

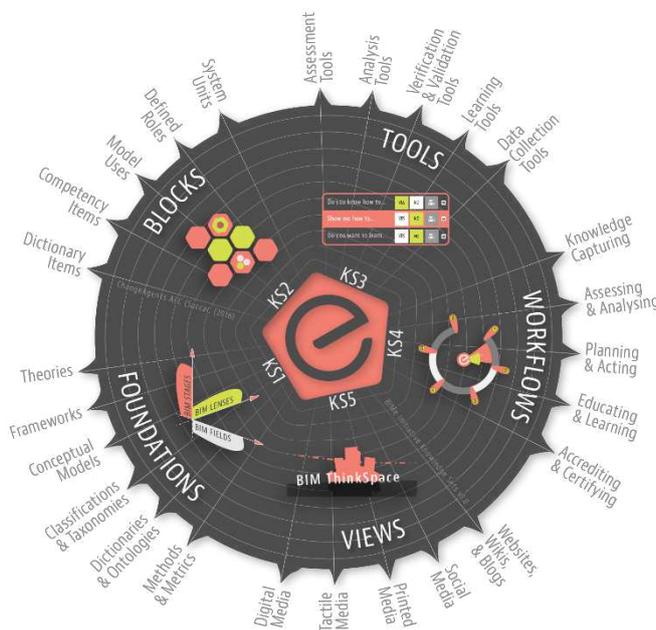
I. Introduction

BIM Excellence (BIMe) is a unique *research-based* approach to digital innovation in the construction industry. It provides an integrated methodology and a modular language for performance assessment, learning and process optimisation. The **BIMe Initiative** is *not-for-profit effort* guided by a set of **Principles**¹ undertaken by volunteer researchers from both industry and academia. The BIMe Initiative is supported by in-kind contributions, commercial services, and institutional/corporate [sponsorship](#).

*This document must be read in conjunction with **101in BIMe Initiative Explainer**, **103in BIMe Initiative Projects**, and **104in BIMe Initiative Network** (refer to list of [publications](#)). The BIM Excellence approach and the BIMe Initiative are based on the published research of [Dr. Bilal Succar](#) and a growing cohort of esteemed international collaborators.*

II. The Knowledge Structure

The BIMe Initiative relies on interconnected research efforts to deliver interconnected *software applications*, *guides*, *conceptual structures* and *learning materials*. These deliverables are dependent on an underlying **Knowledge Structure** composed of five complementary [Knowledge Sets](#):



KS1 Knowledge Foundations represents all the research supporting the BIMe Initiative;

KS2 Knowledge Blocks represents the modular language developed/used by the BIMe Initiative to define inputs, processes and outputs;

KS3 Knowledge Tools represents all the digital and analogue tools/templates used to conduct knowledge acquisition, engineering and sharing;

KS4 Knowledge Workflows represents all repeatable procedures for knowledge acquisition and service delivery; and

KS5 Knowledge Views identifies the varied ways the BIMe Initiative activities and deliverables can be represented and communicated.

