BIMe INITIATIVE

## assess learn implement

301in BIM Maturity Matrix   v1.22

BIM Excellence is a *research-based approach* for assessing and improving the performance of individuals, organizations and project teams. The **BIMe Initiative** organises all research activities into **Knowledge Sets** which are developed through an international **Research Network**.

The BIMe Initiative is not-for-profit effort supported by BIMe Corporate Services, research grants, in-kind contributions, and institutional/corporate sponsorship. For more information about commercial offerings or to become an active sponsor, please contact us . BIM Excellence is based on the published research of Dr. Bilal Succar and a growing cohort of prestigious international collaborators.
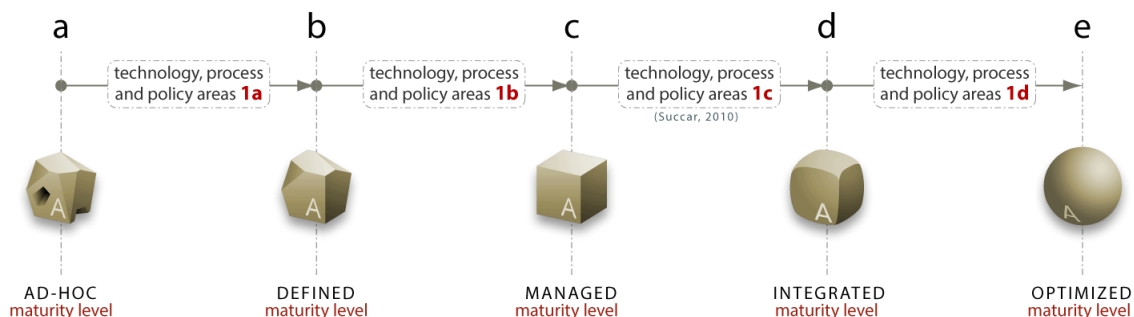
I.   The BIM Maturity Matrix

The BIM Maturity Matrix (BIm³) is a Knowledge Tool for identifying the current BIM Maturity of organisation or Project Team. The BIm³ has two axes - BIM Capability Sets and the BIM Maturity Index. To benefit from BIm³, it is important to first review the concepts of BIM Capability and BIM Maturity:

BIM Capability refers to the *minimum abilities* of an organization or team to deliver measurable outcomes. BIM Capability is measured through BIM Stages separated by BIM Steps (see image below). The BIM Stages model is further explained in Post 3 on the BIM Framework Blog:
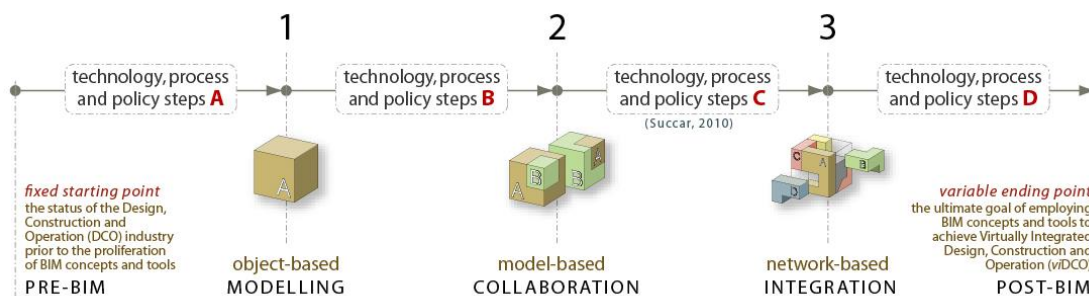
BIM Maturity refers to the gradual and continual improvement in quality, repeatability and predictability within available BIM Capability. BIM Maturity is measured through the BIM Maturity Index which has five levels (see image below). The BIM Maturity Index is further explained in Post 10 on the BIM Framework Blog.

For a detailed comparison of BIM Capability and BIM Maturity, please refer to BIM ThinkSpace Episode 11 and the **Point of Adoption** video on the BIM Framework Channel.

