BIM Client Maturity Levels: Review of different EIRs within the AEC sector

Innovations supporting sustainable growth in the buildings sector session

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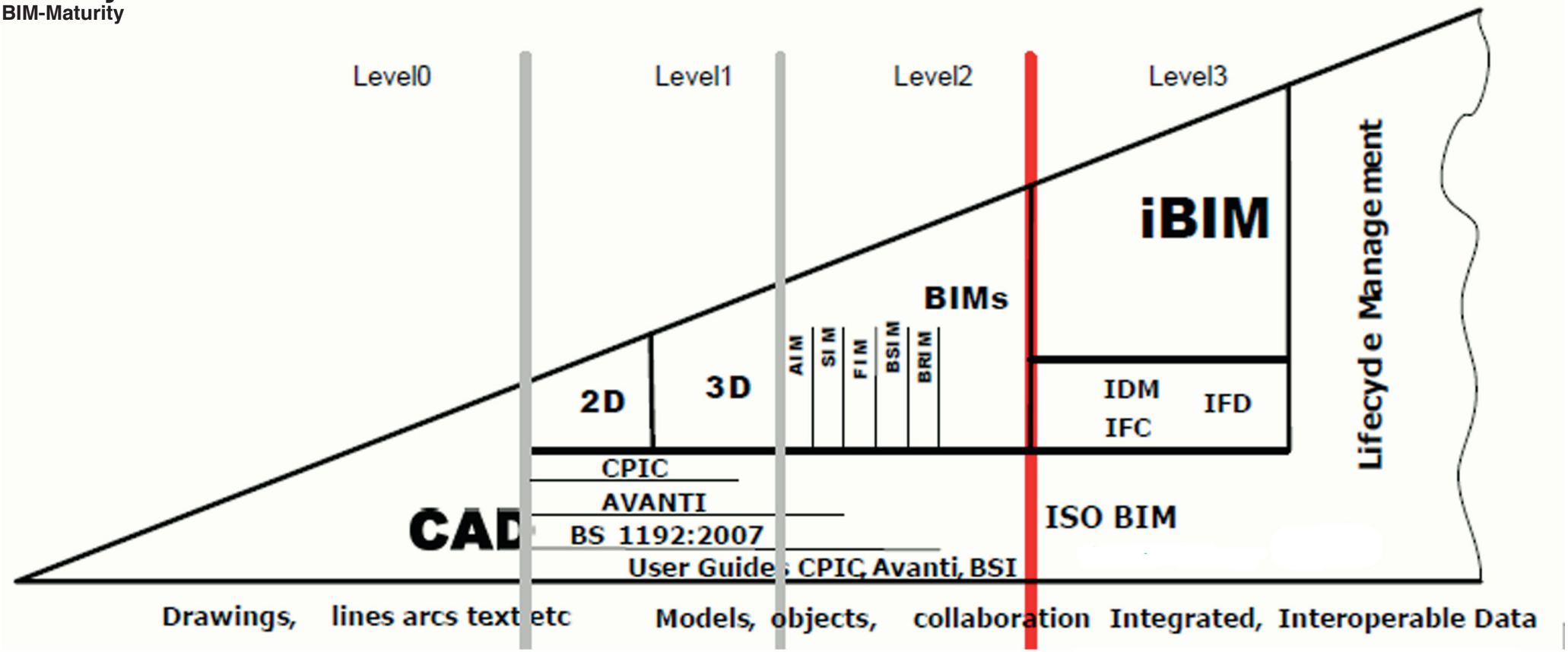
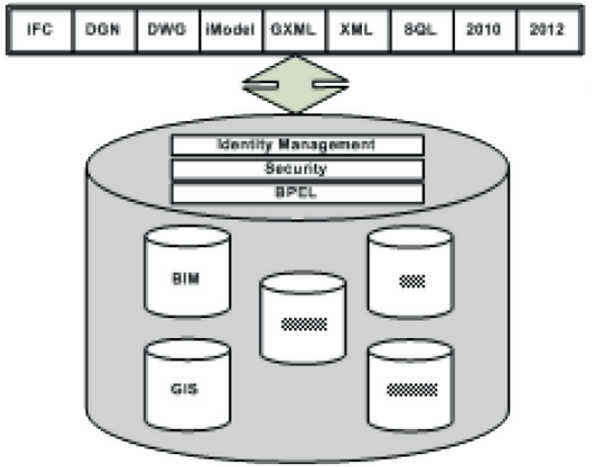
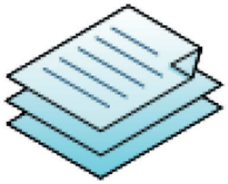
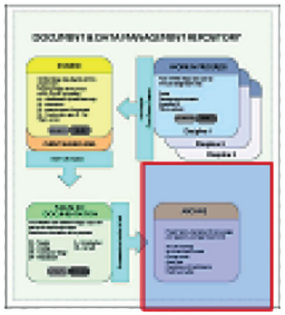
Theory - Reflective

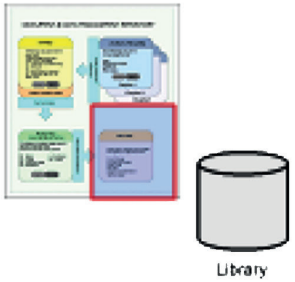
BIM-Maturity











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\ BIS (2011) A report for the Government Construction Client Group Building Information Modelling (BIM) Working Party Strategy Paper (Department for Business, Innovation & Skills, London).

