CitA
BIM GATHERING 2019

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

Mary Flynn and Shane Brodie

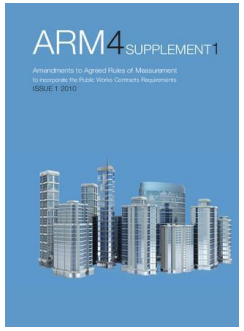
Delivering **better outcomes** for Irish Construction

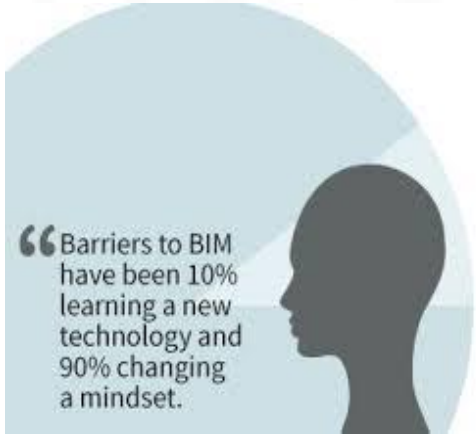
4th CitA BIM Gathering 26th September 2019, Galway, Ireland.

CitA
BIM GATHERING 2019

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

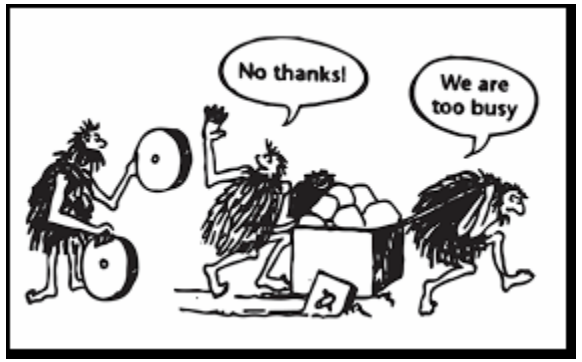
- Barriers that challenged QS's from developing their own (5D)QS MVD

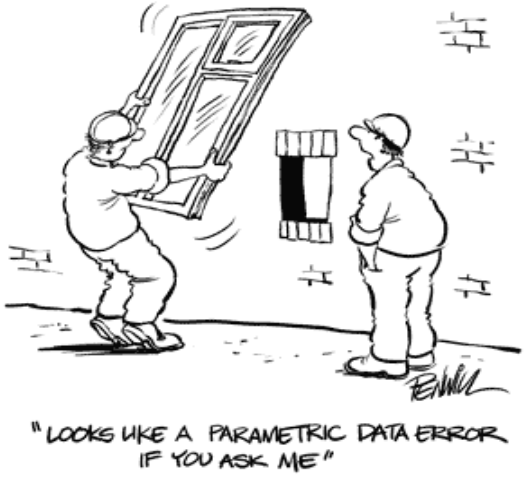




A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

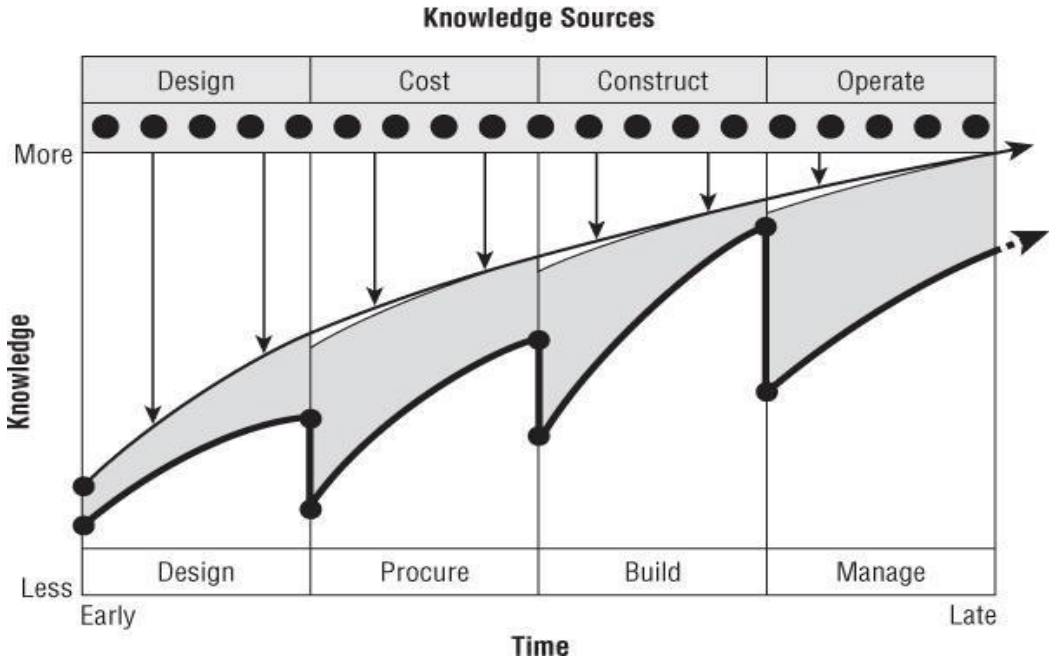
Barriers that challenged QS's from developing their own (5D)QS MVD

