



Smart Buildings  
Overlay to the RIBA  
Plan of Work  
[Straw Man for discussion]



Smart Building Digital Capability Categories:

- Spatial Engagement:** e.g. location, movement, environment sensing, navigation & wayfinding
- Situational Awareness:** e.g. complex situation detection, AI situation composition, analytics
- Connectivity:** e.g. Wireless (Wifi, BLE, LoRa), roaming, human end user device, IoT endpoint
- Access & Security:** e.g. identity, authentication, authorisation, permissions, context-aware authorisation, segmentation
- Performance:** e.g. capacity, throughput, availability, reliability, accessibility, responsiveness, scalability
- Architecture Quality:** e.g. modularity, interoperability, extensibility, future-proof, composability, portability
- Service Management:** e.g. automation, policy-based security & provisioning, monitoring & alerts, configurable, multi-tenancy, self-service
- Smart Building Platforms:** e.g. integration broking, automation, process mgmt, intelligence
- Building Management:** e.g. HVAC, entry, monitoring & diagnostics
- Asset Management:** e.g. fixed and mobile assets, condition based maintenance
- Estates & Facilities Management:** e.g. booking, scheduling, maintenance,
- Enterprise Management:** e.g. ERP, Finance, Customer, HR, Supply Chain, Business Intelligence