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II.   Background Research

This BIM Maturity Matrix is based on peer-reviewed research. For more information, please refer to;

Succar, B. (2009). Building information modelling framework: a research and delivery foundation for industry stakeholders. Automation in Construction, 18(3), 357-375. http://bit.ly/BIMPaperA2

Succar, B. (2010). **Building Information Modelling maturity matrix**. In J. Underwood & U. Isikdag (Eds.), Handbook of research on Building Information Modelling and construction informatics: concepts and technologies (pp. 65-103): Information Science Reference, IGI Publishing. http://bit.ly/BIMPaperA3

Succar, B., Sher, W., & Williams, A. (2012). Measuring BIM performance: five metrics. Architectural Engineering and Design Management, 8(2), 120-142. http://bit.ly/BIMPaperA5

III.   How to use this document

The BIM Maturity Matrix is intended for **low-detail organisational self-assessment** (Organisational Discovery, Granularity Level 1). For best results, please follow the below recommended steps:

Preparation

→   Identify the best person to lead the assessment effort – someone with significant experience in BIM tools, workflows and protocols and sufficient insight into the organisation' systems and culture.
→   Conduct this assessment as a group activity – for example: a workshop with 3-8 individuals representing different roles, disciplines and seniority levels.
→   Set aside 60-90 minutes to complete the self-assessment exercise and its follow-up discussions.

Assessment

→   For each Capability Set (e.g. Software), read the full row within the Matrix before selecting the cell that best describes the organisation's current BIM maturity level.
→   Either use the recommended scores (10-40) or - for more granular assessment - use colours to highlight what has been achieved to date. For example, use *Colour A* if the maturity described within the cell has not been achieved at the time of assessment; *Colour B* if maturity has been *partially* achieved; and *Colour C* if the described maturity has been *fully* achieved.
→   Maturity is progressive – no score or colour should be applied to a cell if the cell preceding it (to its left) has partial or no maturity.
→   Avoid calculating total scores (per column or per row) as these totals are misleading.

Analysis

→   Discuss the results to identify the best steps to improve the organisation's performance. When discussing improvement, aim for overall enhancements rather than excellence in a single area.
→   Repeat the self-assessment every 6-12 months to establish whether improvements have been achieved or a different approach is required.

Disclaimer: based on 5 years of testing and refinement, the above process will yield accurate and repeatable results. However, ChangeAgents cannot be held responsible for how scores are attributed and results interpreted. If you require professional assistance, please contact us for a complementary advice.

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Key Maturity Areas at Granularity level 1	a INITIAL (score 0)	b DEFINED (max score 10)	c MANAGED (max score 20)	d INTEGRATED (max score 30)	e OPTIMIZED (max score 40)
Software: applications, deliverables and data	Usage of software applications is unmonitored and unregulated. 3D Models are relied on to mainly generate accurate 2D representations/deliverables. Data usage, storage and exchanges are not defined within organisations or project teams. Exchanges suffer from a severe lack of interoperability.	Software usage/introduction is unified within an organisation or project teams (multiple organisations). 3D Models are relied upon to generate 2D as well as 3D deliverables. Data usage, storage and exchange are well defined within organisations and project teams. Interoperable data exchanges are defined and prioritised.	Software selection and usage is controlled and managed according to defined deliverables. Models are the basis for 3D views, 2D representations, quantification, specification and analytical studies. Data usage, storage and exchanges are monitored and controlled. Data flow is documented and well-managed. Interoperable data exchanges are mandated and closely monitored.	Software selection and deployment follows strategic objectives, not just operational requirements. Modelling deliverables are well synchronised across projects and tightly integrated with business processes. Interoperable data usage, storage and exchange are regulated and performed as part of an overall organisational or project-team strategy.	Selection/use of software tools is continuously revisited to enhance productivity and align with strategic objectives. Modelling deliverables are cyclically being revised/ optimised to benefit from new software functionalities and available extensions. All matters related to interoperable data usage storage and exchange are documented, controlled, reflected upon and proactively enhanced.
	score	score	score	score	score
Hardware: equipment, deliverables and location/mobility	BIM equipment is inadequate; specifications are too low or inconsistent across the organisation. Equipment replacement or upgrades are treated as cost items and performed only when unavoidable.	Equipment specifications – suitable for the delivery of BIM products and services - are defined, budgeted-for and standardised across the organisation. Hardware replacements and upgrades are well-defined cost items.	A strategy is in place to transparently document, manage and maintain BIM equipment. Investment in hardware is well-targeted to enhance staff mobility (where needed) and extend BIM productivity.	Equipment deployments are treated as BIM enablers. Investment in equipment is tightly integrated with financial plans, business strategies and performance objectives.	Existing equipment and innovative solutions are continuously tested, upgraded and deployed. BIM hardware become part of organisation's or project team's competitive advantage.
	score	score	score	score	score
Network: solutions, deliverables and security/ access control	Network solutions are non-existent or ad-hoc. Individuals, organisations (single location/ dispersed) and project teams use whatever tools found to communicate and share data. Stakeholders lack the network infrastructure necessary to harvest, store and share knowledge.	Network solutions for sharing information and controlling access are identified within and between organisations. At project level, stakeholders identify their requirements for sharing data/information. Dispersed organisations and project teams are connected through relatively low-bandwidth connections.	Network solutions for harvesting, storing and sharing knowledge within and between organisations are well managed through common platforms (ex: intranets or extranets). Content and asset management tools are deployed to regulate structured and unstructured data shared across high-bandwidth connections.	Network solutions enable multiple facets of the BIM process to be integrated through seamless real-time sharing of data, information and knowledge. Solutions include project-specific networks/portals which enable data-intensive interchange (interoperable exchange) between stakeholders.	Network solutions are continuously assessed and replaced by the latest tested innovations. Networks facilitate knowledge acquisition, storing and sharing between all stakeholders. Optimisation of integrated data, process and communication channels is relentless.
	score	score	score	score	score

