection - "Customer demand" from asset operator for data to allow them to hit targets, to apply pressure on owner/construction process - requires clear KPI's etc & external targets (HMG?) - Is new build really fit for future use? @ max 20% new assets is not 100 yrs(?) too much emphasis is put on new build - Alignment to wider digitisation trends e.g. Ind. rev. 4 having impact on supply chain - strong role of HMG to set agenda - Understand impact of business models (within sectors) that may work counter to broader benefits & procurement issues - (Transport) Local liaison forum = county transportation + city planners + nat govt funds - How do we put quality information at heart of what we do?	- Not necessarily new build - could retrofit G5	- Role of government - National BIM strategy - Local linking up - Business to pay? - Retrofit 80-90% - What information is needed to allow retro-fitting or new build, say derived from work done before construction? - Increase collaboration levels across disciplines

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

- Understand the need for change?
- How to make case studies "relevant" to more organisations to drive more change?
- Fuel poverty elimination
- Publicising exemplars/case studies
- Compare tools & platforms to facilitate easy adoption e.g. Govt A, A platform
- Government mandate for BIM
- Corporate applying lessons learned
- Follow the money, return on investment, BIM as better investment
- What is driving funding cycles? How can they be better aligned with quality information being the connection

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)

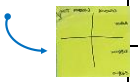
e.g. National/Regional	e.g. City/local	e.g. Asset specific
- How does devolution impact national agenda	- Social history examples @ Nottingham City housing - City council leadership for low-carbon design e.g. Norwich, Nottingham, Bristol, Exeter - ROI? e.g. national capital - Is ROI valid measure	- Could be exemplar/case study - Healthy building publicise

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
					- Retro fit critical in terms of % of building stock/infrastructure	

Application Topic: ...	Delegate names:
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB	[not stated]

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?
- Information quality/data requirement SLA's - Model stakeholder interactions for requirements - We need dual track of digital monitoring of "asset throughout its' lifecycle" and the "conversations of all stakeholders" which interact & inform it throughout its' lifecycle - How to find stakeholders for a topic that nobody understands - How do we know how to capture what is relevant to a situation - Do we know (properly, honestly) why BIM isn't "working" yet? Process & digital engineering are different - What is the purpose of DBB? (is it still the same now we've had experience of it?) - Start with electing the wide variety of world views, values, ethics, beliefs - especially of citizens! Use urban ID diagnostics methodology - Start with the end user in mind, don't assume A6 - SIPOC (Supplier, Input, Process, Output, Customer) > new linear process > prosumer in an information sense 	- Stakeholder value maps for information - Machine as stakeholder? e.g. sensors - DBB would be a "solution looking for a problem" as far as many users are concerned - Is the "natural world" a stakeholder? - How do we learn about the value of digital engineering? Especially for small asset owners. Why is it worth investing in?	- Existing built stock owners. How to engage for DBB? - Importance of data and information capture by all stakeholders - Future - What role will AI have in automating DBB processes? - 1 (no corresponding number of post-its) - 2 - Appropriate rendering of data/info for different stakeholder groups (with different skill sets) - 3 - Philosophical piece - how do infrastructure services enable citizens to achieve their desired outcomes? - 4 - Then, how do citizens learn about the benefits they gain (through achieving their desired outcomes) & then be willing to "pay" for the benefit - 5 - What information do I need so that I can make effective decisions and consequent actions? Then I can work backwards to identify the data needed - 6 - We need to learn how to co-produce - 7- Community partnerships are crucial for identifying stakeholders - partnerships draw attention to issues	- Humans gonna human - Is elitism OK? How to protect against wilful exclusion? - Not a "Grand Design" start - all already out there & working - Not democratising design (is democratic design not the best answer)	- Robustness and resilience of DBB systems? Will we be able to cope if a natural hazard takes out our digital systems? Will we become instantly dumb?
- -No choice but to start from fully "accessible"/open - Better language to record "value" with £? KPI? IRR? NPV? not meaning much - How to cope with nobody needing anything that could be provided - Use of a "stakeholder" skeleton to identify and engage - BIM needs an interface with users/consumers/community which promotes a simple view of the learner/customer so that the "customer-job-to-be-done" is attended to & the customer is included - Who cares who the stakeholder is? Let them come to freely available data via apps - Model the interaction cycle - Geo-specific data for unknown nearby stakeholders 	- Digital & physical security dictates stakeholder information allowances	- 7- Community partnerships are crucial for identifying stakeholders - partnerships draw attention to issues		