Stage Outcome		0	1	2	3	4	5	6	7
		Ensure that <b>Client Requirements</b> are inclusive of the hybrid built/digital experience and active environment control for all space users (e.g. Students, Teachers, Workers) and services.	Capture design parameters in the <b>Project Brief</b> to direct designers to accommodate digital infrastructure in the design and integrate digital and physical experience. Ensure the <b>Project Brief</b> includes the intent to actively manage the environment to deliver a low carbon footprint.	Clearly identify and articulate the role of digital capabilities on User experience, mix of active and passive elements and the relationship between them in terms of the effect on specifics of space design. Identify areas where hybrid experience is significant and capture in the <b>Architectural Concept</b> .	Define the placement, distribution & intensity of <b>Spatial Engagement</b> digital capabilities in relation to all relevant elements of the <b>Outline Specification</b> . Ensure that the relationship between digital and physical elements is coherent. Define interoperability requirements for RF digital components.	Elaborate the <b>Outline Specification</b> to stabilise and detail <b>Smart Digital Building</b> system components and the integration & interoperability between them. Develop detail to a point that facilitates effective procurement of vendor-specific technologies and services.			
Tasks & Information Exchange	Smart Digital Building elements of standard Stages Tasks and Information Exchanges	Prepare the <b>Smart Digital Building</b> elements of the <b>Client Requirements</b> , ensuring coherence and synergy with the built environment, behavioural and environmental elements.  Follow all other RIBA Stage 0 Core Tasks guidelines in relation to the <b>Smart Digital Building</b> content (e.g. <b>Business Case, Project Budget</b> ).	Prepare the <b>Smart Digital Building</b> elements of the <b>Project Brief</b> , ensuring coherence and synergy with other elements such as <b>Sustainability Outcomes and Spatial Requirements</b> .  Follow all other RIBA Stage 1 Core Tasks guidelines in relation to the <b>Smart Digital Building</b> content (e.g. <b>Site Information, Site Surveys, Project Execution plan</b> ).	Prepare the <b>Smart Digital Building</b> elements of the <b>Architectural Concept</b> and <b>Outline Specification</b> , ensuring coherence and synergy with other elements such as <b>Strategic Engineering Requirements and Project Strategies</b> .  Follow all other RIBA Stage 2 Core Tasks guidelines in relation to the <b>Smart Digital Building</b> content (e.g. <b>Site Information, Site Surveys, Project Execution plan, Plan for Use</b> ).	Further develop the <b>Smart Digital Building</b> elements of the <b>Architectural Concept</b> and <b>Outline Specification</b> , ensuring coherence and synergy with other elements such as <b>Cost Plan and Project Strategies</b> .  Follow all other RIBA Stage 3 Core Tasks guidelines in relation to the <b>Smart Digital Building</b> content (e.g. <b>Design Studies, Engineering Analysis, Cost Exercises</b> to test the <b>Architectural Concept</b> ).	Develop the <b>Smart Digital Building</b> elements of the architectural and engineering technical design, ensuring coherence and synergy with other elements such as <b>Smart Digital Building Systems</b> information.  Ensure inclusion of digital capabilities, building operation & coherence of content across all <b>Building Systems</b> information systems, <b>Building Information Management (BIM)</b> systems and <b>Digital Twins</b> .			
	Additional & specialised Tasks and Information Exchanges to address design & use focus items for Smart Digital Buildings	Consider how <b>Smart Digital Building</b> impacts on the <b>Business Case</b> and <b>Client Requirements</b> including how smart technology might influence <b>Smart Digital Building Objectives</b> : <ul style="list-style-type: none"><li>Operational running costs, incl. energy &amp; utilities</li><li>Space Utilisation, especially multi-purpose/user</li><li>User behaviour, incl. football, flow &amp; dwell</li><li>Monetisation and revenue generation</li><li>Physical design and user interaction with it</li><li>The blend of active and passive building elements in achieving project objectives.</li></ul> Consider how <b>Smart Digital Buildings</b> might impact the set up of the project team, Core standard PoW Tasks & Information Exchanges.  Consider which <b>Smart Digital Buildings Digital Infrastructure</b> design decisions need to be made at each Stage to accommodate design options at later stages and to ensure minimal disruption in the event of change.	Initiate <b>Smart Digital Building</b> design thinking, including iterative design processes to manage opportunities & tradeoffs between built, digital, social and operational environment objectives.  Consider how to incorporate the Smart Digital Building <b>Digital Infrastructure Capability</b> Categories into the <b>Project Brief</b> and <b>Project Programme</b> .  Consider <b>Smart Digital Building</b> solutions when undertaking <b>Feasibility Studies</b> considering best practice <b>Smart Digital Building</b> exemplars.  Consider how <b>Digital Infrastructure Capability</b> Categories impact the set up of the project team including the Responsibility Matrix, professional services contracts and intellectual property issues.  Ensure the <b>Project Brief</b> includes guidance on the key parameters guiding hybrid build design (e.g. User behaviour & experience Strategy, building operations, converged infrastructure).	Embed appropriate <b>Digital Infrastructure Capability</b> Categories into the <b>Architectural Concept</b> , developing relevant detail, prioritizing for investment and defining the extent to which <b>Smart Digital Building Objectives</b> depend on them.  Identify and include <b>Smart Digital Building</b> solutions in the <b>Concept Design</b> to deliver <b>Smart Digital Building Objectives</b> in relation to <b>Client Requirements and Business Case</b> .  Identify <b>Agent Scenarios, Use-cases and User Journeys</b> (incl. human and technological). Develop guidelines against each to direct elaboration in the <b>Spatial Coordination</b> Stage, the blend of digital/physical capabilities and structures intended.  Identify and describe high priority <b>Digital Infrastructure Performance Requirements</b> including capacity, ease of access, availability and responsiveness in relation to human and technological Agents.	Distribute <b>Agent Scenarios, Use-cases and User Journeys</b> over time and space, integrating them into the updated <b>Outline Specification</b> and <b>Architectural Concept</b> . Use this distribution to map <b>Digital Infrastructure Performance Requirements</b> across time and space.  Develop clear statements of intent in relation to <b>Common &amp; Shared Digital Infrastructure Capabilities</b> to ensure <b>Technical Design</b> coherence and minimise unnecessary duplication across Information Technology and Operational Technology domains.  Define <b>Interoperability Standards</b> for components of the built, technological, digital and human environments to direct the <b>Technical Design</b> stage and ensure decoupling of domains.  Further refine <b>Digital Infrastructure Capability Categories</b> and adjust to ensure coherence, including: human-spatial engagement, human-human interaction, access & connectivity, security, service integration & management.	Establish <b>digital technology governance</b> inclusive of the relationships between Smart building technology, the built environment, human user experience, building management & operations technology.  Consider & direct how <b>Smart Digital Building</b> capabilities impact on building systems including 'plug and play' connectors and interfaces.  Develop the <b>Smart Digital Building Component Architecture</b> considering component granularity, interfaces and specifications. Define the optimum mix of industry standard and de-facto/proprietary standard interfaces.  Derive requirements for implied capabilities such as: Local & Wide Area Networks, Security & Systems Management and select key generic technologies, standards and services.  Ensure all specifications developed in this phase are agnostic of specific vendors and service-providers.			
Service & Technology Acquisition	Smart Digital Building elements of standard Stages Tasks and Information Exchanges	Develop the <b>Smart Building Service &amp; Technology Acquisition Strategy</b> and include in <b>Client Requirements</b> to ensure that the built and digital environments are considered as a systemic whole.  Define the <b>guiding principles</b> for composite built & digital environment acquisition and operational management.  Ensure that <b>acquisition &amp; procurement processes</b> facilitate iterative exploration, options development, value engineering and tradeoff management between built and digital environments.	Define and include in the <b>Project Brief</b> , the key parameters and intentions guiding the <b>Concept Design</b> Stage that constrain the options for consideration in relation to: <ul style="list-style-type: none"><li>Composite/ combined hybrid (i.e. built-digital) building service management &amp; delivery</li><li>Capability areas where options for outsourced and managed services should be actively explored</li><li>Capability areas where the Client intends to retain hybrid building technology selection decisions</li><li>Capability areas where the Client intends to retain or acquire and internal Service Management &amp; Integration capability for the hybrid building.</li><li>Mapping of key hybrid building service &amp; technology acquisition &amp; management decisions to PoW Stages.</li></ul> Identify and propose the preferred reference standard for service & technology acquisition & management processes (e.g. ITIL-RIBA PoW Hybrid).  Develop initial version of the ITIL <b>Service Strategy</b> or equivalent.	Develop the coarse-grained <b>Target Operating Model (TOM)</b> for Hybrid Building Service Integration and Management and include in the <b>Architectural Concept</b> .  Use the <b>TOM</b> to demarcate the areas of technology or service management capability to be: <ul style="list-style-type: none"><li>Owned &amp; operated internally by the Client</li><li>Owned &amp; operated by third parties</li><li>Owned by the client &amp; operated by third parties</li><li>Owned &amp; operated by Client or third parties where the decision is dependent on Stages 3, 4 and 5.</li></ul> Explore market for technology vendors, systems integration & service integration 3rd parties and establish feasibility of acquisition. Consider converged approach for all elements (i.e. built and digital) of the hybrid building.  Undertake Research and Development with manufacturers to determine supply chain capability prior to design commencing.	Confirm market for technology vendors, systems integration & service integration 3rd parties and shortlist based on capability, track record and ROM cost/ risk/ timescales estimation.  Ensure shortlisted organisations are committed to the content of the <b>Smart Digital Building</b> elements of the <b>Outline Specification</b> and <b>Architectural Concept</b> , clearly indicating where they are unable to or have a viable alternative approach.  Ensure that the <b>Service Design</b> optimally partitions components of the <b>Target Operating Model</b> and that they are coherent & likely to operate as a unified whole across the hybrid building domains and other organisational capabilities (e.g. IT, Customer Service).	Develop final version of the ITIL <b>Service Design</b> or equivalent based on refined <b>Architectural Concept Outline Specification</b> and feedback from the marketplace.  Develop initial version of the ITIL <b>Service Transition</b> or equivalent.  Iteratively develop the <b>Technical Design</b> based on opportunities and constraints discovered with bidding 3 <sup>rd</sup> parties during the value engineering process.  Downselect technology vendors and service providers to be the preferred bidders in each capability domain.  Ensure that the party with overall responsibility for coherent design, build, transition and service delivery is clearly identified and capable. Note that this may be a 3 <sup>rd</sup> party or the Client, depending on the <b>Target Operating Model</b> .			
	Additional & specialised Tasks and Information Exchanges to address design & use focus items for Smart Digital Buildings								