Theory - Architectural "Plan of Works"
BIM-Overlay

BIM Overlay to the RIBA Outline Plan of Work

		RIBA Work Stage	Description of Key Tasks	Core BIM Activities
Preparation	A	Appraisal	Identification of client's needs and objectives, business case, sustainability, life cycle and Facilities Management aspirations and possible constraints on development. Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed.	• Advise client on purpose of BIM including benefits and implications. Agree level and extent of BIM including 4D (time), 5D (cost) and 6D (FM) following software assessment. Advise client on Integrated Team scope of service in totality and for each designer including requirements for specialists and appointment of a BIM Model Manager. • Define long-term responsibilities, including ownership of model. • Define BIM Inputs and Outputs and scope of post-occupancy evaluation (Soft Landings). • Identify scope of and commission BIM surveys and investigation reports. • Data drop 1.
	B	Design Brief	Development of initial statement of requirements into the Design Brief by or on behalf of the client, confirming key requirements and constraints. Identification of procurement method, project sustainability and BIM procedures, building design lifetime and project organisational structure and range of consultants and others to be engaged for the project, including definition of responsibilities.	
Design	C	Concept	Implementation of Design Brief and preparation of additional data. Agreement of Project Quality Plan including BIM and Change Control protocols. Preparation of Concept Design including outline proposals for structural and environmental strategies and services systems, site landscape and ecology, outline specifications, preliminary cost and energy plans. Review of procurement route.	• BIM pre-start meeting. • Initial model sharing with Design Team for strategic analysis and options appraisal. • BIM data used for environmental performance and area analysis. • Identify key model elements (e.g. prefabricated component) and create concept level parametric objects for all major elements. • Enable design team access to BIM data. • Agree extent of performance specified work. • Data drop 2.
	D	Design Development	Development of concept design using project BIM data to include structural and environmental strategies and services systems, site landscape and ecology, updated outline specifications and cost and energy plans. Completion of Project Brief. *Application for detailed planning permission.*	• Data sharing and integration for design co-ordination and detailed analysis including data links between models. • Integration/development of generic/bespoke design components. • BIM data used for environmental performance and area analysis. • Data sharing for design co-ordination, technical analysis and addition of specification data. • Export data for Planning Application. • 4D and/or 5D assessment. • Data drop 3.
	E	Technical Design	Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project, BIM data and *information for statutory standards, sustainability assessment and construction safety.*	
Pre-Construction	F	Production Information	F1 ~~Preparation of production information~~ Development of BIM data in sufficient detail to conclude co-ordination of design team inputs, to enable performance specified work to commence and enable a tender or tenders to be obtained. *Application for statutory approvals.* F2 ~~*Preparation of further information for construction required under the building contract.*~~ *Development of BIM data to integrate performance specified design work into model.* Review of BIM information provided by contractors and specialists, including integration into project BIM data.	• Export data for Building Control Analysis. • Data sharing for conclusion of design co-ordination and detailed analysis with subcontractors. • Detailed modelling, integration and analysis. • Create production level parametric objects for all major elements (where appropriate and information exists this may be based on tier 2 supplier's information). • Embed specification to model. • Final review and sign off of model. • Enable access to BIM model to contractor(s). • Integration of subcontractor performance specified work model information into BIM model data. • Review construction sequencing (4D) with contractor. • Data drop 4.
	G	Tender Documentation	Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project.	
	H	Tender Action	Identification and evaluation of potential contractors and/or specialists for the project. Obtaining and appraising tenders; submission of recommendations to the client.	

The activities in italics may be moved to suit project requirements.

		RIBA Work Stage	Description of Key Tasks	Core BIM Activities
Construction	J	Mobilisation	Letting the building contract, appointing the contractor. ~~Issuing of information to the contractor.~~ Arranging site handover to the contractor.	• Agree timing and scope of 'Soft Landings'. • Co-ordinate and release of 'End of Construction' BIM record model data. • Use of 4D/5D BIM data for contract administration purposes. • Data drop 5.
	K	Construction to Practical Completion	Administration of the building contract to Practical Completion. ~~Provision to the contractor of further Information as and when reasonably required.~~ Clarification and resolution of design queries as they arise. ~~Review of information provided by contractors and specialists.~~ Assist with preparation for commissioning, training, handover, future monitoring and maintenance.	
Use	L	Post Practical Completion	L1 Administration of the building contract after Practical Completion and making final inspections. L2 Assisting building user during initial occupation period.	• FM BIM model data issued as asset changes are made. • Study of parametric object information contained within BIM model data. • Data drop 6.
R&D	M	Model Maintenance & Development	L3 Review of project performance in use and comparison with BIM data. Analysis of BIM data for use on future projects, following feedback and research.	

Current Plan of Work

The current version of the RIBA Outline Plan of Work is available to download at:

http://www.ribabookshops.com/plan-of-work

Green Overlay

To allow the BIM Overlay to sit alongside the Green Overlay to the RIBA Outline Plan of Work, the suggested amendments to the 'description of key tasks' included in the Green Overlay have also been included in the BIM Overlay. The Green Overlay text is highlighted in green, and to avoid confusion the BIM Overlay text is shown in purple.

In reality, many of the changes in the Green Overlay are pertinent to the BIM Overlay. For example, subjects such as Soft Landings are relevant from both a sustainability and BIM perspective. The Green Overlay of the Outline Plan of Work, that also contains additional valuable guidance on green issues, can be downloaded from:

http://www.ribabookshops.com/plan-of-work

The activities in italics may be moved to suit project requirements.

Extract from; Sinclair, D. (Ed.) (2012) *BIM Overlay to the RIBA Outline Plan of Work* (RIBA, London).

Theory - Employer Information Requirements (EIR)

BIM-Client maturity

Specimen Production and Delivery Table for CIC BIM Protocol

	Drop 1 Stage 1		Drop 2a Stage 2		Drop 2b Stage 2		Drop 3 Stage 3		Drop 4 Stage 6	
	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail
Overall form and content										
Space planning	Architect	1	Architect	2	Contractor	2	Contractor	3	Contractor	6
Site and context	Architect	1	Architect	2	Contractor	2	Contractor	3	Contractor	6
Surveys							Contractor	3		
External form and appearance			Architect	2	Contractor	2	Contractor	3	Contractor	6
Building and site sections					Contractor	2	Contractor	3	Contractor	6
Internal layouts					Contractor	2	Contractor	3	Contractor	6
Design strategies										
Fire			Architect	2	Contractor	2	Contractor	3	Contractor	6
Physical security			Architect	2	Contractor	2	Contractor	3	Contractor	6
Disabled access			Architect	2	Contractor	2	Contractor	3	Contractor	6
Maintenance access			Architect	2	Contractor	2	Contractor	3	Contractor	6
BREEAM					Contractor	2	Contractor	3	Contractor	6
Performance										
Building	Architect	1	Architect	2	Contractor	2	Contractor	3		
Structural	Architect	1	Str Eng	2	Contractor	2	Contractor	3		
MEP systems	Architect	1	MEP Eng	2	Contractor	2	Contractor	3		
Regulation compliance analysis							Contractor	3	Contractor	6
Thermal Simulation							Contractor	3	Contractor	6
Sustainability Analysis							Contractor	3	Contractor	6
Acoustic analysis							Contractor	3	Contractor	6
4D Programming Analysis										
5D Cost Analysis										
Services Commissioning							Contractor	3	Contractor	6
Elements, materials components										
Building			Architect	2	Contractor	2	Contractor	3	Contractor	6
Specifications			MEP Eng	2	Contractor	2	Contractor	3	Contractor	6
MEP systems					Contractor	2	Contractor	3	Contractor	6
Construction proposals										
Phasing							Contractor	3		
Site access							Contractor	3		
Site set-up							Contractor	3		
Health and safety										
Design							Contractor	3		
Construction							Contractor	3		
Operation							Contractor	3	Contractor	6

LOD definitions (from PAS 1192)

1 Brief
2 Concept
3 Developed Design
4 Production
5 Installation
6 As constructed
7 In use

Stage definitions (from APM)

0 Strategy
1 Brief
2 Concept
3 Definition
4 Design (production information)
5 Build & Commission
6 Handover & Closeout
7 Operation and end of life

Model Originators identified by name

Extract from; BIM Task Group (2013) *Employer's Information Requirements: Version 07 - Core Content and Guidance Notes* (BIM Task Group, London). Available at: http://www.bimtaskgroup.org/wp-content/uploads/2013/04/Employers-Information-Requirements-Core-Content-and-Guidance.pdf (accessed 16th March 2017)

Research Methodology

BIM-Client maturity

Technical Workshop(s)

Mixed training events / knowledge transfer meetings and professional networking addressing the range of BIM processes with client-side professionals (commissioning / planning / contract management / design review / facilities management) within a mix of construction sectors (commercial / social housing / public health / education / industrial & leisure).