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

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

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	
1A Negotiate and decide the outcomes and outputs sought by stakeholders from 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?***
- Minimise energy use in buildings - meet statutory climate change targets. Exemplar	- Change of use - Energy use metric before & after - Design for changing use. Owner has incentive. Exemplar - Draft case study models/ideas of how to do this	Passiv Haus planning package identifies, analyses & develops low-carbon design. Learn lessons from this	- Monitoring of energy use: DEC, EPC - Identify successful drivers for change? - Modelling of performance gap	- Annually updated digital energy certificates required	- Impact of national energy consumption w/plan? - National grid capacity to absorb local electrification/renewables - Measure of success? Local & national level imports?	- National grid reworked from local to large scale also to include battery storage
- Modelling ROI - benefits - investors & society - targets - investors & society Business models	- Procurement tools to drive new behaviours - Privatisation of national assets - introduces new behaviours	- Case studies	- Owner facility manager to adopt digital methodology to support operations	- Implement & monitor & disseminate		
- Stakeholder identification of new schemes e.g. HS2 - (clash with society) Number of vehicles using an improved road or a new build infrastructure project	- Develop ways for BIM to identify clashes between construction schemes and the needs of the society - How to solve different stakeholders demands? - quantify & answer	- New plans approval regime - Use "place" as an impact fitter to identify those impacted	- Identify and how this changes through deliver - operate - integrate		- Universities/researchers/businesses to develop means of posting research findings on national digital twin (MR) - How is performance of building/assets captured? Customer/client satisfaction	
- National digital twin	- Public vs private. Cost vs free data. Document info - Data sharing: IP, security - Buy in, ownership, handling, data federation, data capture - Incorporate feedback research at early stage of design	- Delivering an inter-operable platform D6	- Developing country-wide database with information about existing transport infrastructure assets - Citizen group access to services running in road	- Deciding who has access and what this costs	- Plugging in "new" project integration models into the national data set - Access to digital twin - publicise & prioritise domains e.g. security, commercial issues - Mechanisms to give feedback to deliver & operate - Balancing big picture issues for citizens and making key decisions between them e.g. land use	- Define protocols & standards that establish terms of engagement/interaction - Common language "data model" - where something could be the Rosetta stone

Application Topic	Delegate names
1A Negotiate and decide the outcomes and outputs sought by stakeholders from DBB	[not stated]

Step 1. What are major demonstrators that are required?	What capabilities / functionalities of the ~~demonstrators~~ engagement tools 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?***
- Roles in data governance/stewardship	- Engagement with obscure stakeholders - Inaccessible or inadequate process definition	- Big PR push in very simple language - Simplify	- Plot been lost - Transfer of data stewardship	- Find plot - Lingua Franca		
- Can we do some disciplined mapping of stakeholder journeys? Because we don't know what we are talking about - Stakeholder engagement & requirements platform - Platforms/test beds (Eg Bristol is open) that can host demonstrators / pilot projects?	- Finding the stakeholders - Who is the customer? - Inadequate rigour	- UKCRIC Bristol collaboration - A set of test beds (e.g. Clifton suspension bridge) - Supported by a collaborative learning & action platform - That will enable pilots, demonstrators, de-risk etc - Social science? - Actual performance (outcomes) specifications e.g. queue length at a train station	- Changes of stakeholders post completion - Public vs private requirements	- Find better(?) ways to explore and define flexibility	- Getting involvement from those not primarily concerned with the built environment - Inclusive engagement, participation & collaboration	- Digital engagement platform for stakeholder
- Fully transparent pilot projects to demonstrate individual work flows - Need affordable, agile demonstrations that will enable quick & dirty learning & projecting & de-risking	- Commercial pressures by using disruptive tech. & processes - "BIM" not really working yet	- Government projects? - User engagement & learning	- Whose responsibility is it to maintain the data? - "Don't really need any more data, not using what already exists. Thanks though" - Build to achieve outcomes not buildings			
- Shared data repository, custom stakeholder views/apps	- The devil is in the junctions. Interfaces between stakeholder data bases	- Find a local authority to experiment with engagement beyond mandatory planning requirements	- Data repurposing/transformation	- Capture once - use many		- Blockchain/tangle