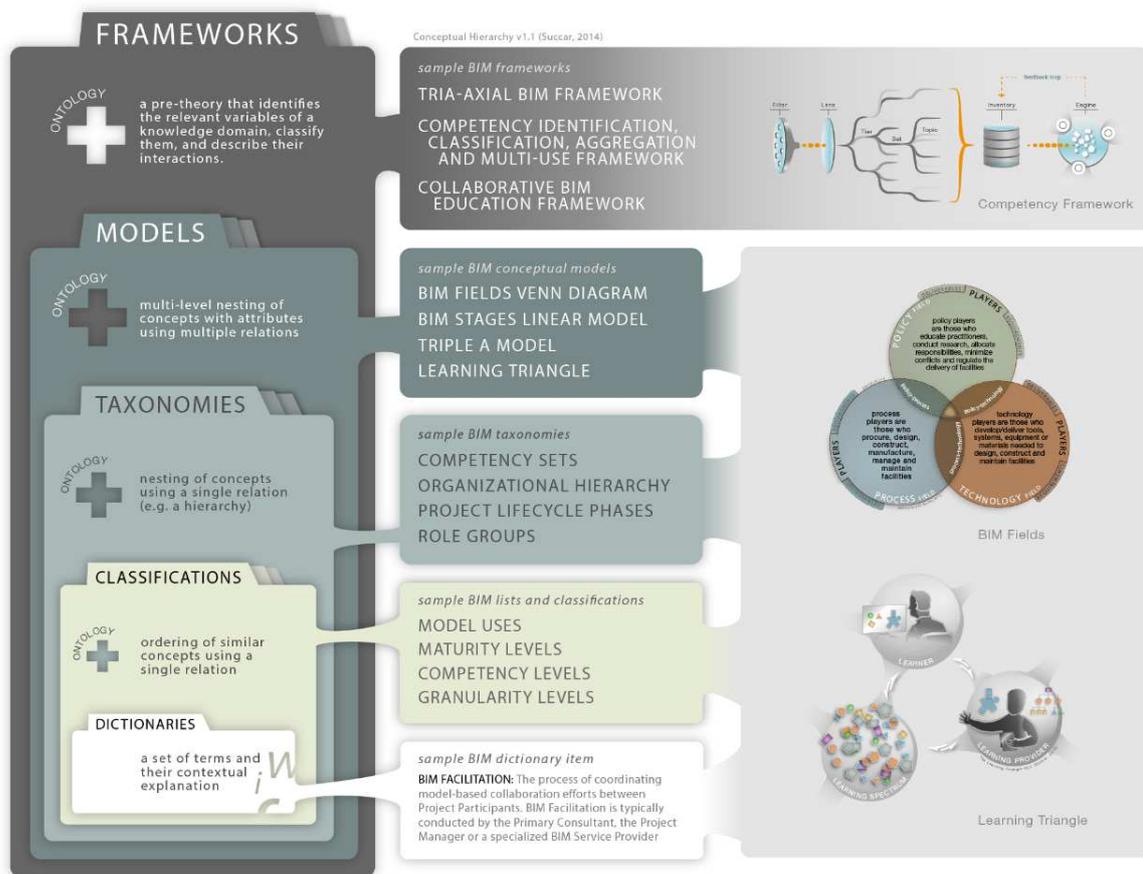
The Knowledge Sets and their subsets ([full size image](#)) form the bases for all *BIMe Initiative Projects*; organise the activities of the *BIMe Initiative Network* (refer to **104in**); and allow the development of expansive **Knowledge Object Library** and **Product Library** (refer to **103in**). The five sets are further explained below:

¹ BIMe Initiative Principles (BIMe Principles, or Principles for short) includes both [General Principles](#) and the [Excellence Manifesto](#).

KS1 Knowledge Foundations

The BIMe Initiative is based on rigorous and continuously expanding peer-reviewed research which provides the [Knowledge Foundation](#) upon which all activities and projects are conducted.

These Knowledge Foundations include an expanding set of **conceptual structures** - frameworks, models, taxonomies, classifications and dictionaries - which enable the generation of a wide range of tools, templates and other practical deliverables.



The **Conceptual Hierarchy Model** ([full size image](#)) clarifies how conceptual constructs are connected through the [BIM Ontology](#). These constructs have two main functions - they enable the generation of:

- Multiple Knowledge Tools (refer to KS3 below and the [Research Continuum](#) model); and
- New Conceptual Constructs (refer to the [Conceptual Reactor](#) model).