Documentation Review(s)

Overview of a mix of commission brief, client instructions (verbal / email / written), minutes of kick-off meeting, contract document(s) including a mix of EIR, pre-BEP and BEP.

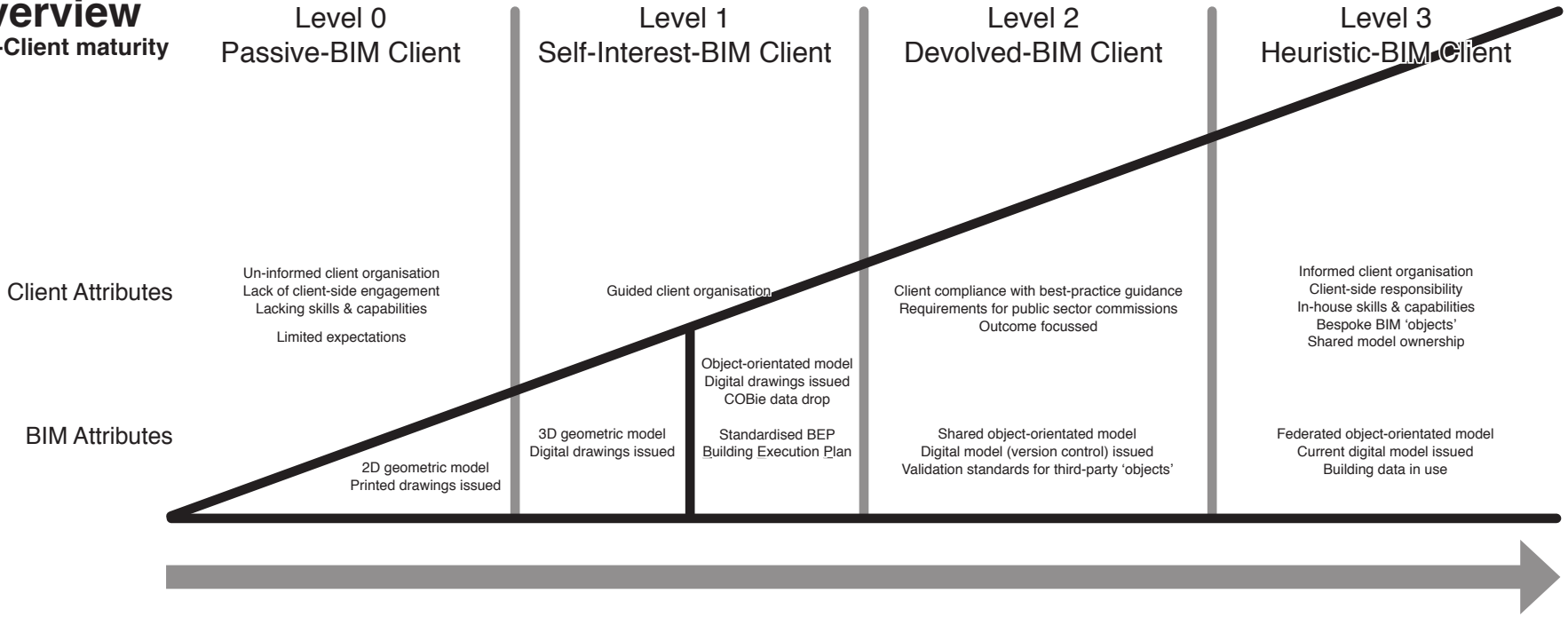
1-2-1 In-depth Interview(s)

Follow-up discussions with client-side professionals.

EIR	Standards	Skills	Applications
Implicit / explicit requirements for project information. Content of 'written' project brief. Supporting documentation (OIR / AIR) & requirements. Project management processes	Building regulations, planning & funding requirements. Compliance with statutory & voluntary BIM / information standards.	Current client organisation BIM capacity and / or awareness. Internal roles & responsibilities for ICT / digital information. Expectations for additional technical support or training.	Anticipated use of digital information. Requirements for geometric models & associated parametric data sets. Relationship of BIM (model / data) with project programme.

Overview

BIM-Client maturity



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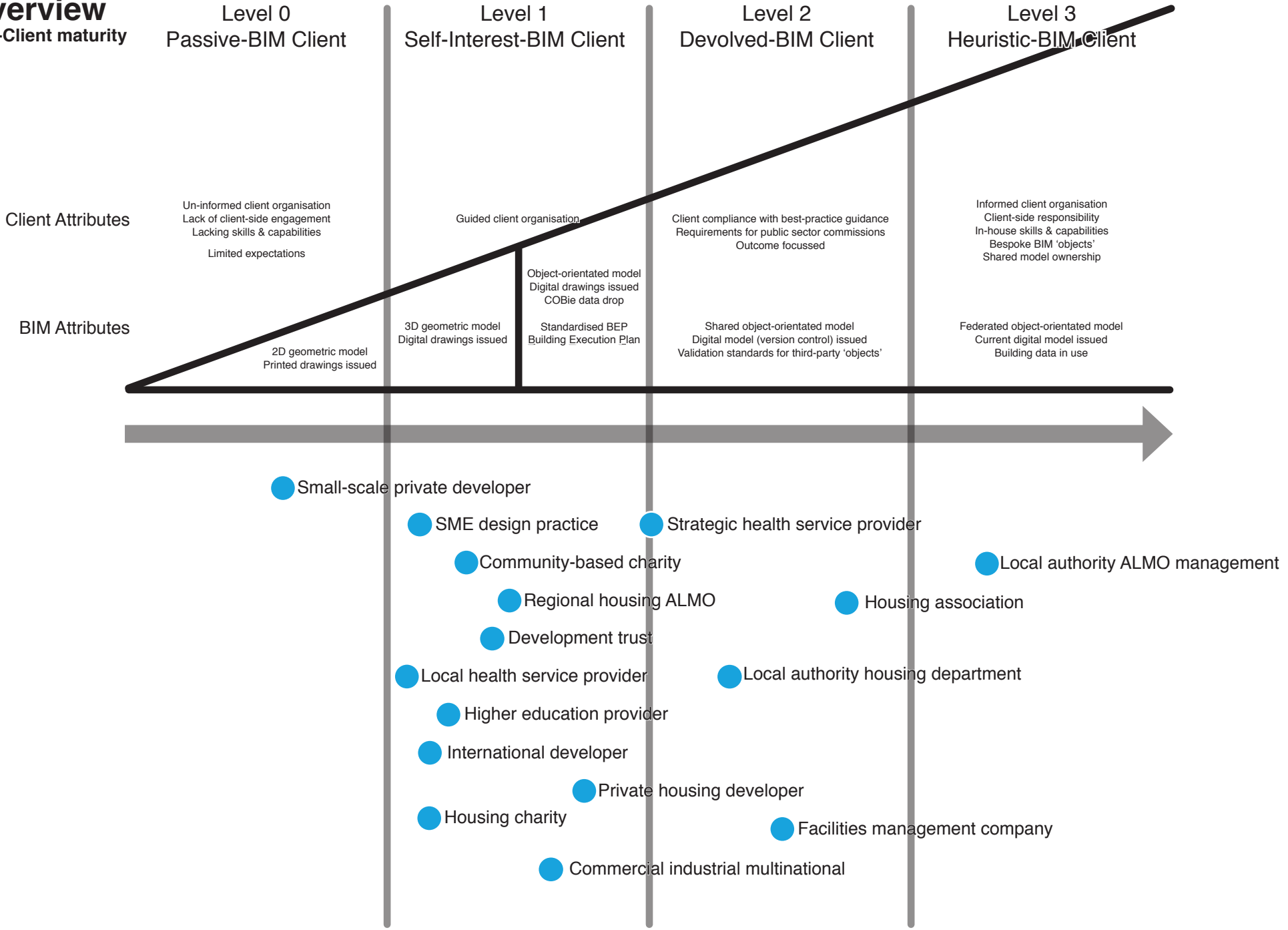