Stages 5, 6 and 7 are not significantly sensitive to the **Smart Digital Building** domain. Buildings and Campuses are inherently complex capabilities with industry standard frameworks and methods that address the complexity of many diverse interrelated components and parties.

Each organisation and project is likely to already be capable in all aspects of Stages 5, 6 and 7, with preferred frameworks that have already been subject to significant capability investment, especially by 3<sup>rd</sup> parties, so the framework will come as part of the commercial package subject to proposal. For this reason, only the Client can own the inter-framework integration model which will be essential for maintaining coherence between the digital and built environments.

The choice of frameworks (there will be several) should be made during Stage 3 to stabilise the concepts, language and re-usable body of knowledge used in subsequent Stages.

The **Smart Digital Building** places particular demands on the frameworks to effectively deal with multiple digital domains (e.g. Applications, Data, Infrastructure) and their relationship with non-Digital domains (e.g. built environment).

Clients, or consultants in their employ, will need to select the relevant Industry Standard frameworks for Digitally-intensive Systems and Complex Multi-domain Systems Development. The frameworks need to cover life-cycle and governance processes. Prime candidates for consideration will be:

- ITIL [[www.itil.org.uk](http://www.itil.org.uk)] focused on Service design & delivery (not specifically digital)
- INCOSE [[www.incose.org](http://www.incose.org)] focused on complex multi-domain systems engineering
- TOGAF [[www.opengroup.org/togaf](http://www.opengroup.org/togaf)] focused on structural aspects of digital capability
- COBIT [[www.isaca.org/resources/cobit](http://www.isaca.org/resources/cobit)] objectives-driven governance framework

While these frameworks typically have formal alignment defined with each-other, as yet, no digitally-oriented framework has formal links with the RIBA Plan of Work or other non-Digital frameworks (e.g. built environment, Electrical & Mechanical). Until these emerge, Clients will need to define their own integration approach with the RIBA Plan of Work as their common reference point.