BIM CAPABILITY SETS

TECHNOLOGY based on Capability Set v5

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Resources: Physical and knowledge infrastructure	The work environment is either not recognised as a factor in staff satisfaction or may not be conducive to productivity. Knowledge is not recognised as an asset; BIM knowledge is typically shared informally between staff (through tips, techniques and lessons learned).	The work environment and workplace tools are identified as factors affecting motivation and productivity. Similarly, knowledge is recognised as an asset; shared knowledge is harvested, documented and thus transferred from tacit to explicit.	The work environment is controlled, modified and its criteria managed to enhance staff motivation, satisfaction and productivity. Also, documented knowledge is adequately stored.	Environmental factors are integrated into performance strategies. Knowledge is integrated into organisational systems; stored knowledge is made accessible and easily retrievable.	Physical workplace factors are reviewed constantly to insure staff satisfaction and an environment conducive to productivity. Similarly, knowledge structures responsible for acquisition, representation and dissemination are systemically reviewed and enhanced.
	score	score	score	score	score
Activities & Workflows: Knowledge, skills, experience, roles and relevant dynamics	There is an absence of defined processes; roles are ambiguous and team structures/dynamics are inconsistent. Performance is unpredictable and productivity depends on individual heroics. A mentality of 'working 'around the system' flourishes.	BIM roles are informally defined and teams are formed accordingly. Each BIM project is planned independently. BIM competency is identified and targeted; BIM heroism fades as competency increases but productivity is still unpredictable.	Cooperation within organisations increases as tools for cross-project communication are made available. Flow of information steadies; BIM roles are visible and targets are achieved more consistently.	BIM roles and competency targets are imbedded within the organisation. Traditional teams are replaced by BIM-oriented ones as new processes become part of organisation/ project team's culture. Productivity is now consistent and predictable.	BIM competency targets are continuously upgraded to match technological advances and align with organisational objectives. Human resource practices are proactively reviewed to insure intellectual capital matches process needs.
	score	score	score	score	score
Products & Services: Specification, differentiation and R&D	3D models deliverables (a BIM product) suffer from too high, too low or inconsistent levels of detail.	A "statement defining the object breakdown of the 3D model" is available.	Adoption of product/ service specifications similar to Model Progression Specifications, BIPS 'information levels' or similar.	Products and services are specified and differentiated according to Model Progression Specifications or similar.	BIM products and services are constantly evaluated; feedback loops promote continuous improvement.
	score	score	score	score	score
Leadership & Management: Organisational, strategic, managerial and communicative attributes; innovation and renewal	Senior leaders/ managers have varied visions about BIM. BIM implementation (according to BIM Stage requirements) is conducted without a guiding strategy. At this maturity level, BIM is treated as a technology stream; innovation is not recognised as an independent value and business opportunities arising from BIM are not acknowledged.	Senior leaders/managers adopt a common vision about BIM. BIM implementation strategy lacks actionable details. BIM is treated as a process-changing, technology stream. Product and process innovations are recognised; business opportunities arising from BIM are identified but not exploited.	The vision to implement BIM is communicated and understood by most staff. BIM implementation strategy is coupled with detailed action plans and a monitoring regime. BIM is acknowledged as a series of technology, process and policy changes which need to be managed without hampering innovation. Business opportunities arising from BIM are acknowledged and used in marketing efforts.	The vision is shared by staff across the organisation and/or project partners. BIM implementation, its requirements and process/ product innovation are integrated into organisational, strategic, managerial and communicative channels. Business opportunities arising from BIM are part of team, organisation or project-team's competitive advantage and are used to attract and keep clients.	Stakeholders have internalised the BIM vision and are actively achieving it. BIM implementation strategy and its effects on organisational models are continuously revisited and realigned with other strategies. If alterations are needed, they are proactively implemented. Innovative product/ process solutions and business opportunities are sought-after and followed through relentlessly.
	score	score	score	score	score