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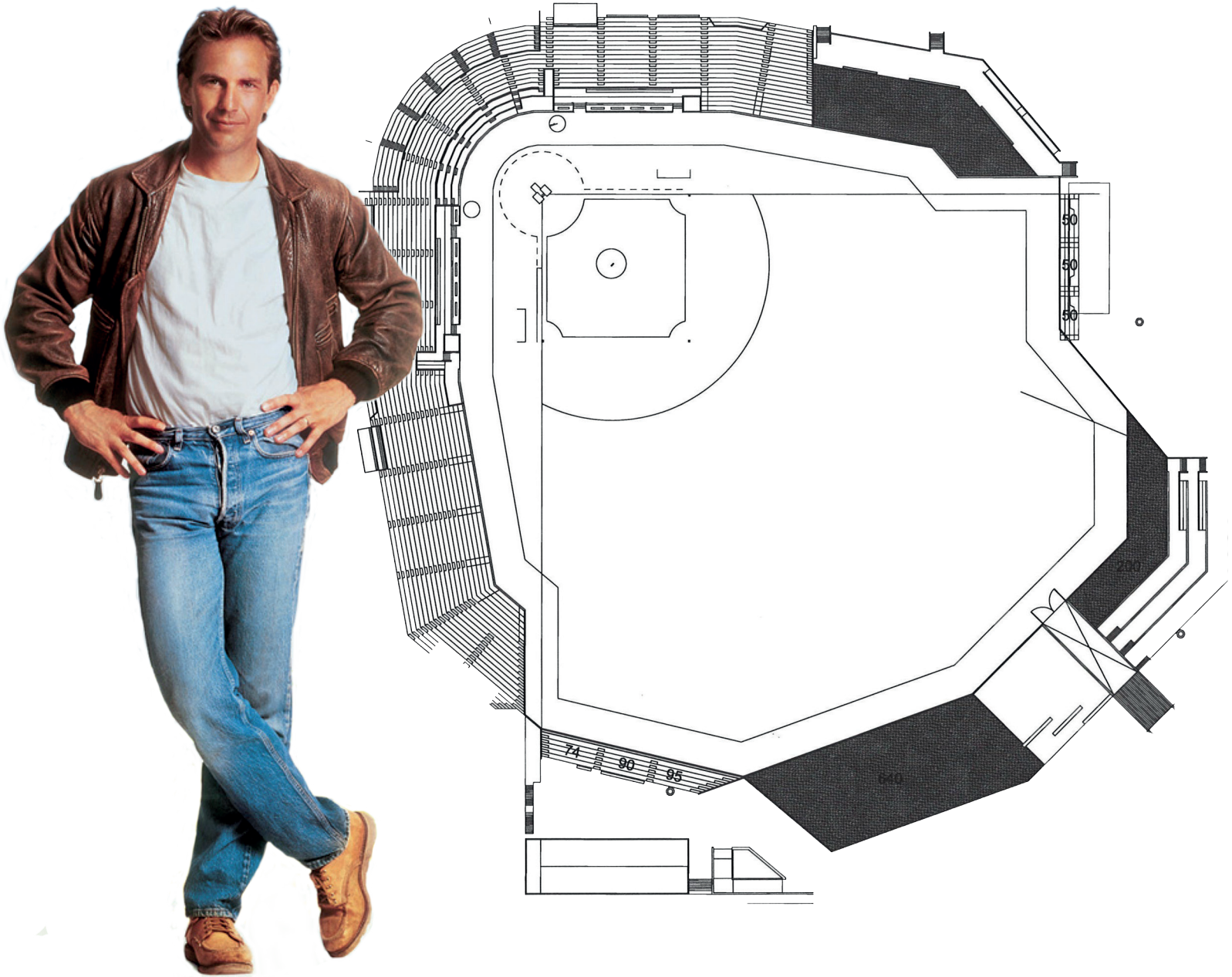
Passive-BIM Client

BIM-Client maturity level 0



Passive-BIM Client

BIM-Client maturity level 0

"I'm not really sure who is in charge of these sort of issues …but I'll try and find out if you think they are important ..."

"It (BIM) all just looks too complex for us to make any informed decision at this stage. We'll probably just wait until the government makes it an actual requirement … we don't want to make any unnecessary investment in ICT or training … "

"We're not too worried about the process. We're just interested in the outcomes … getting the development done ... to be honest, we are just interested in the visualisation, and perhaps a 'fly-through ...'

Self-Interest-BIM Client

BIM-Client maturity level 1

Self-Interest-BIM Client

BIM-Client maturity level 1

"You'll know better than us what is needed to deal with all of the compliance issues … although if it is about self-assessment and self-validation then we are happy to do this and follow your recommendations ..."