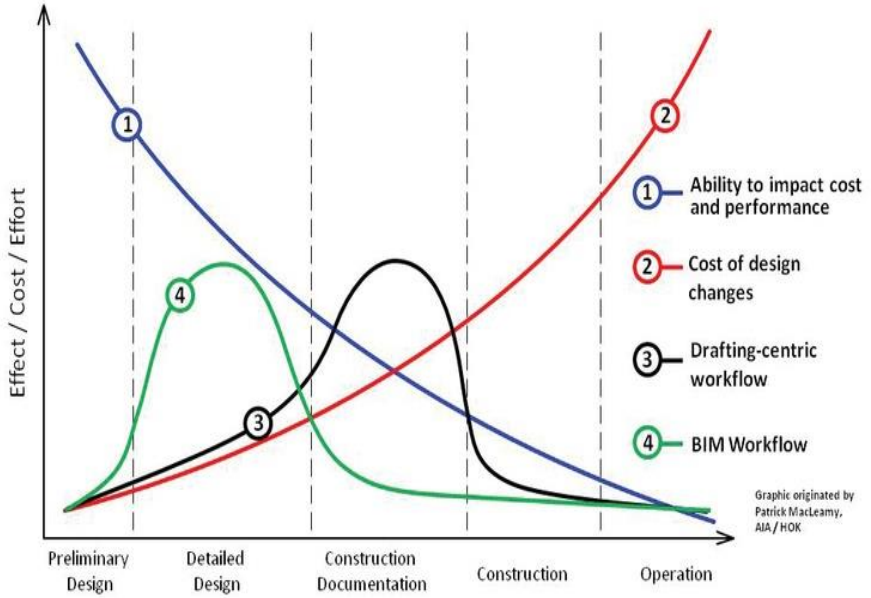




A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

Current Situation





Current Situation- QSs need to understand :-

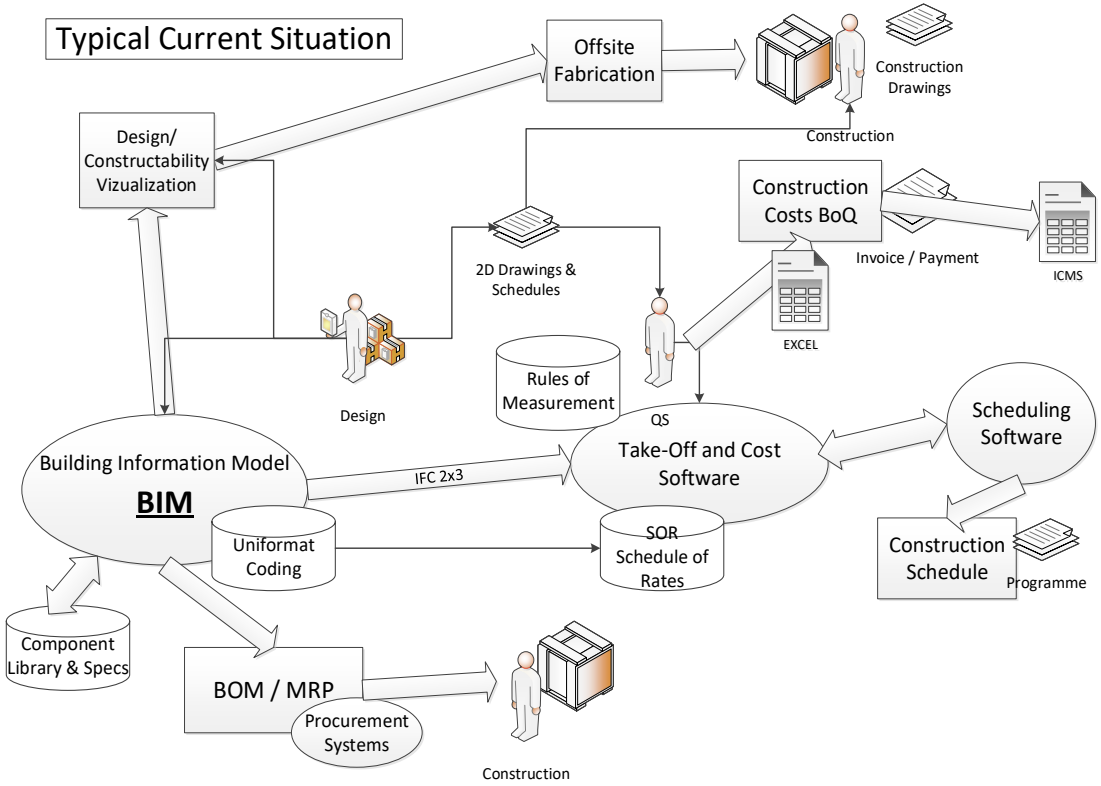
- Lack of understanding of the different disciplines
- QS lack of ICT skills
- Lack of fully functioning & integrated 5D BIM QS software
- Lack of a QS MVD (model view definition)
- Lack of 5D case studies to learn from
- Very little faith in the data inmost current BIM Models as they are incomplete, of poor quality & not modelled to a level suitable for the QS automatic quantification
- There is a shortage of suitably skilled 5D BIM QS's who fully understand the BIM process & have the necessary digital skills for interrogating the models pushing & pulling cost rich information