PROCESS based on Capability Set v5.0

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POLICY based on Capability Set v5.0 — **Preparatory:** research, educational / training programmes and deliverables	Very little or no training available to BIM staff. Educational/ training mediums are not suitable to achieve the results sought.	Training requirements are defined and are typically provided only when needed. Training mediums are varied allowing flexibility in content delivery.	Training requirements are managed to adhere to pre-set broad competency and performance objectives. Training mediums are tailored to suit trainees and to reach learning objectives in a cost-effective manner.	Training is integrated into organisational strategies and performance targets. Training is typically based on staff roles and respective competency objectives. Training mediums are incorporated into knowledge and communication channels.	Training is continuously evaluated and improved upon. Training availability and delivery methods are tailored to allow multi-modal continuous learning.
	score	score	score	score	score
Regulatory: codes, regulations, standards, classifications, guidelines and benchmarks	There are no BIM guidelines, documentation protocols or modelling standards. There is an absence of documentation and modelling standards. There is informal or no quality control plans; neither for 3D models nor for documentation. There are no performance benchmarks for processes, products or services.	Basic BIM guidelines are available (ex: training manual and BIM delivery standards). Modelling and documentation standards are well defined according to market-accepted standards. Quality targets and performance benchmarks are set.	Detailed BIM guidelines are available (training, standards, workflow, exceptions...). Modelling, representation, quantification, specifications and analytical properties of 3D models are managed through detailed modelling standards and quality plans. Performance against benchmarks is tightly monitored and controlled.	BIM guidelines are integrated into overall policies and business strategies. BIM standards and performance benchmarks are incorporated into quality management and performance improvement systems.	BIM guidelines are continuously and proactively refined to reflect lessons learned and industry best practices. Quality improvement and adherence to regulations and codes are continuously aligned and refined. Benchmarks are repetitively revisited to insure highest possible quality in processes, products and services.
	score	score	score	score	score
Contractual: responsibilities, rewards and risk allocations	Dependence on pre-BIM contractual arrangements. Risks related to model-based collaboration are not recognised or are ignored.	BIM requirements are recognised. "Statements defining the responsibility of each stakeholder regarding information management" are now available.	There is a mechanism to manage shared BIM intellectual property, confidentiality, liability and a system for BIM conflict resolution.	Organisation are aligned through trust and mutual dependency beyond contractual barriers.	Responsibilities, risks and rewards are continuously revisited and realigned to effort. Contractual models are modified to achieve best practices and highest value for all stakeholders.
	score	score	score	score	score
STAGE 1 — **Object-based Modelling:** single-disciplinary use within a Project Lifecycle phase	Implementation of an object-based tool. No process or policy changes identified to accompany this implementation	Pilot projects are concluded. BIM process and policy requirements are identified. Implementation strategy and detailed plans are prepared.	BIM processes and policies are instigated, standardised and controlled.	BIM technologies, processes and policies are integrated into organisational strategies and aligned with business objectives.	BIM technologies, processes and policies are continuously revisited to benefit from innovation and achieve higher performance targets.
	score	score	score	score	score

