UPSKILLING BRIEFING PAPER

UKBIM
ALLIANCE
Enabling Digital Transformation

Written by:
Martin Simpson & Debbie Carlton

BACKGROUND

The UK Government BIM Mandate[1] came into effect in 2016. This mandate applied to all centrally procured Government projects. However, to have meaningful impact on the productivity of the UK Construction Industry it was accepted that it was necessary to extend the adoption of BIM Level 2 beyond "Government centrally procured" projects to the whole of the industry. The UK BIM Alliance was created as an industry response to support this wider adoption of the principles of the Government Construction Strategy and the BS/PAS 1192 suite.

The UK BIM Alliance is an umbrella organisation positioned to engage and interact with the supply and demand chain across industry silos. The Alliance's outreach into industry is predominantly facilitated by the BIM Regions, BIM4s and other specialist interest groups, collectively known as Communities.

It works closely with other organisations with allied mission statements such as **Centre for Digital Built Britain** and in January 2018 incorporated the UK & Ireland chapter of buildingSMART International into its organisation.

The Digital Transformation of the Built Environment is a significant undertaking. The UK BIM Alliance was created with the goal to champion and enable the implementation of BIM across the industry to become business as usual. Within the Alliance, the "Upskilling" stream was tasked with determining how to best support professionals of the built environment to learn, develop and enhance the skills, knowledge and competence they need to implement BIM Level 2.

---

[1] The Government 2011 Construction Strategy (GCS) requires that: Government will require fully collaborative 3D Building Information Modelling (BIM) as a minimum by 2016. This was later evolved to "Government will require BIM Level 2 on all centrally procured projects" with BIM Level 2 defined by the BS/PAS 1192 suite.

STATE OF PLAY

 A number of key reports have been published over the past 2 years which influence on the overall direction of the Digital Transformation Agenda including:

- The <u>UK Government Industry Strategy</u>, including the <u>Construction Sector Deal</u>
- The <u>Review of the Industry Training Boards</u>
- <u>Data for the Public Good</u>
- <u>Transforming Infrastructure Performance</u>
- <u>CIC Response to Building a Safer Future</u>
- <u>Going Digital</u>
- <u>A Fresh Way Forward for Product Data – State of the Nation</u>
- <u>The Winfield Rock Report</u>
- <u>Modernise or Die</u>

A common theme within these reports is the flow of correct information at the appropriate time on which to make decisions across the whole life-cycle of the project and assets. To do this we need to evolve:

- digital information exchanges, in place of tradition document-centric methods, to improve speed, accuracy and auditability (whilst not sacrificing security or privacy)
- data-centric processes (including procurement, contractual and financial) to support the digital information exchanges
- a digitally competent and agile workforce to support emerging technology and processes.

The key theme of competence was recognised at the inception of the UK BIM Alliance Upskilling Stream. Within the wider industry the significance of "competence" is often miss-understood. The construction industry and wider built environment attitude to competency management and competency assurance (which concerns managing the risks of people carrying out tasks and activities without the appropriate competence) is patchy at best. The collapse of Carillion and the Grenfell Fire are significant failures of the industry where a poor attitude to competence played a significant part. "Competence", "Competent" and "Competency" are collectively mentioned 236 times in "<u>Building a Safer Future</u>".

The CIC response to Building a Safer Future states that systemic change is required to enable demonstrable competence of individuals in the 'roles' they are undertaking. The use of "role" is open to misinterpretation. Competence is associated with activities that people carry out as part of their work. The "Role" that someone undertakes on a project or within a company is an aggregation or the activities they undertake. "Roles" used correctly are often unique to that individual and/or project. In reviewing many documents and competency frameworks the UK BIM Alliance Upskilling team has witnessed "Role" being used as a proxy for discipline (architect, structural engineering, project manager), job title (BIM/Information manager, BIM author) etc... This approach is fundamentally flawed as it is disconnected from "**why**" a person is carrying out an activity; i.e. it misses the context for the activity and corresponding duties. As a result, it leads to a competency profile that is either too generic (so as not to actually assure the competence of the person against the tasks they need to carry out as part of their work) or too constraining (so that it is impossible for any individual to actually demonstrate competence across all the possible activities that a "discipline" may be engaged in across the whole industry). Using "role" as a proxy for "discipline" also limits the exportability of any frameworks, tools and services developed to meet this challenge. This is simply because the "activities" within the Built Environment project lifecycle are often universal, but often carried out by different "disciplines" or "professions" or "job titles" in different countries.

THE WAY FORWARD

To have the impact required to facilitate systemic change within the industry we need to:

- start at the tasks and activities that are involved across Built Environment asset lifecycles
- articulate the demonstrable competence required by an individual to engage in this task or activity.

If successful projects are characterised by the Right People, making the Right Decision at the Right Time with the Right Information, then **Competence** (ensuring the Right People ask the Right Questions and know what to do with the answers) and *Information Flow* (answering those questions with the Right Information at the Right Time) are inextricably linked. The concept of "Information Flow" also takes prominence in the "Building a Safe Future" report and is referred to as the "Golden Thread of Information". It is important that we keep in mind that "Information" is not to be confused with "Documentation". There is a tendency to adopt emerging digital technology to replicate pre-existing document-centric deliverables. This will inevitably lock the industry into the existing deliverables, workflows, procurement strategies and contractual arrangements.

THE DEVIL IS IN THE DETAIL

Competence is not just about knowledge and skills. It is the application of a combination of experience, knowledge, skills, abilities, behaviours and attitude at work.   The philosophy of purpose driven information transactions and collaborative practises that inspired the 2011 Government Construction Strategy and later the BS/PAS 1192 suite is fundamentally about collaboration and sharing. It follows that behaviour and attitude is key to successfully implementation, regardless of how technologies and workflows continue to evolve and whether we call this "BIM" or "Digital".