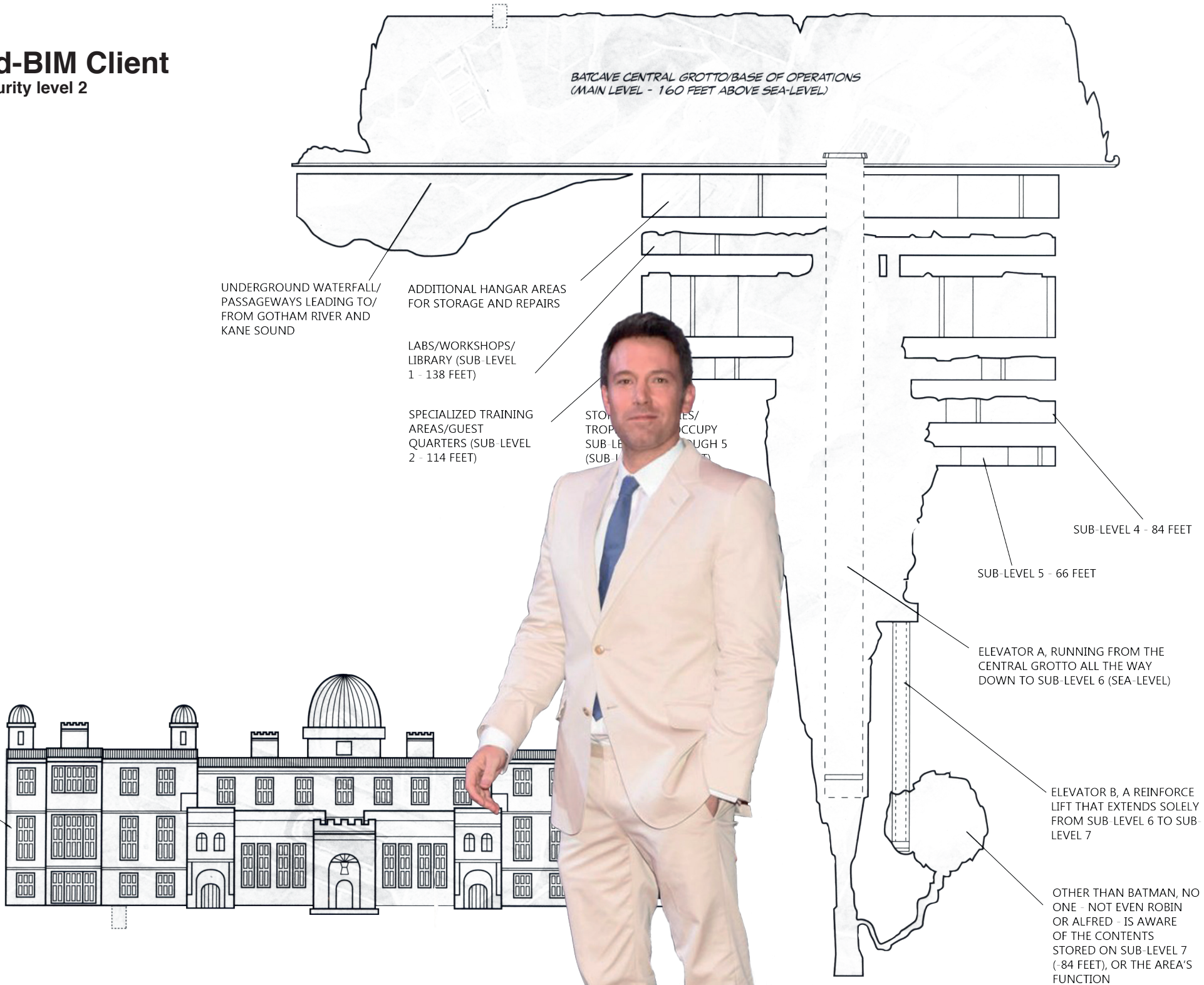
"If you're able to set out what we have discussed … and call it a brief or EIR or whatever if you want … as the basis for the project …"

"I'm doing the model (BIM) for myself and don't expect to have to share it with anyone else. If we thought that was the case, then we'd look a lot closer at the quality of the BIM model and the standards required ... "

"To be honest we're not totally convinced of the value and the commitment required to make it work. We don't need to understand it (BIM), that's why we are employing you …"

Devolved-BIM Client

BIM-Client maturity level 2



Devolved-BIM Client

BIM-Client maturity level 2

"We know how important the cultural change attached to BIM is … we totally understand that, but many of the senior management don't share this understanding yet. So we will try and progress and show the benefits as we go along …"

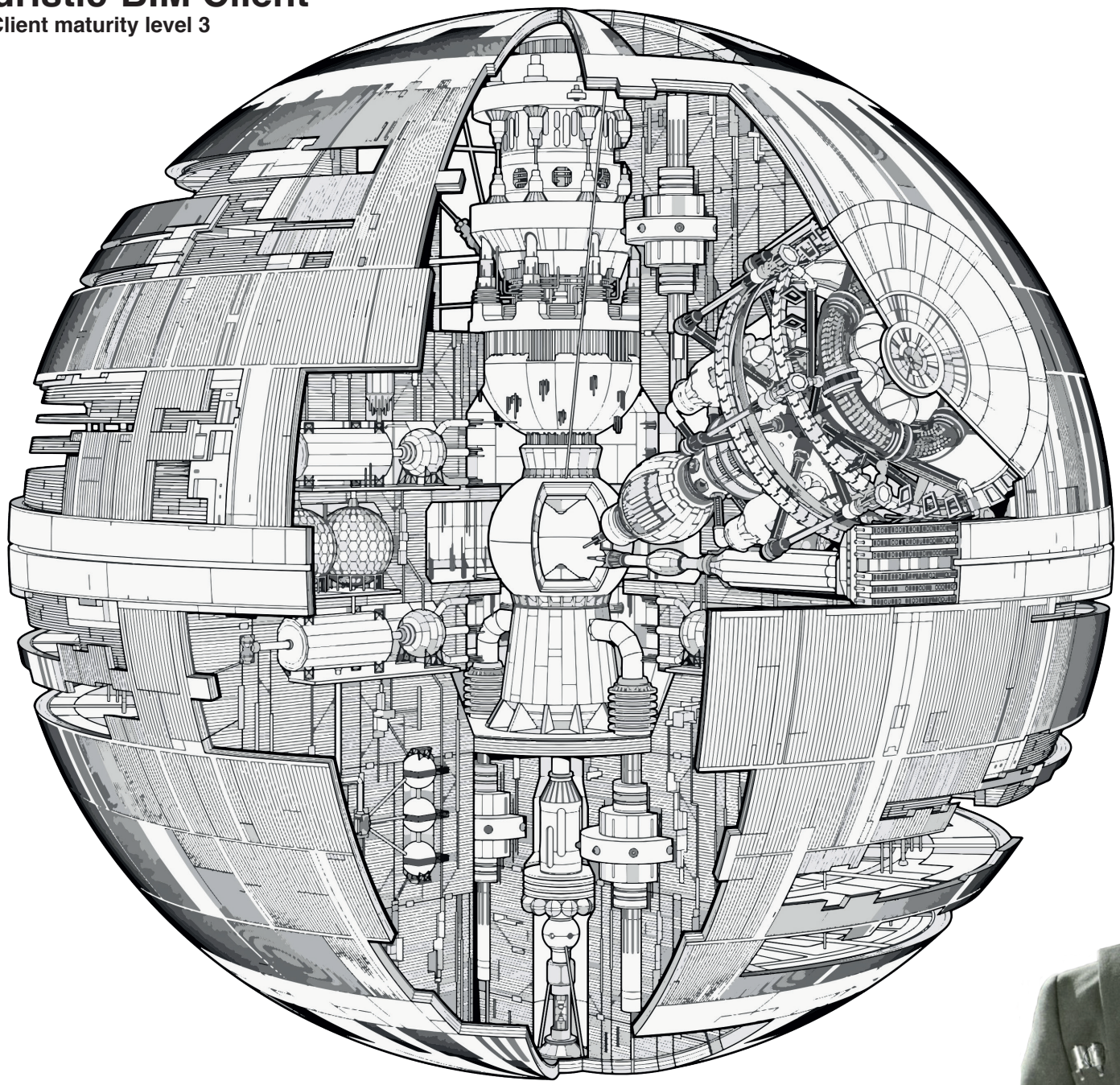
"We do have a standard EIR that we use on all of our development and construction jobs now …"

"There are a few people joining us now who have the skills to actually benefit from BIM, but we are lacking in many of the longer-term employees and they resent having to change the way we are doing things …"

"If it helps us understand the impact to refurbishment is making in terms of energy efficiency, then we would be interested in the results … we think that quality control is critical in the construction, so anything you can add to the project manager on site to maintain control is of benefit …"