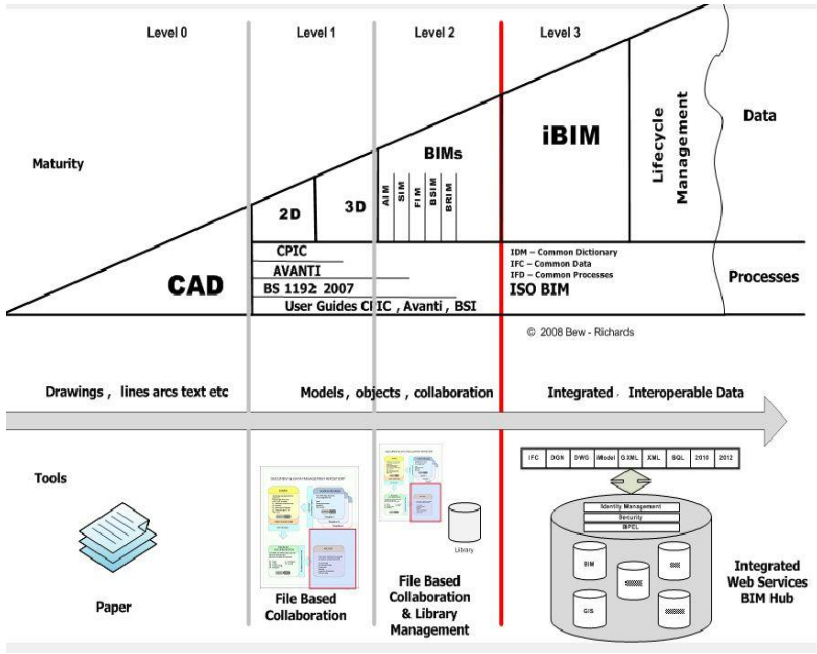
Current Situation- QSs need :-

- To think of BIM as a value creator not as a cost factor
- To get to become more aware of current trends & upskill
- To be realistic & pragmatic in their expectations & realise that BIM is not a perfect digital solution but an imperfect digital advancement with great potential
- To realise there is always some quantifiable data in bad models & QS's need to know how to navigate the model & articulate their requirements
- To realise that this an ever evolving journey & they need to work with what they have & incorporate changes as they occur such as the ICMS and the revised ARM 4