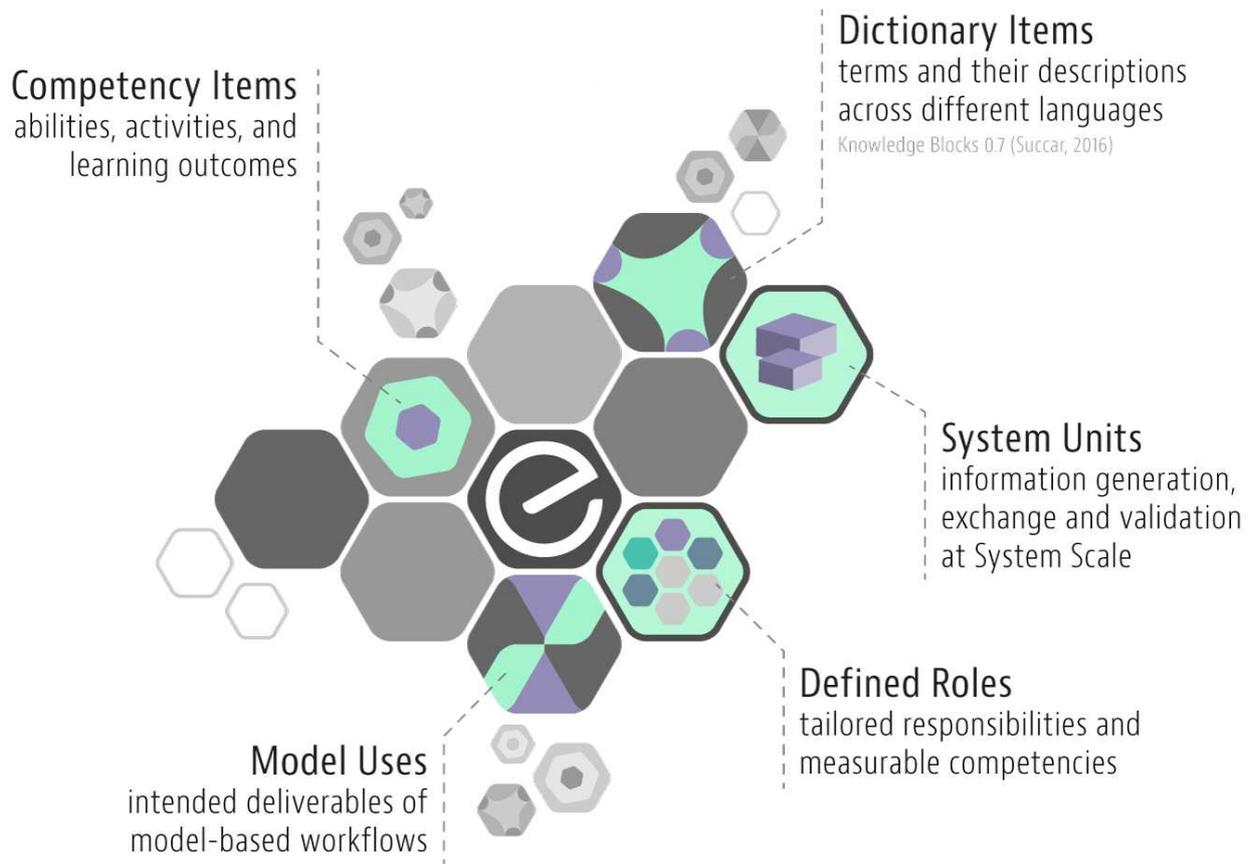
KS1 Keywords: BIM Framework; Conceptual Constructs; Conceptual Meshing; Evidence-based Research; Metrics; Indices; Data Collection; Validation.

KS2 Knowledge Blocks

Knowledge Blocks are self-contained and measurable units of structured information which can be easily understood and used by both practitioners and researchers, and flexibly combined into larger units.

There are several types of Knowledge Blocks (e.g. Dictionary Items, Competency Items, System Units and Model Uses). When used in combination, knowledge blocks form a *modular language* to facilitate communication between industry stakeholders, and between people and systems – referred to as Human-computer Interaction (HCI). When used to populate Knowledge Tools (KS3) and Knowledge Workflows (KS4), Knowledge Blocks help *reduce process complexity* and *facilitate process automation*.