Heuristic-BIM Client

BIM-Client maturity level 3



Heuristic-BIM Client

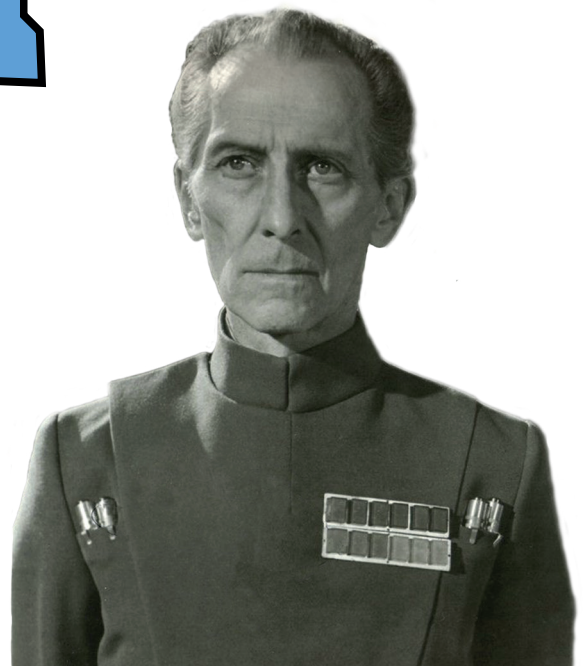
BIM-Client maturity level 3

"Getting confidence in the quality and certification processes using BIM will be of benefit given the scale of the task … we don't expect the architects to know all of the standards but we do expect them to be part of the BIM model, embedded from the brief with the correct LOD so we can check internally at the appropriate project stage … "

"We are getting the right information specified for the last few projects … the architects have been surprised in what we have been asking for and how the COBie sheets are proving to be more critical for our property management than the 3D geometric model … we're all about knowing our costs and assets …"

"If it helps us understand the impact to refurbishment is making in terms of energy efficiency, then we would be interested in the results … we also think that quality control is critical in the construction, so anything mobile you can add to the project manager on site to maintain control is of benefit …"

"We've been taking our time to get the right people together to make the business case for investing in BIM across our projects … it's taken time but we're getting the buy-in from the management at last to make the right sort of investments …"



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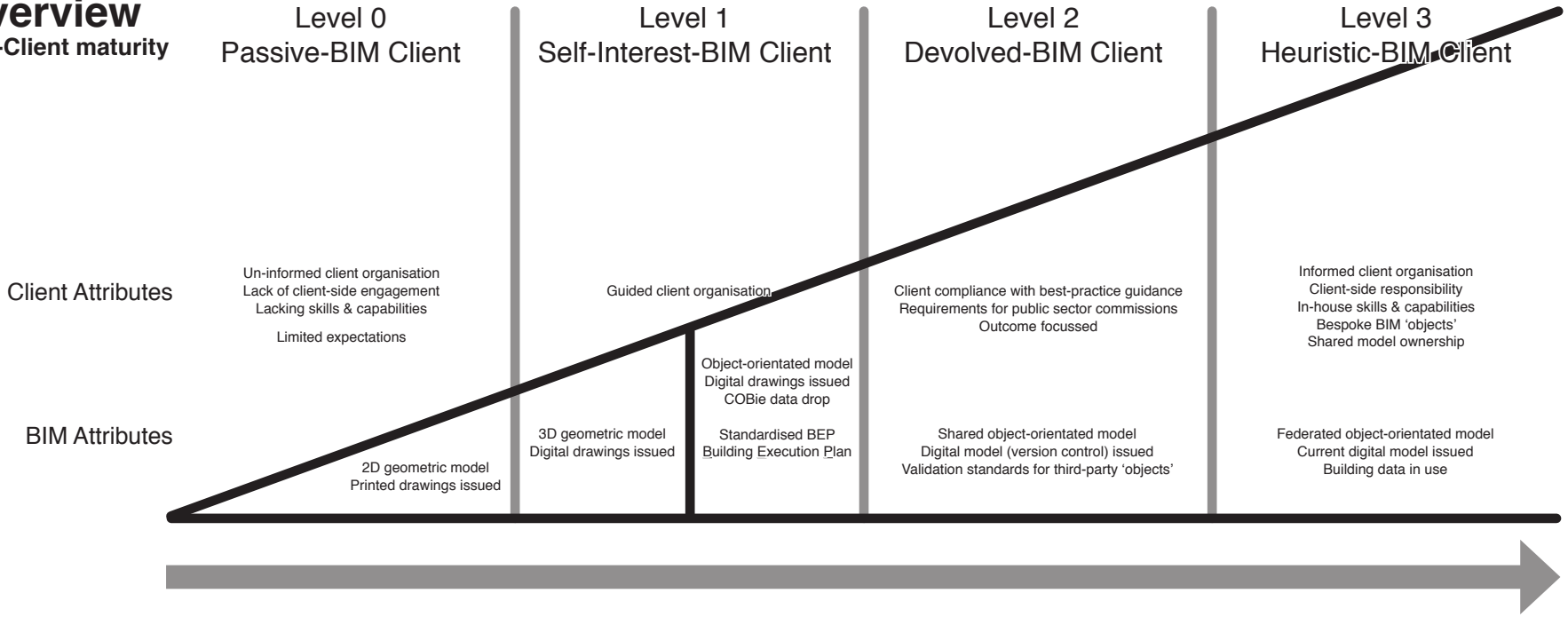
BIM-Client maturity