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

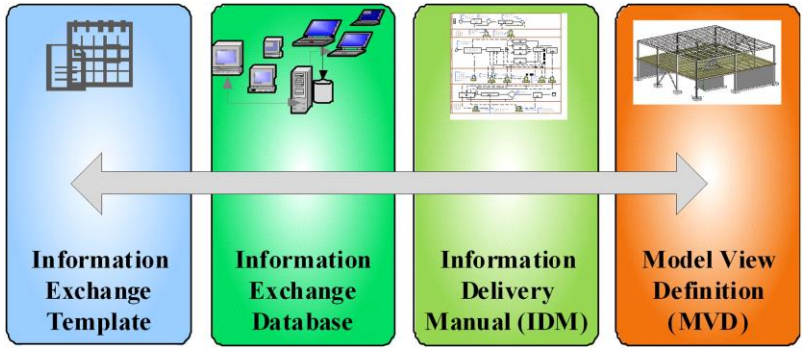
Current Situation





A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

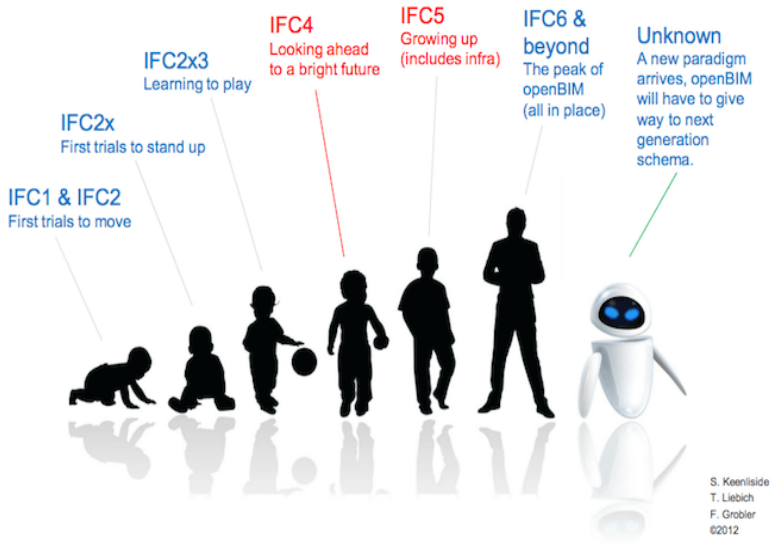
"**Model View Definition**" or MVD, is a subset of the overall IFC schema to describe a data exchange for a specific use or workflow.



The Irish QS needs to collaborate with other designers and software vendors to develop a QS MVD to deliver the full benefits of what BIM can offer such as carbon & energy costing, cost data analytics.

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

CitA BIM GATHERING 2019



IFC Overview Presentation

IFC 4

Property Sets for Objects

The Property Sets for Objects concept template applies to this entity as shown in Table 436.

PredefinedType	PsetName	Properties
	Pset_AirTerminalBoxTypeCommon	15
	Pset_SoundGeneration	1
	Pset_ElectricalDeviceCommon	10
	Pset_EnvironmentalImpactIndicators	19
	Pset_EnvironmentalImpactValues	17
	Pset_Condition	3
	Pset_ManufacturerOccurrence	5
	Pset_ManufacturerTypeInformation	7
	Pset_ServiceLife	2
	Pset_Warranty	8

Table 436 — IfcAirTerminalBox Property Sets for Objects

87 total properties

may be exchanged without being already assigned to occurrences.

The occurrences of the *IfcAirTerminalBoxType* are represented by instances c or its subtypes.

IFC 2X3

Property Set Use Definition:

The property sets relating to this entity are defined by the *IfcPropertySet* anc *IfcRelDefinesByProperties* relationship. It is accessible by the inverse *IsDefine* The following property set definitions specific to this entity are part of this IF

- Pset_AirTerminalBoxTypeCommon: 15 mmon property set for all air ter

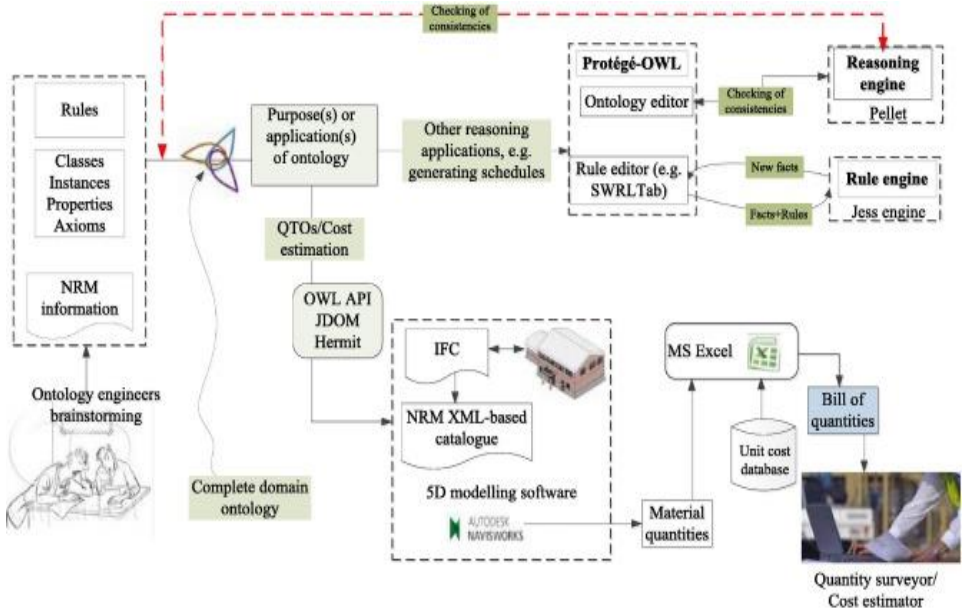
HISTORY: New entity in IFC Release 2x2.