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STAGE 2	**Modelling-based Collaboration**: multi-disciplinary, fast-tracked interchange of models	Ad-hoc BIM collaboration; in-house collaboration capabilities incompatible with project partners. Trust and respect between project participants may be lacking.	Single-thread, well-defined yet reactive BIM collaboration. There are identifiable signs of mutual trust and respect among project participants.	Multi-thread proactive collaboration; protocols are well documented and managed. There are mutual trust, respect and sharing of risks and rewards among project participants.	Multi-thread collaboration includes downstream players. This is characterised by the involvement of key participants during projects' early lifecycle phases.	Multi-thread team included all key players in an environment characterised by goodwill, trust and respect.
		score	score	score	score	score
STAGE 3	**Network-based Integration**: concurrent interdisciplinary interchange of nD models across Project Lifecycle Phases	Integrated models are generated by a limited set of project stakeholders - possibly behind corporate firewalls. Integration occurs with little or no pre-defined process guides, standards or interchange protocols. There is no formal resolution of stakeholders' roles and responsibilities.	Integrated models are generated by a large subset of project stakeholders. Integration follows predefined process guides, standards and interchange protocols. Responsibilities are distributed and risks are mitigated through contractual means.	Integrated models (or parts of) are generated and managed by most project stakeholders. Responsibilities are clear within temporary project alliances or longer-term partnerships. Risks and rewards are actively managed and distributed.	Integrated models are generated and managed by all key project stakeholders. Network-based integration is the norm and focus is no longer on *how* to integrate models/ workflows but on proactively detecting and resolving technology, process and policy misalignments.	Integration of models and workflows are continuously revisited and optimised. New efficiencies, deliverables and alignments are actively pursued by a tightly-knit interdisciplinary project team. Integrated models are contributed to by many stakeholders along the construction supply chain.
		score	score	score	score	score
MICRO	**Organisations**: dynamics and BIM deliverables	BIM leadership is non-existent; implementation depends on technology champions.	BIM leadership is formalised; different roles within the implementation process are defined.	Pre-defined BIM roles complement each other in managing the implementation process.	BIM roles are integrated into organisation's leadership structures.	BIM leadership continuously mutates to allow for new technologies, processes and deliverables.
		score	score	score	score	score
MESO	**Project Teams**: (multiple organisations): inter-organisational dynamics and BIM deliverables	Each project is run independently. There is no agreement between stakeholders to collaborate beyond their current common project.	Stakeholders think beyond a single project. Collaboration protocols between project stakeholders are defined and documented.	Collaboration between multiple organisations over several projects is managed through temporary alliances between stakeholders.	Collaborative projects are undertaken by inter-disciplinary organisations or multidisciplinary project teams; an alliance of many key stakeholders.	Collaborative projects are undertaken by self-optimising interdisciplinary project teams which include most stakeholders.
		score	score	score	score	score
MACRO	**Markets**: dynamics and BIM deliverables *(only apply this topic if assisted by a trained assessor)*	Very few supplier-generated BIM components (virtual products and materials representing physical ones). Most components are prepared by software developers and end-users.	Supplier-generated BIM components are increasingly available as manufactures/ suppliers identify the business benefits.	BIM Components are available through highly accessible/searchable central repositories. Components are not interactively connected to suppliers' databases.	Access to component repositories are integrated into BIM software. Components are interactively linked to source databases (for price, availability, etc...).	Dynamic, multi-way generation and interchange of BIM components (virtual products and materials) between all project stakeholders through central or meshed repositories.
		score	score	score	score	score

ORG SCALE

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IV. Translations

This document is released in English on July 7, 2016 and will be translated into a number of languages through the generous contributions of **BIMe Knowledge Affiliates**. Updated versions of this and other BIMe Initiative documents can be downloaded from BIMexcellence.org (late 2016), BIMframework.info and the affiliate's respective website.

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VI. Change Log

VERSION	DATE	DESCRIPTION
1.0	Nov 2010	Matrix published	peer-reviewed chapter: http://bit.ly/BIMPaperA3/
1.1	Feb 2011 -Jun 2016	Matrix made publically available online and through workshops
1.22	Jul 2016	Matrix reformatted and released as part of the BIMe Initiative

VII. Contact Info

If you found this document beneficial and would like to contribute to the **BIMe Initiative**, please contact Bilal Succar (bsuccar@changeagents.com.au | +61 412 556 671). You can also follow the BIMe Initiative's news and document releases on Twitter (@bimexcellence), Facebook, Google+ and LinkedIn; thank you.

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