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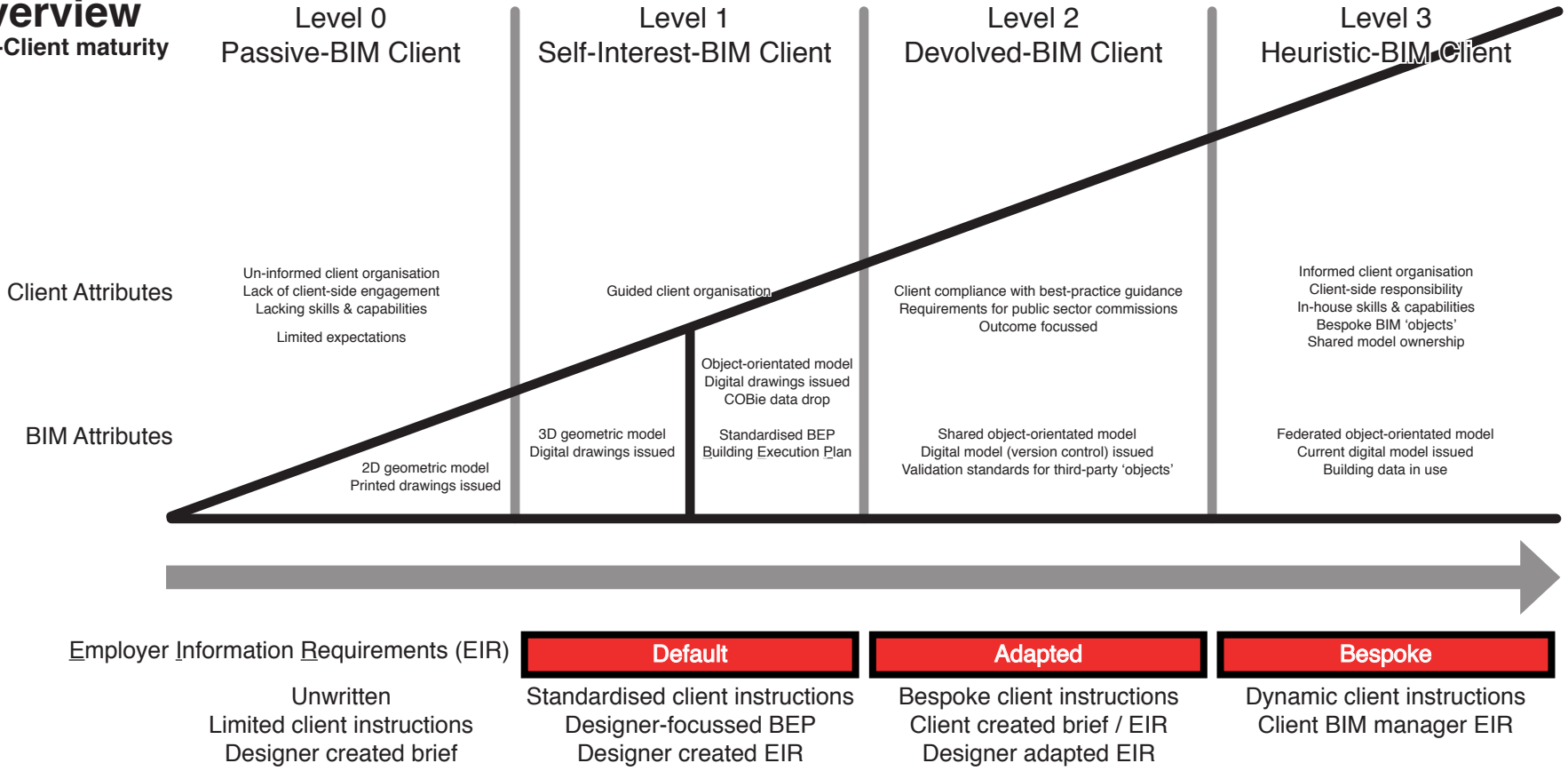

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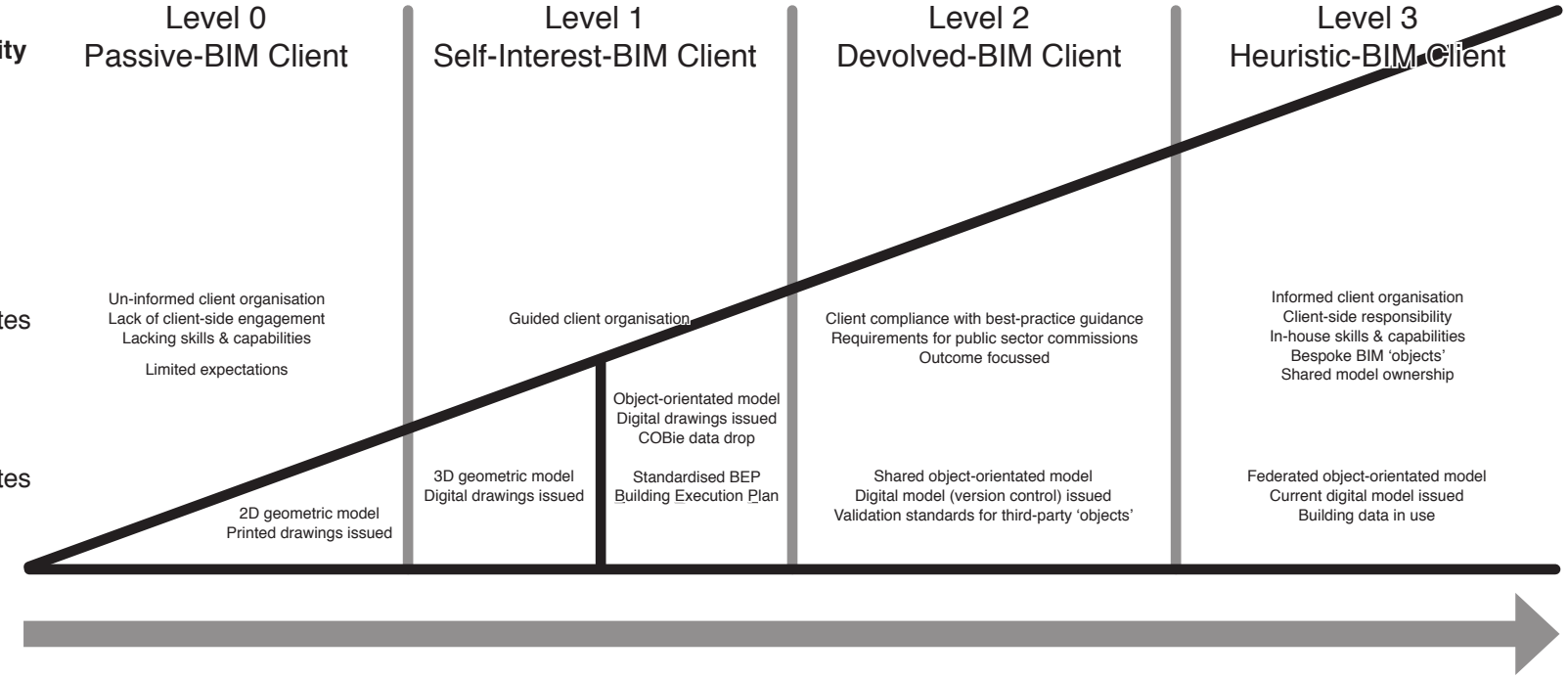

Employer Information Requirements (EIR)	Default	Adapted	Bespoke
	Standardised client instructions Designer-focussed BEP Designer created EIR	Bespoke client instructions Client created brief / EIR Designer adapted EIR	Dynamic client instructions Client BIM manager EIR
Unwritten Limited client instructions Designer created brief			
Standards	**Advisory**	**Conditional**	**Statutory**	**Professional Liability**
	Project management & process standards RIBA 2013 Plan of Works RIBA Digital Overlay / NBS Toolkit	Requirements for funding PAS 1192-2:2013 British Standards Institution (BS) Data security standards BS 7000-4 & BS 1192-5 (Security)	Document management standards Construction Project Information Committee (CPIC) Classification systems Uniclass2 (ISO 12006-2) / OmniClass (OCCS) BS1192-7 (Digital construction product information)	Organisation information requirements (OIR) BS1192-6 (Health & Safety) Asset information requirements (AIR)