EXPRESS specification:

15 total properties

```
ENTITY IfcAirTerminalBoxType
  SUBTYPE OF (IfcFlowControllerType);
    PredefinedType   : IfcAirTerminalBoxTypeEnum;
  WHERE
    WR1      : (PredefinedType <> IfcAirTerminalBoxTypeEnum.USERI
                ((PredefinedType = IfcAirTerminalBoxTypeEnum.USERI
               EXISTS(SELF\IfcElementType.ElementType));
END_ENTITY;
```

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement



ICMS mapped to RICS NRM

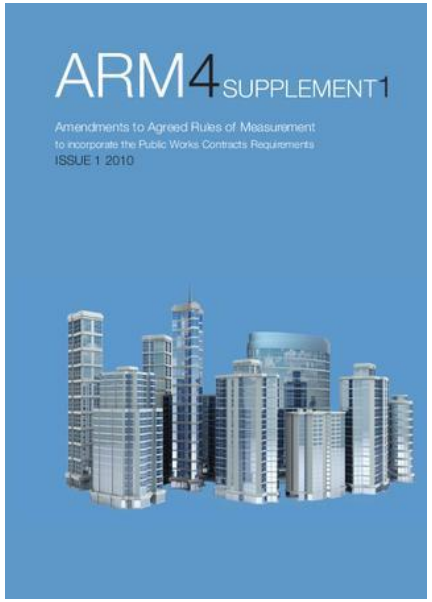
ICMS RICS

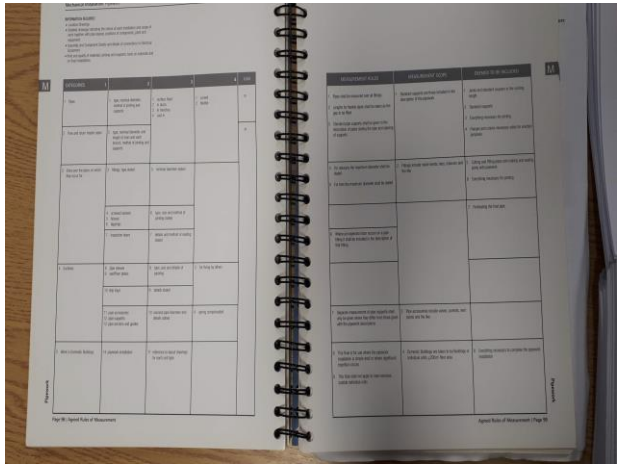
Unique ID	Cost Category (Level 1)	Cost Category (Level 2)	Cost Group (Level 3)	Cost Sub-Group (Level 4)	Cost Category (Level 1)	Cost Category (Level 2)	Cost Group (Level 3)	Cost Sub-Group (Level 4)	NRM	Group Element	Element	Sub-element
1.02.030	1	02	030	1	Capital Construction Costs	Substructure	Basement sides and bottom:	excavation and disposal	1.1.4	Substructure	Substructure	Basement excavation
1.02.030	1	02	030	2	Capital Construction Costs	Substructure	Basement sides and bottom:	lateral supports		#N/A	#N/A	#N/A
1.02.030	1	02	030	3	Capital Construction Costs	Substructure	Basement sides and bottom:	bottom slabs and blinding		#N/A	#N/A	#N/A
1.02.030	1	02	030	4	Capital Construction Costs	Substructure	Basement sides and bottom:	sides	1.1.5	Substructure	Substructure	Basement retaining walls
1.02.030	1	02	030	5	Capital Construction Costs	Substructure	Basement sides and bottom:	vertical waterproof tanking, drainage blanket, drains and skin		#N/A	#N/A	#N/A
1.02.030	1	02	030	6	Capital Construction Costs	Substructure	Basement sides and bottom:	horizontal waterproof tanking, drainage blanket, drains and		#N/A	#N/A	#N/A
1.02.030	1	02	030	7	Capital Construction Costs	Substructure	Basement sides and bottom:	insulation		#N/A	#N/A	#N/A
1.02.030	1	02	030	8	Capital Construction Costs	Substructure	Basement sides and bottom:	lift pits, sump pits, sleeves.		#N/A	#N/A	#N/A
1.03	1	03			Capital Construction Costs	Structure			2.1.1	Superstructure	Frame	Steel frames
1.03	1	03			Capital Construction Costs	Structure			2.1.2	Superstructure	Frame	Space frames/decks
1.03	1	03			Capital Construction Costs	Structure			2.1.3	Superstructure	Frame	Concrete casings to steel frames
1.03	1	03			Capital Construction Costs	Structure			2.1.4	Superstructure	Frame	Concrete frames
1.03	1	03			Capital Construction Costs	Structure			2.2.1	Superstructure	Upper Floor	Floors