Knowledge *blocks* can be collated into larger blocks units. For example, multiple *Dictionary Items* can be part of a single *Competency Item*, and multiple *Competency Items* can be part of a single Defined Role.



KS2 Keywords: Information Uses; Many-to-Many Relations; Modular Language; Inventories.

KS3 Knowledge Tools

Knowledge Tools are the practical deliverables of BIMe Initiative, the instruments used to assess performance, deliver learning materials and organise the management of information across a project's or facility's whole life cycle.

Knowledge Tools are dependent on the Knowledge Foundations (KS1) and Knowledge Blocks (KS2) to deliver three types of **Information Management Modules** of direct benefit to practitioners, researchers, students, teachers and policy makers - these are:

- **Assessment Modules** (e.g. a questionnaire or capability-assessment form);
- **Learning Modules** (e.g. a printed handout, a tutorial video or a full course); and
- **Implementation Modules** (e.g. a task list, checklist or workflow).

These modules can be used on their own (e.g. [BIM Maturity Matrix](#)), combined with other modules into a guide (e.g. a [BIM Management Plan](#)), or made available through a digital platform (e.g. [BIMexcellence.com](#)). Below is the Assessment Module to be used within the *International Competency Benchmarking Project* (refer to **103in**):

The screenshot shows a digital assessment interface. On the left, a circular progress indicator shows 'Assessment Progress' at 6% and 'IMPLEMENTATION' at 28%. The main heading is 'Individual Discovery > Implementation' with links for 'Campaign' and 'Dashboard'. Below the heading is a progress scale from 0 (None) to 4 (Expert). The current section is 'Implementation Fundamentals', with a question: 'Do you have the ability to: Implement BIM Software Tools, their processes and protocols at your organization'. A tooltip for 'Modelling Standard' is visible, defining it as 'The agreed norms of delivering a BIModel according to defined Levels of Development, Classification Systems, Naming Protocols or similar'. Below the question are five colored boxes representing different levels of proficiency. An 'Actions' menu is open over the boxes, offering options: 'Not applicable', 'Add Note', 'Learn Later', and 'Send Feedback'. At the bottom, there is a 'BIMexcellence.com' logo and a settings gear icon.

KS3 Keywords: Modules, Tools and Platforms; Assessment and Reporting; Self-learning; Templates; Decision Support Systems; Workflow Engine; User Interface (UI); User Experience (UX); Usability.

KS4 Knowledge Workflows

Knowledge Workflows are the techniques and methods used within the BIMe Initiative to capture knowledge, conduct assessment activities and deliver information-rich projects. Two sample [Knowledge Workflows](#) are briefly explained below:

Performance Improvement Lifecycle

This Knowledge Workflow – *Performance Improvement Lifecycle* - clarifies the six repetitive activities that need to be conducted in order to continuously improve the performance of a target population:

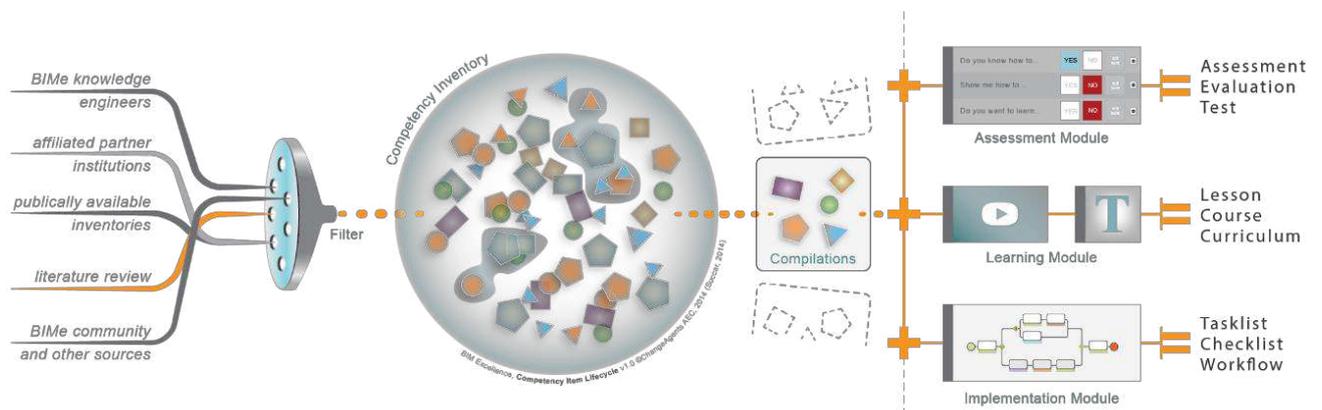


The first activity **[1] SCOPING** is performed to identify the *target population* and select the *assessment parameters* to be used; **[2] ASSESSMENT** activities are then conducted through specialised online or offline tools. This is followed by **[3] ANALYSIS** activities of data collected and the generation of reports identifying performance benchmarks and gaps. These gaps can then be used by policy makers for **[4] PLANNING** a series of performance improvement activities and then **[5] ACTING** upon these plans (e.g. delivering training, implementing an incentives policy, or investing in procuring/upgrading information technology). Finally, through partial or full re-assessment, performance improvement can be established by **[6] MEASURING** and comparing updated results against the benchmarks established in analysis reports.

These six activities form a single **Performance Improvement Cycle** which may be repeated over time.

Inventory Development Workflows

This Knowledge Workflow – *Competency Item Lifecycle* - clarifies how Competency Items are collected, filtered and then collated into three interconnected **Information Management Modules**:



KS4 Keywords: Methodologies; Methods; Techniques; Workflows; Processes; Procedures; Steps.

KS5 Knowledge Views

Knowledge Views refer to the varied ways the BIMe Initiative can be represented and communicated with industry stakeholders. This communication takes many forms including: publication of **blog posts** and peer-



reviewed **articles**; conducting online and offline **presentations**; and the development of **Knowledge-Sharing Outlets**. Sample [Knowledge Views](#) include the [BIM ThinkSpace blog](#), the [BIM Framework blog](#) and the BIM Framework's [YouTube Channel](#).

KS5 Keywords: Representation; Communication; Publication; Shared Information; Shared Knowledge.

III. Using the Knowledge Structure

In summary, Knowledge Sets are interdependent with each **End Product** (refer to **103in**) requiring components derived from all five sets. The following example illustrates this interdependence:

A competency *assessment module* (**Tool**) is populated with *competency items* (**Blocks**) that are measured using *assessment metrics* (**Foundations**) and *assessment routines* (**Workflows**) to generate *assessment reports* (**Views**).

Although the five Knowledge Sets are interdependent, identifying each set separately is intended to:

- Organise all research conducted to date under practical headings;
- Assist **BIMe Members** and **BIMe Volunteers** to understand components and their connections;
- Attract domain specialists interested in a specific Knowledge Set; and
- Allow each Knowledge Set to be extended at its own pace.

IV. More Info

To join the BIMe Initiative, please complete the online [Membership Application Form](#). Alternatively, to stay informed of the Initiative's main activities, new tools and publications, please subscribe to the [Mailing List](#) and/or follow [@BIMeInitiative](#) on Twitter. To request more information, suggest an improvement or simply get in touch, please [Contact Us](#); thank you.

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VI. Change Log

| VERSION | DATE | DESCRIPTION |
|---------|----------------|--|
| 0.1 | Jul 29, 2016 | Initial draft - 1 st Cycle Limited Peer Review |
| 0.2-0.3 | Aug 9-22, 2016 | Minor changes; 2 nd Cycle Peer Review |
| 0.4 | Jan 10, 2017 | Renamed document + aligned with other 100 Series documents |
| 1.0 | Jan 21, 2017 | First Official Version for release through BIMexcellence.org |