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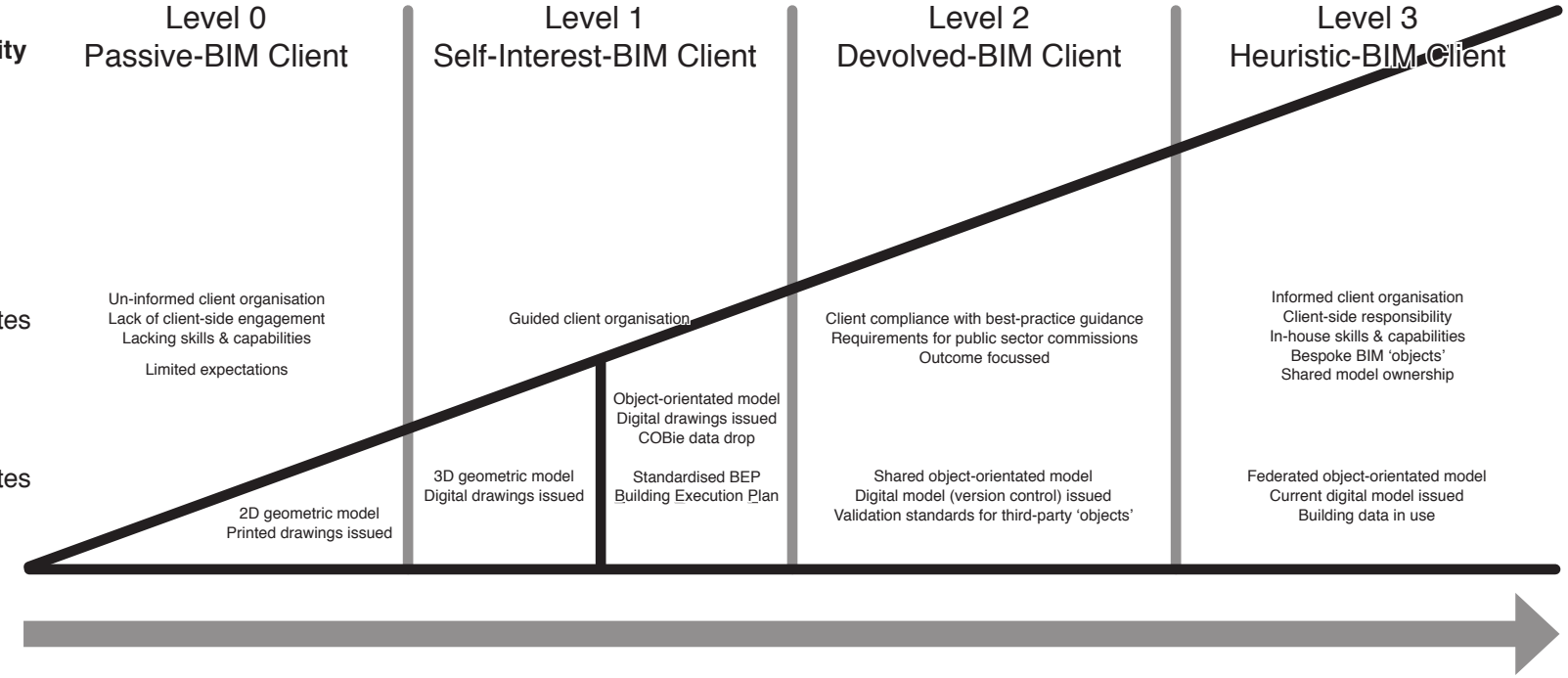

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Client Skills	**Drawing / Model Viewing**		**Model Manipulation**	**Model Editing**
	2D Plans / elevations	3D & Parametric modelling Data exchange	Project management Accessing parametric data	BEP training requirements of client team Post-occupancy '*Softlanding*' assessment Dynamic / agent-based modelling

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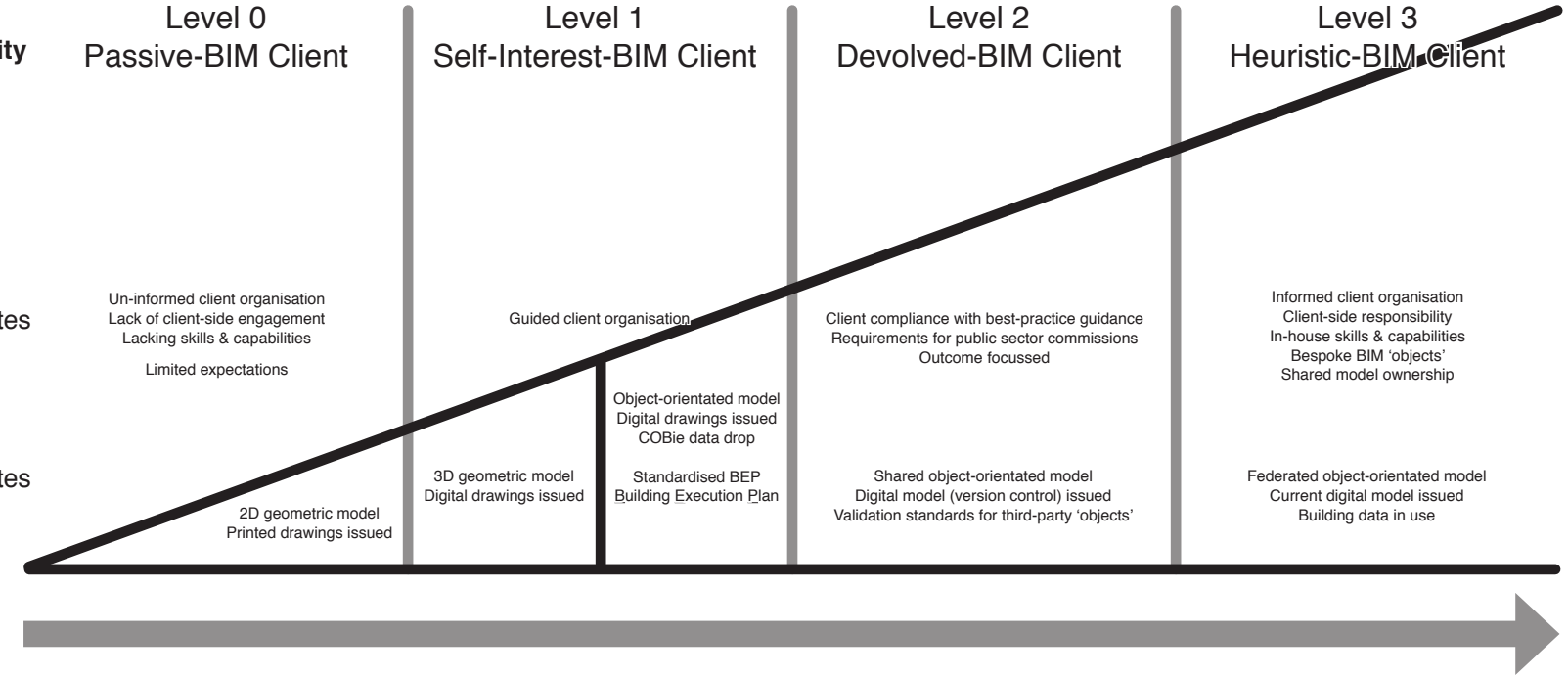

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Applications	**Business Case**	**Design**	**Construction / Fabrication**	**Facilities Management**
	Visualisation Marketing & communication	Design integration Compliance checking	Integrated supply-chain Quality controls	Post-occupancy management Adaptation & upgrading Finance / funding & insurance

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