A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

Collaborative problem solving

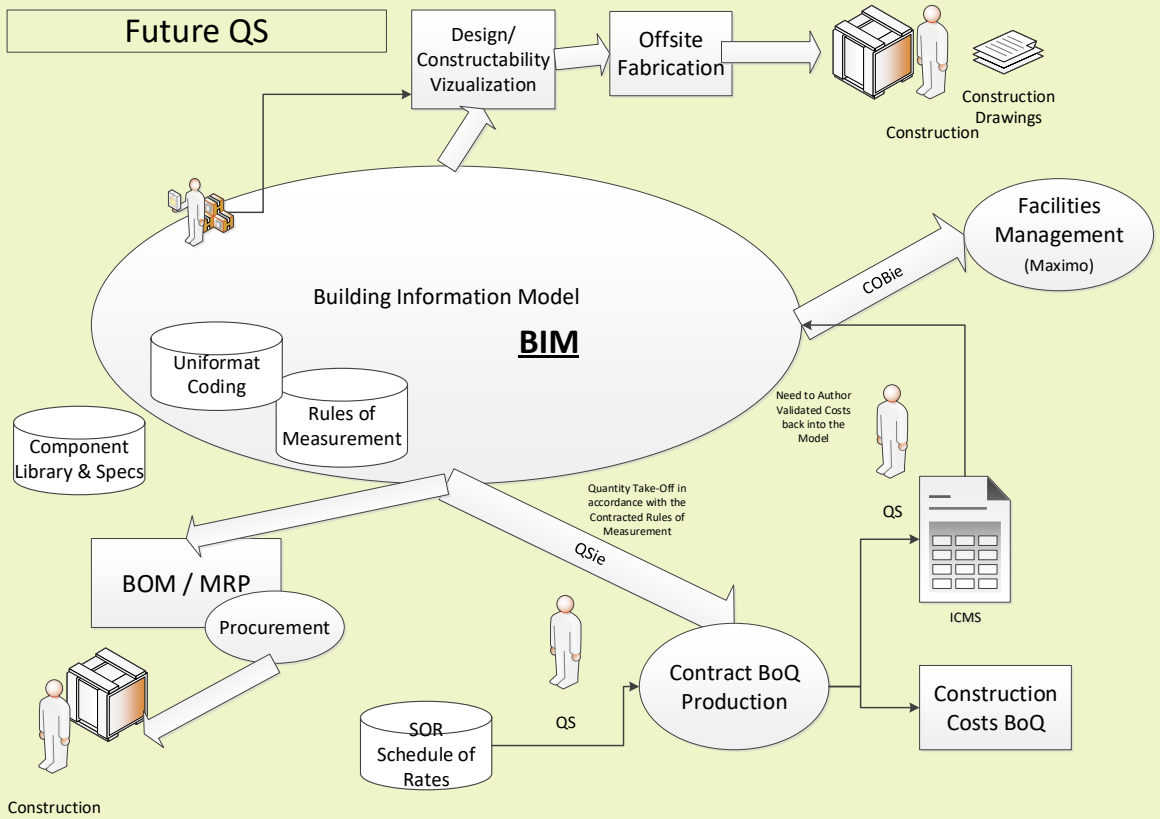
ARM4



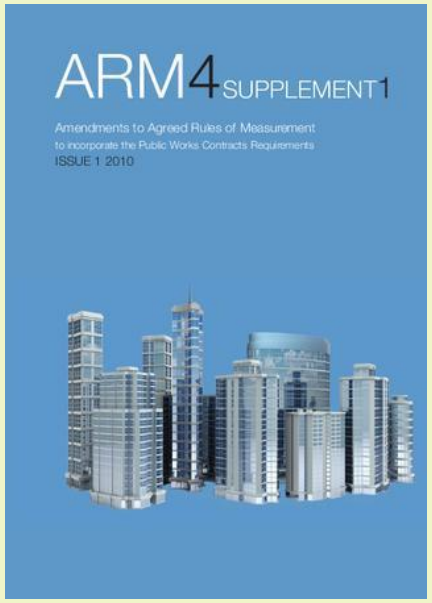


These rules were written for a different time! They have no clear coding and are often subjective requiring a great deal of experience to implement them. Fig 4 above shows a typical ARM4 page. In this case it shows Page 98 – Pipework.