"Work", which would include any Built Environment project, can be described as a collection of activities. The activity, the 'golden thread' of information required to carry out that activity and the competency of the person or team to carry out that activity are all intrinsically linked. The core of competence is Activity at Work[2]. It is how to do what, when, where, with what, by whom and most importantly why. Key components that need addressing are:

- Competency Definition
- Competency Development
- Competency Management
- Competency Assurance

THE IMPLICATIONS ON TRAINING & UPSKILLING

The lack of a recognised framework and approach to competency and collaborative competency management across the industry has resulted in a disjointed, fragmented and poorly implemented competence assurance system. In turn this has led to a disjointed and uncoordinated approach to training and upskilling. This concurs with pathfinding work that the UK BIM Alliance Upskilling team carried out in 2017 to look at the BIM Training Landscape in the UK (including Postgraduate Level, CPD with a proxy "BIM" qualification – "Certified BIM Professional" etc., Paid for BIM CPD without "BIM" qualification, Software specific BIM related CPD, Free CPD in person & on-line, BIM Conferences and Employer Specific BIM Training). A fair description of current BIM training provision would be that it is variable.

---

[2] Dr Gang Zhao, 'Competence with Activity Semantics' 2017

NEXT STEPS

CITB have been working closely with the UK BIM Alliance Upskilling stream. They have requested an evidence base to support their proposed commissioned funding stream around the "development of an extensible competency framework", which is to be launched in Q1 2019..

Competence Frameworks aid the communication and application of competences demanded at work and provides a solid foundation upon which professional development (training, learning & CPD), certification, workforce planning, performance assessment etc. can be built. The development of a robust competency framework, underpinned by proven methodologies, to support the systemic change required in the built environment as articulated in "Building a Safer Future", the "Construction Sector Deal" and the "CIC response to Building a Safer Future" is a significant undertaking. No other industry or sector has the inertia of the Built Environment ("we've been doing it this way for hundreds of years"), nor the large numbers of SME (Small Medium Enterprises) and micro-SME practitioners we need to reach for this to be effective throughout the supply chain. "Transforming Infrastructure Performance" has this figure at 3.1million, but the actual figure could be much higher.

UK BIM ALLIANCE WHITE PAPER

UK BIM Alliance Upskilling has written a White Paper to provide a framework to start to address the following proposition:

The productivity of the nation, relating to the Built Environment, will not be positively affected unless it facilitates the evolution of a highly agile and digitally competent workforce capable of supporting the emerging digitally enabled processes, purpose driven information flow and the collaborative behaviours that underpin them.

This paper aligns to simultaneous work carried out by Scottish Future Trust and the Institution of Civil Engineers which will provide an appropriate evidence base for CITB. But also asks a much deeper question about how we will be able to measure the impact of this work on productivity, which feeds into a parallel project with Office for National Statistics. I

The UK BIM Alliance Upskilling White Paper will be released within the in Q1 2019 and will be found on the Alliance website

Appendix A: Suggested requirements of Competency Framework

Any competency framework developed to tackle the systemic issues as highlighted in "Building a Safer Future" must be (and not restricted to):

- **Outcomes** – the competency framework must have the ability to deliver a breadth of outcomes relating not only to education and training but also to issues such as professional development, CPD, certification, talent management, appraisal and organisational development.

- **Activity based**. Template roles could be "pre-packaged" from activities to aid implementation, however, the fundamental building block must be activity. A requirement of any pathfinder project should be to demonstrate through a proof of concept how activities can be aggregated into roles, jobs, functions, professions etc. and their inter-relationships

- **Extensible**. The scale of the challenge is such that it would be impossible to complete it for all activities across the whole project lifecycle for the all Built Environment assets. Therefore the extensibility of the framework is a key requirement. A requirement for any pathfinder project should be to demonstrate through a proof of concept how the framework can be extensible and suggest a business model which could fund future extensibility beyond the initial funding cycle.

- **Adaptable**. The industry is changing faster than at any other time in history with new technology, processes, professions and therefore competences to deal with these. Any framework therefore needs to be fit-for-purpose as the industry is today but support a continued evolution of the framework for yet-as-unknown activities in the future. A requirement for any pathfinder project should be to demonstrate through a proof of concept how the framework can be adaptable.

- **Traceable** – traceability from source to interpretation to analysis to results is vital as the framework is updated, extended or customised

- **Open**. The fundamental competency framework needs to be open (though there may be a licence charge to help fund extensibility) and support collaborative competency management[3]. Services that utilise the framework may be targeted at specific sectors and may be proprietary. They may provide services relating to education, skills development, competence management, competence development or competence assurance. However, there must be no lock-in of the framework to one service provider over another. A requirement for any pathfinder project should be to demonstrate through proof of concept how services can utilise the underlying competence framework.

- **Scalable** – scalability is important both in terms of supporting the potential scope of analysis and application but also in terms of recognising competency management infrastructure is required to support the whole life cycle of the competence framework. A requirement for any pathfinder project should be to demonstrate how any small-scale proof of concept can be scaled (as well as extended) to meet the requirements of the 3+ million stakeholders it will need to serve.

Notes:

- *a competence framework is a semi-structured representation of competences. They typically have a restricted linguistic style with controlled syntax and vocabulary and are often structured along given conceptual dimensions (like NOS).*
-

---

[3] Institution of Civil Engineers has carried out some pathfinder work on collaborative competency management

UKBIM ALLIANCE

buildingSMART
United Kingdom and Ireland

UKBIM ALLIANCE
Enabling Digital Transformation