CitA
BIM GATHERING 2019

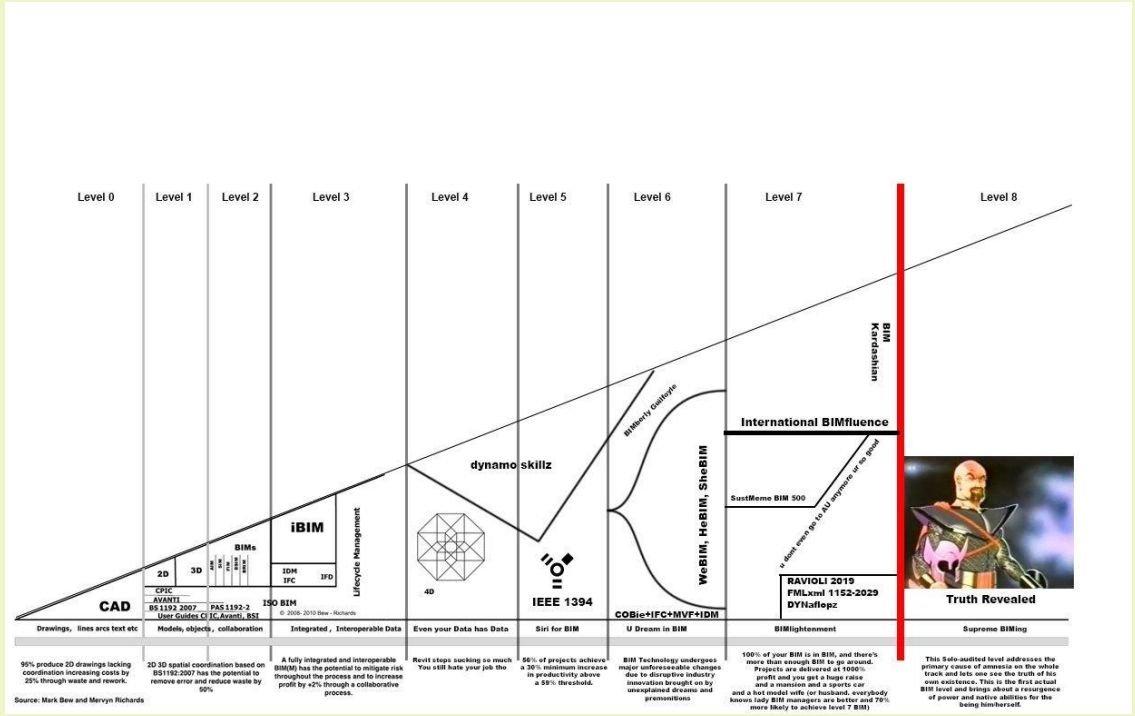


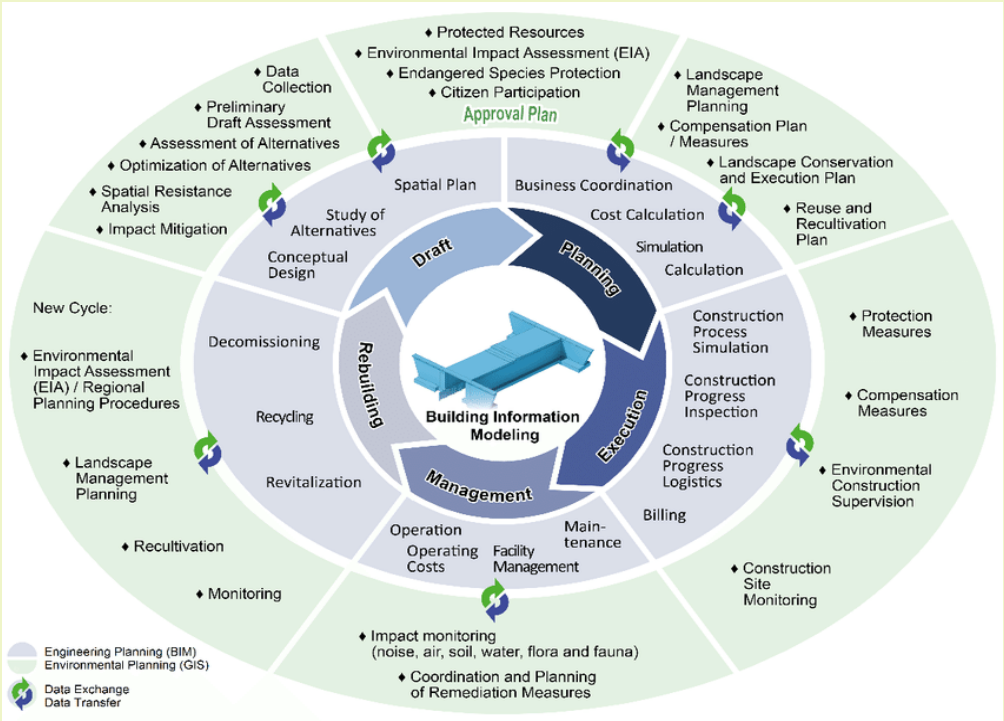
Future 5 to 10 years



A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

Future 5 to 10 years





A Critical Review of the Requirements of a Quantity Surveyors Model View Definition for 5D Collaborative BIM Engagement

CitA BIM GATHERING 2019

CARBON LIFE CYCLE COSTING - DATA STRUCTURE

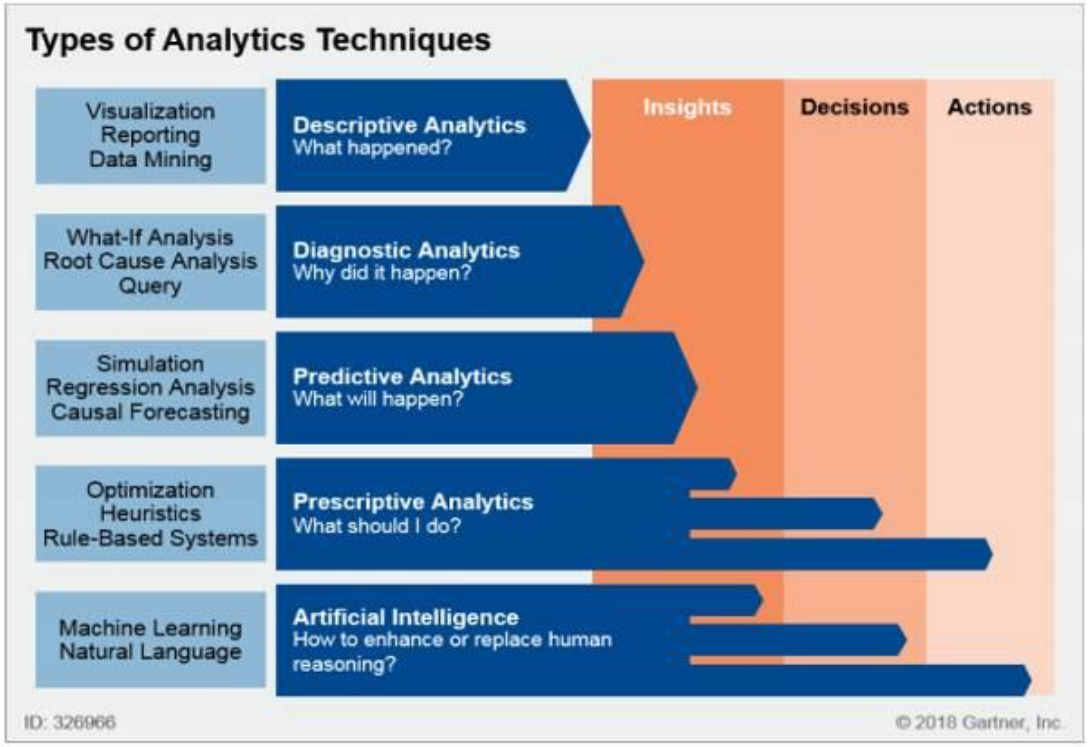
Embodied carbon as part of life cycle carbon emissions

Design	Materials or Product Manufacture	Distribution	Assembly on Site	In Use	Refurbish / Demolish
1-2% Emissions	15-30% Emissions	3-4% Emissions	5-6% Emissions	50-70% Emissions	2-4% Emissions

Embodied carbon
- Resource extraction
- Transportation
- Manufacturing and fabrication of a product (typically 'cradle-to-factory gate')
- Can include energy used during and end-of-life stages

Construction carbon
- Construction site machinery
- Site huts
- Transport

Operational carbon
- Carbon emission from energy consumed once the building is occupied



CitA
BIM GATHERING 2019

Thank you

Delivering **better outcomes**
for Irish Construction